

ChatGPT in Language Education: Insights from Learners and Teachers

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Abstract

Artificial Intelligence (AI) has become an integral part of our lives across various fields, including education. As a recent AI tool developed by OpenAI, ChatGPT emerges as a promising tool for interactive and personalized learning. Accordingly, this study aims to investigate the experiences of language learners and teachers in utilizing ChatGPT during the language learning and teaching process. A phenomenological design, a type of qualitative research approach, is adopted for this study. The participants comprise eight second year students from Faculty of Arts University of Jaffna and three English language teachers who teach with diverse levels of teaching experience. They are selected voluntarily through purposive sampling, and data are collected using interviews. The study's findings showed that both ChatGPT and AI are seen as valuable resources for language teaching and learning. Nevertheless, some challenges persist, including the neglect of learners' individual learning backgrounds, context-specific language errors, and crucial cultural and interlingual subtleties. It is anticipated that students and teachers will make greater use of ChatGPT and AI in the future, and efforts to strengthen teachers' technological and pedagogical content knowledge.

Keywords: *Integral, Personalized, Diverse, Content*

Literature Review

Fitria (2021) asserted that AI creates an environment which is comfortable for studying English. By tailoring the learning experience to the proficiency level of learners, career needs and interests, AI enables a personalized setting to practise their English skills while engaging multiple senses. AI technology facilitates to improve English language ability. But according to Woo & Choi (2021) most of these tools were used for machine learning and natural language processing. They helped to assess language skills, identify errors, and provide feedback. As a result, learners' language skills and knowledge improved when they provided accurate input to these AI applications. Therefore, teachers should guide students on how to input information effectively.

Farrokhnia et al. (2023) employed the SWOT analysis framework to discuss ChatGPT's strengths, weaknesses, opportunities and threats associated with using ChatGPT in education. Learners get immediate corrections, suggestions, or explanations, which supports self-directed learning and reduces waiting time for

teacher feedback. The limitations of ChatGPT include its inability to develop higher-order thinking skills and its lack of cultural awareness. ChatGPT can lead students to become overly reliant on it.

Application of Theory

According to Suhendi & Purwarno (2018), “the Constructivist Language Learning theory encourages the construction of knowledge rather than passively receiving it”. AI and ChatGPT facilitates this approach by giving dynamic learning experiences. It encourages meaningful conversations, immediate feedback and real-time interactions with the AI.

In contrast, the SAMR Model is not a learning theory but a practical framework for teachers to evaluate how deeply technology is integrated into tasks. It describes four levels — Substitution, Augmentation, Modification, and Redefinition—which illustrate a path from basic to transformative technology use. The SAMR Model helps educators redesign lessons so that learners can engage in more complex, creative, and collaborative work that often complement constructivist principles.

Method

A phenomenological design a qualitative research approach was employed for this investigation. In phenomenology, the researcher seeks to explore and understand individuals’ varied perceptions of a particular phenomenon, aiming to gain insights into participants’ lived experiences and to describe how they perceive and respond to it. This typically involves “collecting data through in-depth interviews and then identifying and describing the key aspects of each participant’s experiences in detail” (Fraenkel, 2012, p. 432). The participants of this study are eight language learners and three language teachers who have experience with ChatGPT in their learning and teaching practices.

Implications for Constructivist Language Learning Theory

Constructivist principles support ChatGPT's compliance to individual needs, real-time interactions, and personalized learning experiences. Statements that support this theory are:

- S1 and S3 illustrate how ChatGPT effectively personalizes language learning by adjusting to individual proficiency levels and delivering fast, clear responses.
- S4 highlights the advantage of anonymity, which allows shy learners to speak English more freely and without fear.
- S15 and S6 emphasize the strengths of ChatGPT in providing instant feedbacks and translations.

- S5 emphasizes the novelty of the experience- online conversations with native speakers.
- T1 recognizes ChatGPT's potential for supporting real-time conversations without hesitation.
- T2 and T3 emphasize the efficiency of ChatGPT in quickly generating teaching materials and activities.

When considered from a Constructivist perspective, the SAMR model provides a practical framework for designing technology-integrated learning experiences that align with constructivist ideals. According to participants,

T1 illustrates through ChatGPT students can construct the authentic materials and practice it.

