Artificial Intelligence Tools in Tamil Language Teaching and Learning

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ABSTRACT

Artificial Intelligence (AI) has increasingly influenced language education by reshaping instructional practices, assessment methods, and learner engagement. In the context of Tamil language teaching and learning, the integration of AI remains an emerging yet underexplored area, particularly for a linguistically complex and comparatively low-resource language. This study reviews recent scholarly literature to examine the benefits and challenges associated with the use of AI tools in Tamil language education. A systematic literature review was conducted on studies published between 2021 and 2025 using major academic databases, following a structured screening and selection process. The findings indicate that AI tools contribute positively to personalized learning, learner engagement, writing development, accessibility, and assessment efficiency in Tamil language instruction. However, significant challenges persist, including limited availability of high-quality Tamil linguistic datasets, inadequate technological infrastructure, insufficient teacher preparedness, and ethical concerns related to bias, data privacy, and academic integrity. This review highlights the need for localized AI development, targeted professional training for educators, and coherent policy frameworks to support sustainable AI integration in Tamil language education. The study provides a consolidated understanding of current trends and identifies directions for future research and policy development.

Keywords: Artificial IntelligenceTamil Language Language Teaching and Learning Educational Technology Natural Language Processing Digital Education

INTRODUCTION

Artificial Intelligence (AI) is increasingly recognised as a significant driver of change in modern educational contexts, influencing the ways knowledge is presented, evaluated, and engaged with by learners [1], [45]. Within the domain of language education, the integration of AI-driven technologies including intelligent tutoring systems, natural language processing-based applications, and automated feedback mechanisms has facilitated instructional approaches that are more adaptive, interactive, and focused on learner needs [3], [32]. As a result, research interest in AI-supported language learning has expanded rapidly, particularly in studies involving globally dominant and widely used languages [37]. In contrast, the utilisation of AI for the teaching and learning of less-resourced languages remains fragmented, with existing research limited in scope and lacking comprehensive synthesis [46].

Tamil is one of the world's oldest classical languages and continues to be widely used across South and Southeast Asia and diaspora communities. Despite its rich literary heritage and active speaker population, Tamil presents considerable challenges for AI-driven educational applications due to its complex morphology, diglossic structure, script variability, and limited availability of large, annotated linguistic datasets [14], [16]. As a result, the development and implementation of AI tools for Tamil language education have progressed more slowly compared to high-resource languages, creating gaps in accessibility, instructional innovation, and empirical evidence [19].

In recent years, scholarly interest in the application of Artificial Intelligence (AI) within Tamil language teaching and learning has increased steadily. Prior research has explored various AI-driven tools and approaches, including automated writing assistance, machine translation systems, speech recognition technologies, AI-based content generation, and adaptive learning platforms [9], [15], [25]. Collectively, these studies indicate that AI can play a meaningful role in supporting personalised learning experiences, enhancing learner engagement, promoting inclusive educational practices, and improving overall instructional efficiency [10], [23]. Nevertheless, the literature also points to several recurring challenges that hinder the long-term and effective adoption of AI in Tamil language education. These include limited availability of language data resources, constraints in technological infrastructure, varying levels of teacher readiness, unresolved ethical issues, and a lack of coherent policy support, all of which complicate efforts to integrate AI in a sustainable and pedagogically sound manner [4], [8], [17].

Although individual empirical studies and conceptual discussions are increasing, the literature remains fragmented, with limited efforts to systematically consolidate findings across different contexts, methodologies, and AI applications [30]. Previous reviews often focus broadly on educational technology or artificial intelligence in language education without specific attention to Tamil, or they address Tamil computing from a technical perspective without considering pedagogical implications [20], [21]. Consequently, educators, researchers, and policymakers lack a comprehensive and structured understanding of how AI is currently being applied in Tamil language teaching and learning, as well as the benefits and constraints associated with its use [1].

To address this gap, this study synthesises recent scholarly literature on the use of AI tools in Tamil language teaching and learning through a systematic review of studies published between 2021 and 2025. The review aims to consolidate existing evidence on the educational benefits of AI applications, identify key challenges and limitations in their implementation, and highlight emerging research trends and policy-relevant issues [8], [30]. By providing an integrated overview of current developments, this study contributes to a clearer understanding of the role of AI in Tamil language education and offers directions for future research, professional practice, and educational policy.