T2 illustrates that instead of simply writing an essay in a word processor, students might use an online collaborative platform (like Google Docs) to co-write, peer-edit, and give each other real-time feedback (Modification and Redefinition)

S6 asserts learners can use ChatGPT to practice writing or speaking tasks and then reflect on the AI's suggestions, compare them with their original ideas, and refine their work.

According to T4 teachers can create technology-rich activities that help students to become independent learners.

Discussion

This study explored the experiences of English language learners and teachers of ChatGPT and AI in learning and teaching the English language having theories like SAMR model and Constructivist principles.

From the teachers' perspective, ChatGPT provided authentic materials and activities. Under the challenges, the questions are only generalized one not specific. Teachers pointed out that ChatGPT did not take into account the cultural and interlingual nuances and responses needed revision and editing. For students, ChatGPT does not always understand learners' specific learning histories, goals, or subtle language errors in context, which can limit personalised feedback quality. Some learners feel that using ChatGPT alone can reduce their motivation to interact with peers or participate in group activities. Learners sometimes find the responses too advanced or too simple — it may not always perfectly match their learning level without clear prompts. Students sometimes feel that ChatGPT's answers can be too general or lack the depth and context that a human teacher or peer could

provide. Many students say they miss the emotional support, encouragement, or cultural nuance that comes from interacting with real teachers or classmates.

Conclusion

This study concludes that ChatGPT and AI are regarded as valuable tools for language teaching and learning, highlighting their positive impact on educational practices. However, challenges remain, such as overlooking learners' individual learning histories, contextual language errors, and important cultural and interlingual nuances.

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Designing Adaptive AI Pedagogies for large ELT classrooms in Sri Lankan universities: Incorporating Google Translate and Google Assistant to enhance English Language Skills

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Abstract

English language teaching (ELT) classrooms in Sri Lankan universities predominately delivered in large classroom settings in which lecturers undergo problems and challenges in offering individualized feedback to students, maintaining constant student engagement and incorporating diversified learner needs and learner styles of the student population. Stereotypical teacher – centered English language classrooms has made the language acquisition uninteresting and less motivating to students which evidenced the English language proficiency of undergraduates as a burning problem irrespective of various attempts to overcome this challenge. This study articulates the employment of Google AI powered tools; the Google Assistant and Google Translate to improve the English language proficiency of Sri Lankan undergraduates. The research sample includes 80 students from two state universities: Sabaragamuwa university and University of Kelaniya. The researcher has interviewed 10 English language lecturers to conduct a balanced overview. A questionnaire was conducted to evaluate the usage frequency, expected effectiveness and challenges encountered. Major findings of the study depicted that 72% of participants' employ Google Translate on a daily basis to accompany translation requirements and vocabulary acquisition. On the other hand, 58% of participants revealed that Google Assistant can be positively involved with the practice of pronunciation and conversational English. Moreover, the questionnaire survey manifested the effective employment of both tools in listening comprehension and confidence building through the pragmatic employment of them. However, majority of undergraduates indicated that occasional mistranslations and the lack of contextual accuracy in certain occasions. Lecturers depicted that these tools encourage learner autonomy and increase student engagement yet emphasized the necessity for guided assistance for students.

Keywords: *AI tools, English, Google Translate, Google Assistant, Sri Lankan undergraduates*

Introduction

In Sri Lanka, English language is included to the national curricular from primary to the tertiary level education yet it has undergone many obstacles in the equal acquisition of the language proficiency by students. Ample amount of reasons has affected this crisis such as the limited exposure to the language in real life and pragmatic scenarios, cultural barriers, stereotypical teaching methods employed in the language instruction and the need for skilled and updated educators. This gap is further broaden with Generation Z (Gen Z) students as these individuals are much exposed to information literacy while the English language education follows traditional teacher-centered instruction that made the language acquisition less motivated for students. In recent years, the global emergence of artificial intelligence (AI) tools has introduced novice opportunities for learners and language educators to engage with real-time and pragmatic collaboration with the language specially outside the language classroom. The growing popularity of the incorporation of Google apps in the pragmatic instruction of English language teaching is owing to its flexible and versatile approaches which can be effectively incorporated for student engagement and interactive language classrooms. Moreover, these applications have simple platforms that give constant feedback and encourages participation of learners. In this regard, Google Translate and Google Assistant have become increasingly popular among students owing to the accessibility and easy and simple interfaces used.