LITERATURE REVIEW/RELATED WORK

The increasing adoption of Artificial Intelligence (AI) within educational settings has attracted considerable academic attention, particularly in research related to language instruction, learning analytics, and educational technology. Prior investigations have explored how AI can be utilised to enable personalised instructional approaches, streamline assessment practices, and foster higher levels of learner engagement across various educational contexts [1], [7], [38]. Within the field of language education, a wide range of AI-based tools including intelligent tutoring systems, automated writing feedback mechanisms, speech recognition technologies, and adaptive learning environments have been examined extensively, with numerous studies reporting improvements in learner achievement, motivation, and learning efficiency [3], [18], [32].

Research related to Tamil language education has traditionally emphasized language preservation, curriculum development, and technology-enhanced learning through multimedia and mobile-assisted platforms. In parallel, studies in Tamil computing have explored natural language processing techniques, machine translation systems, speech recognition models, and text digitisation tools, largely from technical or linguistic perspectives [20], [21]. While these studies have made important contributions to the computational processing of the Tamil language, they often provide limited discussion of pedagogical integration, classroom implementation, or learner outcomes within formal educational settings [9], [16].

More recent research has begun to bridge this gap by examining AI applications specifically designed to support Tamil language teaching and learning. These studies have investigated AI-assisted writing tools, generative language models, automated translation systems, speech-to-text applications, and adaptive learning environments [11], [13]. Findings from this emerging body of research suggest that AI can enhance writing proficiency, improve

accessibility for diverse learners, support inclusive education, and facilitate more efficient instructional practices [10], [23], [24]. At the same time, researchers have identified persistent challenges related to data scarcity, linguistic ambiguity, technological constraints, and the need for culturally and contextually appropriate AI solutions tailored to Tamil language use [22], [26].

Several review and conceptual studies have also addressed broader issues associated with AI integration in language education, including ethical considerations, teacher readiness, and policy development [35], [47], [12]. These works emphasize the importance of responsible AI use, targeted professional development for educators, and alignment between AI tools and existing curricular frameworks. Nevertheless, many of these reviews adopt a general language education perspective or focus on dominant global languages, offering limited discussion of the unique linguistic, cultural, and educational characteristics of Tamil language education [38].

Overall, the existing literature reflects growing recognition of AI's potential to support language teaching and learning, including emerging efforts within the Tamil language context. However, the research remains fragmented across technical, pedagogical, and policy-oriented domains, with limited systematic synthesis of empirical findings related specifically to Tamil language education. This fragmentation highlights the need for a focused and structured review that integrates evidence across studies, examines key trends and limitations, and provides a coherent foundation for future research, educational practice, and policy formulation [9], [30]. The present study addresses this need by systematically reviewing recent literature on AI applications in Tamil language teaching and learning published between 2021 and 2025.

METHOD

Overview of the Selected Studies

This study adopted a systematic literature review approach to examine the use of Artificial Intelligence (AI) tools in Tamil language teaching and learning [30], [38]. The systematic review method was selected to ensure a structured, transparent, and replicable process for identifying, evaluating, and synthesising relevant scholarly studies [30]. This approach enabled the consolidation of empirical and conceptual evidence related to the educational benefits, challenges, and emerging trends associated with AI integration in Tamil language education [1], [38].

Data sources and search strategy

A systematic literature search was carried out across four widely used academic databases, namely Google Scholar, Scopus, Emerald, and ScienceDirect. These sources were chosen because of their extensive coverage of scholarly work in the fields of education, educational technology, and language studies [30]. To ensure that the review reflected recent advancements and prevailing research directions in AI-assisted language education, the search was limited to studies published between 2021 and 2025 [32], [38].

Multiple search strings were applied to retrieve relevant studies, combining key terms related to artificial intelligence, Tamil language, language teaching, and educational technology [33]. Variations of keywords were used to ensure inclusivity and reduce the risk of omitting relevant literature [30]. Only full-text articles written in English, Tamil, or Malay were considered to ensure accurate interpretation and analysis. The search strings used to retrieve relevant studies across the selected databases are summarised in Table 1.

Table 1. Search Strings Used Across Databases

No.	Search Strings
1	Tamil Language AND Artificial Intelligence
2	Tamil Language Teaching AND Artificial Intelligence

3	Artificial Intelligence AND Natural Language Processing
4	Artificial Intelligence AND Technology in Education AND Tamil Language Teaching

Inclusion and Exclusion Criteria

To maintain the relevance and methodological rigour of the reviewed studies, clearly defined inclusion and exclusion criteria were employed throughout the selection process [30], [38]. Studies were considered eligible if they explicitly examined the use of Artificial Intelligence (AI) tools, models, or systems within Tamil language teaching, learning, or closely related educational contexts. The review included peer-reviewed journal articles, conference proceedings, and scholarly review papers that were available in full text, ensuring sufficient detail for analysis [30].