Literature Review

As per Tai & Chen (2020), in order to achieve proficiency in English, an individual should acquire proficiency in speaking, writing, listening and reading. Moreover, limited exposure to the language outside the language classroom, insufficient knowledge regarding the content and traditional teaching methods had made the English language classroom boring and demotivating for undergraduates (Pokrivcakova, 2019). According to Shahzad et al., 2024, English language acquirers have the fear of judgement and peer pressure that made them reluctant to communicate in English. Teaching and learning English has become more convenient and interesting experience owing to these tools. Moreover, Sarah (2019) depicts that the incorporation of AI tools into the English language classroom has elevated the capacity of instructors and lecturers to manage the challenging classroom settings. This study emphasized perceptions of learners in the usage of Google Assistant for learning English language with the sample of Information Technology undergraduates. It is obvious that, limited research was conducted on the incorporation of Google AI assisted tools such as Google Translate and Google Assistant in improving the English Language competence of undergraduates. In Sri

Lankan higher education sector, the application of AI tools for language learning is still in progress and in the early stages of action.

Methodology

This study adopted a Mixed Method research design to obtain a comprehensive understanding of the use and impact of Google Translate and Google Assistant among undergraduates. The quantitative component involved distributing a structured questionnaire to 80 students majoring in IT and enrolled in various English language courses at Sabaragamuwa University and the University of Kelaniya. The questionnaire investigated the frequency of students' AI usage and tangible experiences of students regarding the effectiveness and challenges in utilising them to the language classroom. Moreover, Qualitative data collection was conducted by interviewing 10 English lecturers from selected universities. These interviews explored views of lecturers on integrating AI tools into teaching practices and observations regarding the engagement of students with technological tools. The collected data were analysed and interpreted using descriptive statistics for quantitative responses and thematic analysis for qualitative responses.

Results and Discussion

a) Frequency of usage during the language classroom

The results revealed that 72% of all participants to the questionnaire survey revealed the use of Google Translate for instant translation needs. On the other hand, 60% of respondents manifested the usage of Google Assistant for voice assisted tasks alike voice commands to make an action quick and effective. This indicated that students employ these tools yet majority of them are less exposed to the effective employment to enhance English language proficiency and communicative competence. According to the survey catered on the effective employment of Google Assistant and Google Translate to improve English language proficiency, there is a gradual inclination of using Google Translate than Google Assistant. 80% of students have responded on the daily usage of Google Translate for translation of the meaning to the mother tongue of the student. 80% of students from University of Kelaniya and 75 % of undergraduates from Sabaragamuwa university has employed Google Translate. It is significant to highlight that 5% of undergraduates belonging to both universities highlighted regarding the lack of knowledge regarding the effective usage of Google Translate for improving English proficiency which explained the necessity to derive proper mechanisms and procedures undergraduates regarding specific ways of using selected applications for English language proficiency.

b) Effectiveness of selected AI tools

This section investigates how students perceived the effectiveness of Google Translate and Google Assistant in English language learning. The questionnaire evaluated four key areas: vocabulary acquisition, Pronunciation practice, listening comprehension and enhancing confidence. Majority of students suggested the efficacy of Google Translate in vocabulary acquisition while Google Assistant has a greater influence on practicing pronunciation than vocabulary acquisition. It is significant to indicate the successful employment of Google Translate for listening comprehension with a percentage of 43%. Undergraduates manifested the use of microphone or the voice feature of the application in this regard. Both applications successfully impacted on enhancing confidence of students in communicating and employing the language on pragmatic settings owing to the exposure driven by these applications.

c) Perspectives of lecturers

Semi structured interviews were conducted with 10 English language lecturers belonging to both universities. This sample agreed the ability of Google tools to foster learner autonomy and promote active learning experiences with the capability to boost confidence among students in the pragmatic usage of English language in real word situations. The entire sample manifested the necessity to have guided and supervised intervention towards the students' utilization of Google tools in the language classroom. At the University of Kelaniya, lecturers encourage Google Translate as a warm-up tool while promoting cross-checking with dictionaries or peers, and use Google Assistant for pronunciation practice to boost speaking confidence. At Sabaragamuwa University, lecturers highlighted that such tools enhance learner autonomy and classroom teaching but warn against over-reliance, emphasizing the need to guide students in critically evaluating AI-generated outputs.

Conclusion

In conclusion, Google Translate and Google Assistant have articulated positive results as valuable supplementary tools in enhancing English language proficiency of undergraduates in Sri Lanka. The effectiveness of these tools is evident in scopes such as vocabulary acquisition, pronunciation practice, listening comprehension and learner motivation. However, several concerns related to mistranslations, lack of contextual relevance and the scarcity of required infrastructure have functioned as drawbacks in this integration.

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Performance vs. Authenticity: Reflections on AI Use in Undergraduate Literature Classrooms in Sri Lanka

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Introduction to the Study

The rapid integration of Artificial Intelligence (AI) technologies into higher education globally has created both exciting opportunities and complex challenges for teaching and learning practices. In Sri Lanka, where I teach English Language and Literature at the tertiary level, this transformation is keenly felt. Large Language Models (LLMs) such as ChatGPT, alongside AI-powered reading and listening applications, have become widely accessible to students. While these tools enable learners to produce highly polished take-home assignments and creative presentations, a concerning discrepancy has emerged: students' performances in supervised in-class tests and final examinations often do not reflect the potential demonstrated in AI-assisted work.

This observation prompted the present study to investigate the implications of AI usage on academic authenticity and student learning outcomes within literature education. The research explores how AI tools influence students' engagement with texts, critical thinking skills, and originality, and addresses the tension between leveraging AI's pedagogical benefits and maintaining academic integrity. It further considers how educators might adapt assessment strategies and pedagogical approaches to foster independent thinking while harnessing AI's potential.

AI's growing influence in Sri Lankan higher education is compounded by uneven institutional readiness. While students often access AI tools independently—via mobile devices and open-access platforms—there is limited guidance from universities on responsible usage. Institutional policies are still evolving, and many educators, including myself, find ourselves navigating this unfamiliar terrain without established frameworks. This lack of formal integration creates ambiguity for both teachers and learners.

The study is situated within a growing international discourse on AI's role in education. Scholars such as Kaplan (2020) highlight AI's capacity to revolutionize teaching and learning, yet caution against overreliance that may undermine authentic educational experiences. Meanwhile, Mainzer (2019) emphasizes the ethical dimensions of AI adoption, advocating for frameworks that ensure responsible and reflective use. Such perspectives resonate with the Sri Lankan context, where infrastructure, AI literacy, and cultural factors uniquely shape educational practices.

Methods and Methodology

This study employs a qualitative reflective practitioner methodology grounded in direct classroom experience and empirical data collected during the 2024/25 academic years. The approach allowed for introspective analysis of teaching practices, triangulated with data collected from students to understand how AI usage shaped their academic performance and learning processes. Data were analyzed thematically using interviews with students, their written work, and discussions with teachers to identify recurring patterns in AI usage and perceptions. Triangulation of multiple sources (classroom observations, student/teacher feedback, and comparative performance data) enhanced validity.

Data sources include:

- Observations of student work across multiple assessment formats: take-home essays, oral presentations, in-class writing tasks, and final examinations.
- Informal interviews and focus group discussions with undergraduate literature students (N=30), aimed at understanding their use of AI tools, perceptions of AI's benefits and limitations, and attitudes toward academic integrity.
- Comparative analysis of assignment quality and test scores to identify performance discrepancies attributable to AI usage.

Participants were selected purposively from intermediate and advanced levels, ensuring diversity in English proficiency, digital access, and prior exposure to AI technologies. Ethical considerations were followed throughout the study. Verbal consent was obtained from students, and participants were assured that responses would remain anonymous. The reflective practitioner lens enabled iterative reevaluation of teaching strategies and student engagement in real-time.

Additionally, a literature review of current research on AI in higher education provided theoretical grounding. This review incorporated global and regional scholarship addressing AI ethics, pedagogical innovation, and student engagement, ensuring the study's findings are contextualized within broader academic debates.

Research Findings and Discussion

The study uncovered a pronounced dichotomy between students' AI-enhanced output in take-home tasks and their unaided performance in supervised assessments. AI tools—especially ChatGPT and digital media applications—enabled students to craft well-structured, articulate essays and dynamic presentations, often incorporating interdisciplinary references and creative multimedia elements. For example, several students used AI-generated summaries and text suggestions to deepen their literary analyses and improve fluency. Some leveraged speech-to-text functions and grammar support tools to polish oral presentations.