Studies were excluded if they were published outside the specified time frame, lacked relevance to AI or education, focused solely on technical development without educational implications, or were non-academic sources such as opinion articles, blogs, or incomplete reports [38]. This filtering process ensured that only methodologically sound and thematically relevant studies were retained for analysis [30], [32]. The inclusion and exclusion criteria applied during the study selection process are presented in Table 2.

Table 2. Inclusion and Exclusion Criteria Applied in the Study

No.	Criteria	Inclusion Criteria	Exclusion Criteria
1	Year of publication	Studies published between 2021 and 2025	Studies published before 2021
2	Language	English, Tamil, or Malay	Other languages
3	Article type	Peer-reviewed journal articles, conference papers, review studies	Blogs, opinion pieces, non-academic sources
4	Subject relevance	Focus on AI tools in Tamil language teaching and learning	AI studies not related to education or Tamil
5	Accessibility	Full-text available	Abstract-only or incomplete texts

Screening and Selection Process

The study selection process followed a structured, multi-phase screening procedure [30], [38]. Initially, all retrieved records were screened based on their titles and abstracts to assess relevance. Duplicate records were identified and removed at this stage. Subsequently, full-text screening was conducted to evaluate each study against the predefined inclusion and exclusion criteria.

Only studies that directly addressed AI integration in Tamil language teaching and learning, or closely related linguistic and educational applications, were retained. This systematic screening process resulted in a final set of 30 studies deemed suitable for detailed analysis [38]. The overall selection process was documented using a flowchart to ensure transparency and methodological clarity [30]. The screening and selection procedure of the reviewed studies is illustrated in Figure 1.

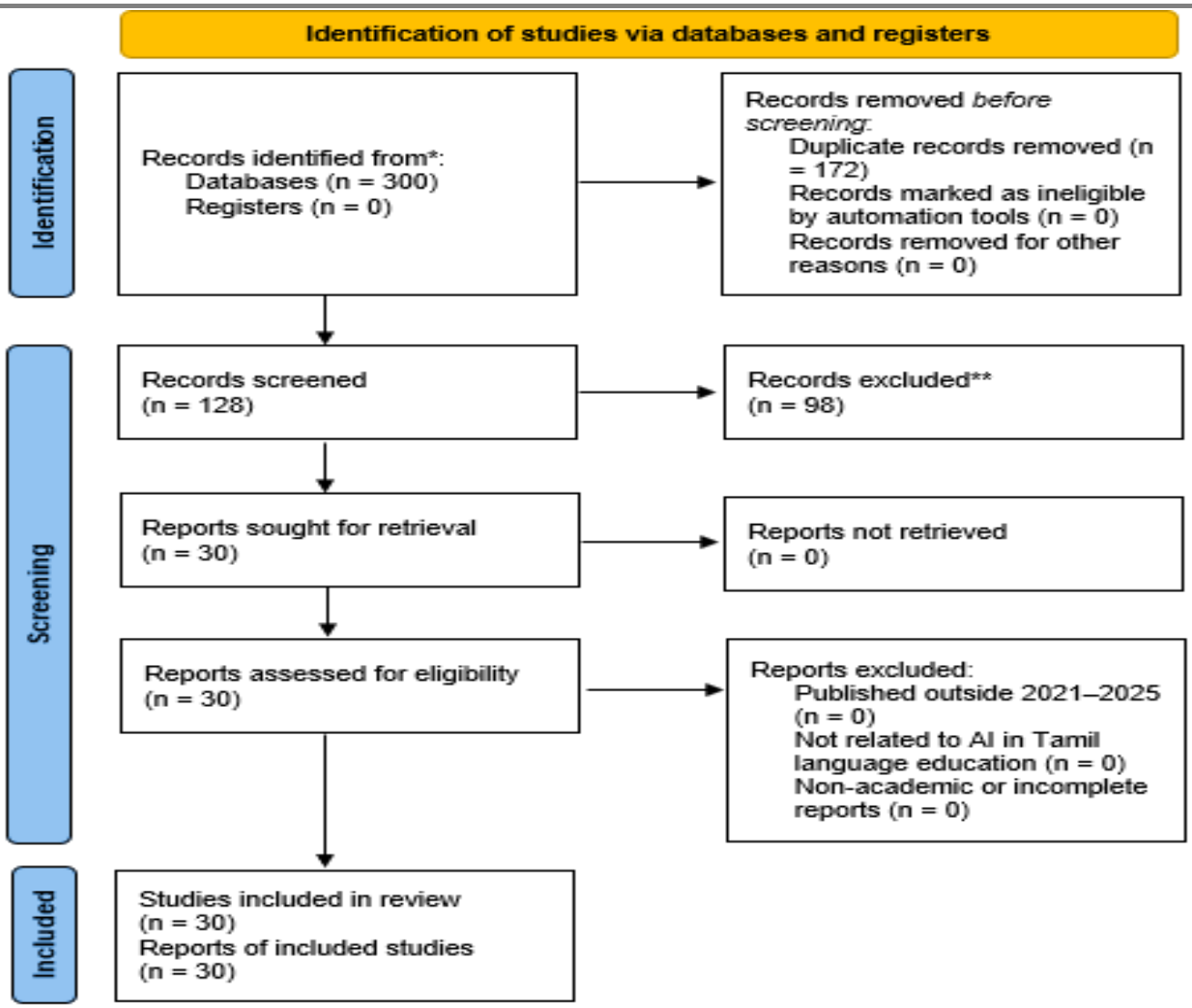

Figure 1. PRISMA flowchart illustrating the study selection and screening process

Data Extraction and Analysis

Data extraction was conducted systematically to capture key information from each selected study [30]. Extracted data included research design, educational context, participant characteristics, AI tools or techniques employed, and reported outcomes related to Tamil language teaching and learning. A content analysis approach was used to identify recurring patterns, themes, and relationships across the reviewed studies [30], [38].

The extracted data were synthesised thematically, allowing the categorisation of findings into key areas such as educational benefits, implementation challenges, pedagogical implications, and ethical considerations [8], [38]. This thematic synthesis facilitated a comprehensive understanding of how AI tools are currently utilised in Tamil language education and highlighted areas requiring further research and development [30].

RESULTS AND DISCUSSION

This section presents and discusses the findings of the systematic literature review based on the final set of 30 selected studies. The results are organised thematically in accordance with the objectives of the review, focusing on the benefits and challenges associated with the integration of Artificial Intelligence (AI) tools in Tamil language teaching and learning [1], [9], [18]. A summary of the characteristics of the reviewed studies, including research design, geographical context, research focus, and AI technologies employed, is presented in Table 3. Detailed information on individual studies and their key findings is provided in Table 4.

Overview of the Selected Studies

The reviewed studies reflect a diverse range of research designs, including qualitative, quantitative, mixed-methods, experimental, review-based, and conceptual approaches [2], [7]. These studies were conducted across various geographical contexts, with a strong concentration in India, alongside contributions from Malaysia, Sri Lanka, China, Australia, Europe, and other regions. The research primarily involved teachers, students, or the development and evaluation of AI-based language tools, indicating growing interdisciplinary interest in AI-supported Tamil language education [3], [18].

In terms of technological focus, the studies examined a wide spectrum of AI tools and techniques, including natural language processing, machine translation, speech recognition, generative language models, adaptive learning systems, and AI-assisted writing platforms. This diversity demonstrates that AI applications in Tamil language education are no longer limited to isolated technical experiments but increasingly address pedagogical, accessibility, and learner-centred concerns [9], [10]. An overview of the selected studies, including their research design, geographical context, focus areas, and AI tools employed, is provided in Table 3.

Table 3. Summary of Selected Studies by Research Design, Location, Focus Area, and AI Tools

Research Design	**Location**	**Research Focus**	**AI Tools / Techniques**
Qualitative	New Zealand, Sweden, China, Indonesia, Hong Kong	Students, teachers, perceptions	ChatGPT, NLP, AI writing tools
Quantitative	Germany, Kenya, Malaysia, India	Assessment, AI adoption	AI assessment tools, surveys
Mixed Methods	China, Philippines, Saudi Arabia	Adaptive learning, AI systems	ChatGPT, predictive AI
Experimental	India, Australia	Tool development, accessibility	Transformers, speech recognition
Review / SLR	India, Sri Lanka, Malaysia	Policy, ethics, Tamil AI	OCR, MT, NLP
Conceptual	India, multinational	Framework design	AI co-writing models

Detailed characteristics of each reviewed study, including methodology, AI technologies used, and key findings, are summarised in Table 4.

Table 4. Characteristics of Reviewed Studies and Key Findings

No.	**Study (Author, Year)**	**Location**	**Methodology**	**AI Tools / Techniques**	**Key Findings**
1	Liu et al. (2023)	New Zealand	Qualitative	ChatGPT, Bing Chat	Generative AI positively supported students' writing development and multimodal composing.
2	Paramasivam & Ramesh (2025)	India	Review	Digital platforms, MALL, AI tools	Identified instructional opportunities alongside

					persistent implementation barriers.
3	Jeba et al. (2024)	India	Experimental	NLP, summarization, speech synthesis	Improved accessibility and summarization of Tamil video content.
4	Yang (2024)	China	Mixed methods	ChatGPT	AI enhanced teaching efficiency and supported student skill development.
5	Balachandran (2025)	India	Experimental	LoRA, LLaMA, NLP	Developed an extended LLaMA model that improved Tamil text generation.
6	Sarveswaran (2023)	Sri Lanka	Review	NLP, AI technologies	Highlighted AI's impact on Tamil language computing and academic writing.
7	Fleckenstein et al. (2024)	Germany	Quantitative	ChatGPT	Teachers struggled to distinguish AI-generated texts from student writing.
8	Shibani et al. (2024)	Australia, India, USA	Prototype	GPT-2, speech recognition, AI co-writing	Developed a Tamil AI co-writer supporting inclusive and equitable writing practices.
9	Veerakannan & Vijayakumar (2025)	India	Review	OCR, NLP, text analytics	Demonstrated AI applications in Tamil literature and highlighted data limitations.
10	Ou et al. (2024)	Sweden	Qualitative	ChatGPT, Grammarly, Google Translate	AI tools supported academic writing practices in higher education.
11	Mustopa et al. (2024)	China, India, Indonesia	Qualitative	General AI platforms	Revealed variation in AI use shaped by national and institutional contexts.
12	Fundi et al. (2024)	Kenya	Quantitative	AI systems	Emphasised the importance of AI-focused professional development for teachers.
13	Veerakannan (2025)	India	Review	NLP, AI tools	Reported improvements in efficiency and accessibility of Tamil essay writing.

14	Krishnamurthy (2023)	India	Review	Parsing, machine translation	Traced advancements in Tamil computing and translation technologies.
15	Kohnke et al. (2023)	Hong Kong	Qualitative	ChatGPT	Highlighted the need for structured AI training for language instructors.
16	Subalalitha (2025)	India	Review	LLMs, translation, chatbots	Identified opportunities and ethical challenges of generative AI for Tamil.
17	Renganathan (2025)	India	Conceptual	LLMs, linguistic theory	Emphasised the role of linguists in improving AI language understanding.
18	Evangeline & Moorthy (2025)	India	Experimental	LSTM, GRU, BERT	Developed bilingual AAC prediction models for low-resource Tamil contexts.
19	Gokul (2025)	India	Experimental	Retrieval-augmented generation	Proposed Tamil-specific RAG models addressing grammatical and cultural nuances.
20	Punidha et al. (2025)	India	Experimental	Transformers, reinforcement learning	Introduced "Yazhi", improving Tamil text generation and translation accuracy.
21	Thamburaj et al. (2021)	India	Experimental	ANN, hybrid neural models	Improved speech recognition accuracy for Tamil language applications.
22	Mananay (2025)	Philippines	Mixed methods	Adaptive learning, AI simulations	Teachers viewed AI as effective in improving engagement and autonomy.
23	Dakakni & Safa (2023)	Saudi Arabia	Mixed methods	AI systems	Highlighted ethical and curricular implications of AI in language education.
24	Darwin et al. (2024)	Indonesia	Qualitative	ChatGPT	AI supported critical thinking with appropriate instructional guidance.
25	Gurunathan & Kaviya (2025)	India	Quantitative	General AI tools	Teacher attitudes and self-efficacy strongly influenced AI adoption.

26	Ting & Norman (2024)	Malaysia	Quantitative	General AI tools	Social influence affected teachers' readiness to adopt AI in teaching.
27	Abdul Jalil (2024)	Malaysia	Quantitative	ChatGPT, image and assessment AI	Teachers showed high interest but limited skills and technical support.
28	Owoc et al. (2021)	Poland	Qualitative	Adaptive tutoring, NLP assistants	Identified benefits and challenges of AI implementation in education.
29	Zainuddin et al. (2024)	Malaysia	Review	Ethical AI frameworks	Emphasised ethical governance and policy alignment in AI adoption.
30	Ramli et al. (2024)	Malaysia	Empirical	ChatGPT, Grammarly	Students used AI responsibly with metacognitive strategies.

Benefits of AI Tools in Tamil Language Teaching and Learning

The reviewed evidence demonstrates that the integration of Artificial Intelligence (AI) brings meaningful advantages to Tamil language teaching and learning, particularly in relation to learning personalisation, learner involvement, accessibility, and instructional effectiveness [1], [9], [18]. One of the most consistently highlighted strengths of AI lies in its capacity to tailor learning experiences by adjusting instructional content, feedback mechanisms, and learning pace according to individual learner profiles [3], [32], [39]. In particular, adaptive learning environments and AI-supported writing applications allow learners to obtain prompt and targeted feedback on aspects such as grammatical accuracy, vocabulary selection, and sentence construction, which in turn supports improvements in overall writing quality and language proficiency [15], [25], [34].

Enhanced learner engagement also emerges as a recurring theme across the analysed studies [10], [23]. Interactive language applications and generative AI tools are reported to promote active learner participation, creative language use, and collaborative learning processes [6], [37]. As a result, learners demonstrate higher levels of motivation, increased confidence, and a greater willingness to experiment with Tamil language production, especially in writing tasks and multimodal learning activities [10], [29]. When supported by appropriate instructional strategies, these technologies further contribute to the development of higher-order cognitive abilities, including critical thinking, reflective learning, and metacognitive awareness [6], [18].

In addition, AI-based technologies play an important role in strengthening accessibility and inclusivity within Tamil language education [11], [26]. Tools such as speech recognition, text-to-speech systems, and automated summarisation applications provide valuable support for learners with diverse learning needs, including individuals with limited literacy proficiency or specific learning difficulties [26]. Furthermore, AI-enabled translation and content generation tools help broaden access to Tamil language learning resources for non-native speakers and multilingual learners, thereby extending the reach of Tamil language education across varied educational settings and learner populations [14], [24].

From a pedagogical perspective, AI tools enhance instructional efficiency by automating routine tasks such as assessment, feedback provision, and content adaptation [7], [18], [42], [48]. This allows educators to allocate more time to higher-level instructional planning, learner support, and classroom interaction [35]. In addition,

AI-driven platforms support mobile-assisted and self-directed learning, enabling learners to engage with Tamil language content beyond traditional classroom settings [31], [43].

Beyond classroom instruction, several studies highlight the role of AI in supporting language preservation and cultural transmission [14], [16]. AI applications such as optical character recognition, digital archiving, and genre-based text analysis facilitate the digitisation and analysis of classical Tamil texts [16], [20]. These developments contribute to preserving linguistic heritage while making traditional literature more accessible to contemporary learners [14], [21].

Challenges and Limitations in Integrating AI for Tamil Language Education

Despite the documented benefits, the reviewed studies consistently report several challenges that constrain the effective integration of AI tools in Tamil language teaching and learning [8], [17]. A major limitation is the scarcity of high-quality, annotated Tamil language datasets required for training robust AI models [13], [16]. Tamil's morphological richness, diglossic usage, and dialectal variation further complicate natural language processing tasks, resulting in reduced accuracy and generalisability of AI-generated outputs [14], [24].

Teacher preparedness and AI literacy also emerge as critical challenges [7], [27], [50]. Although many educators express positive attitudes toward AI adoption, they often lack the technical knowledge, pedagogical training, and institutional support necessary to integrate AI tools effectively into their teaching practices [3], [35], [36]. The absence of structured professional development programmes limits teachers' confidence and ability to align AI tools with curriculum objectives and assessment practices [7], [49].

Technological and infrastructural constraints present additional barriers, particularly in resource-limited educational settings [17], [28]. Issues such as inconsistent internet connectivity, limited access to digital devices, and insufficient technical support hinder the sustained use of AI tools [41]. Furthermore, some AI systems struggle to accommodate classical Tamil, region-specific language varieties, and culturally nuanced expressions, reducing their effectiveness in diverse learning environments [14], [16].

Ethical and policy-related concerns are increasingly highlighted in the literature [4], [8], [44]. The use of generative AI tools raises issues related to academic integrity, data privacy, algorithmic bias, and overreliance on automated systems [2], [40]. Several studies note that educators face difficulties in distinguishing between AI-generated and learner-produced content, which complicates assessment practices [2], [45]. The lack of clear institutional guidelines and national policies further exacerbates these concerns, creating uncertainty around responsible AI use in education [8], [47].

Finally, to ethical considerations researchers have expressed concern about the pedagogical implications of excessive reliance on AI-supported tools in language learning [6], [46]. When used without deliberate instructional planning, AI-assisted learning environments may reduce opportunities for learners to develop autonomy, creativity, and deeper linguistic competence. Instead, such practices risk promoting superficial task completion rather than sustained language use, critical reflection, and meaningful cognitive engagement [18], [37].

Synthesis of Findings and Implications

Overall, the findings demonstrate that Artificial Intelligence (AI) holds considerable promise for advancing Tamil language teaching and learning, particularly through improvements in learning personalisation, accessibility, and instructional effectiveness [1], [9], [18]. At the same time, the evidence makes clear that meaningful adoption of AI technologies depends on resolving ongoing challenges related to the availability of language data, teacher expertise, technological infrastructure, and ethical oversight [7], [8], [47]. Rather than positioning AI as a substitute for teachers, the reviewed studies consistently emphasise its role as a supportive pedagogical tool that complements human instruction and professional judgement [4], [35].

The synthesis of the literature further highlights the importance of collaborative and coordinated action among key stakeholders, including educators, researchers, technology developers, and policymakers, to ensure the development of AI solutions that are sensitive to the linguistic and educational context of Tamil language learning [8], [17]. Strategic investment in areas such as dataset creation, professional development for teachers, the establishment of ethical guidelines, and alignment with curriculum requirements is crucial for enabling AI to contribute in a sustainable, responsible, and equitable manner to Tamil language education [14], [47], [49].

CONCLUSION

The rapid development of Artificial Intelligence (AI) has reshaped contemporary educational practices and introduced new possibilities for innovation in language teaching and learning, including in the area of Tamil language education. This systematic literature review examined 30 studies published between 2021 and 2025 to synthesise current evidence on the application of AI in Tamil language teaching and learning, with particular attention to reported benefits, limitations, and emerging research directions. The reviewed studies collectively indicate that AI-based tools can enhance learning personalisation, promote learner engagement, improve accessibility, support writing development, and increase instructional efficiency. Beyond classroom outcomes, AI technologies also contribute to wider educational objectives, such as fostering inclusive learning environments and supporting the digitisation and preservation of Tamil linguistic and literary resources.

At the same time, the review reveals a range of enduring challenges that continue to hinder the effective adoption of AI in Tamil language education. These challenges include the limited availability of high-quality annotated Tamil language datasets, the inherent linguistic complexity of Tamil, constraints in technological infrastructure, varying levels of teacher readiness, and unresolved ethical issues related to data privacy, academic integrity, and algorithmic bias. The persistence of these issues suggests that successful AI integration cannot be achieved through technological solutions alone, but requires thoughtful pedagogical planning, continuous professional development for educators, and sustained institutional support.

In conclusion, a balanced and context-aware approach is essential in integrating AI into Tamil language teaching and learning. Rather than replacing teachers, AI should be positioned as a complementary tool that enhances instructional practices. Future research should incorporate more empirical and classroom-based studies to evaluate the real-world effectiveness of AI tools in Tamil language learning across educational levels. Greater focus is needed on primary and secondary education contexts, as well as rural and resource-limited settings. Collaborative efforts among linguists, educators, and technologists are recommended to develop culturally and linguistically appropriate AI tools. Additionally, sustained teacher training, ethical guidelines, and policy support are essential to ensure responsible, inclusive, and pedagogically sound AI integration. Continuous research and adaptive strategies will be necessary to keep pace with the rapid evolution of AI technologies and to ensure their long-term relevance in Tamil language education.

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All authors have read and agreed to the published version of the manuscript.

Conflict Of Interest Statement

Authors state no conflict of interest.

Informed Consent

Informed consent was not applicable to this study as it did not involve human participants.

Ethical Approval

Ethical approval was not required for this study as it was based solely on a systematic review of published literature.

Data Availability

Data availability is not applicable to this study as no new data were created or analyzed.

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