Moreover, AI-supported reading and listening platforms expanded students' access to diverse texts and enhanced comprehension, particularly benefiting those

with varying learning needs. These technological affordances aligned with findings by Luckin et al. (2016), who emphasize AI's potential to personalize learning and foster engagement.

Students expressed appreciation for these tools. One student commented, "ChatGPT helps me write better, but I don't really understand what I'm saying until I'm in an exam—and then I panic." Another said, "It feels like cheating sometimes, but it's also the only way I can catch up when I'm behind." Such responses underscore both the accessibility benefits and the ethical grey zones students navigate.

However, the positive effects observed in take-home work did not translate to in-class tests or exams, where students demonstrated difficulties in producing original critical interpretations under time constraints. This gap suggests a reliance on AI during unsupervised assignments, raising concerns about the erosion of key cognitive skills essential for literature studies, such as close reading, independent argumentation, and creative thinking.

These observations corroborate Kaplan's (2020) caution regarding AI's disruptive potential: while AI tools can enhance learning, overdependence risks diminishing authentic student effort and intellectual development. Mainzer (2019) further stresses the importance of embedding ethical considerations into AI deployment, underscoring the educator's role in cultivating responsible usage habits.

Additionally, Selwyn's (2019) critique of technology's role in education resonates here, warning against unchecked adoption that may marginalize human judgment and teacher-student interaction. The findings also echo VanLehn's (2011) analysis of tutoring systems, highlighting that AI cannot yet fully replicate the nuanced feedback and adaptive scaffolding provided by human educators.

An intriguing dimension of the study involved students' perceptions of AI ethics and integrity. While most acknowledged the usefulness of AI tools, many expressed uncertainty about acceptable boundaries and feared inadvertent plagiarism. This points to an urgent need for AI literacy programs that educate students on ethical AI use, paraphrasing, citation norms, and academic honesty.

Schuller et al. (2021) suggest that affective computing and adaptive AI systems could be harnessed to engage students more deeply, promoting metacognition rather than superficial task completion. Such technological advancements could potentially mitigate some of the authenticity challenges identified.

Based on these findings, the study argues for a pedagogical recalibration. Educators should design assessments that prioritize critical thinking and originality, such as reflective journals, oral defenses, and collaborative projects that incorporate AI responsibly. Assignments could include "AI reflection logs," where students document how they used AI tools, what insights were gained, and where challenges arose. These reflective practices enhance metacognitive awareness and promote accountability.

Furthermore, institutional policies must evolve to provide clear guidelines and support structures addressing AI use, equitable access, and the development of digital literacies. Universities could embed AI literacy into academic skills courses or orientation modules, ensuring both students and staff understand the boundaries of responsible use. Dedicated AI advisors or learning technologists could support this transition.

Finally, the research highlights the broader contextual challenges faced by Sri Lankan higher education institutions, including infrastructural constraints, limited staff training, and varying levels of digital readiness, which must be factored into AI integration strategies. Williamson and Piattoeva's (2022) work on datafication and AI governance offers useful frameworks for designing context-sensitive, equitable policies.

Conclusion

This study highlights the urgent need for thoughtful, ethically grounded AI integration within literature classrooms. While tools like ChatGPT offer expanded access and creative possibilities, they also risk distorting students' learning trajectories if not complemented by pedagogy that fosters independence and deep thinking. As AI continues to evolve, educators must remain reflective and adaptable, balancing innovation with the core values of education: authenticity, intellectual growth, and integrity.

Future research could explore longitudinal impacts of AI on student writing development, comparative studies across disciplines, or collaborative policy development involving teachers, students, and administrators.

Keywords: *Higher education, English literature teaching, student assessment, ChatGPT, academic integrity, reflective practice, creativity*

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Reassessing the Take-Home: Designing AI-Resilient Assessment Criteria in Undergraduate Literature Programs

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Introduction

Take-home assignments have long been used as a central method of assessing students' achievement of learning outcomes. However, the development of new Generative AI tools like ChatGPT have posed new challenges to the traditional assessment design (Gruenhagen et al., 2024). In the context of literature, the traditional evaluation criteria were focused on assessing students' critical thinking, interpreting skills, written expression and language competencies. However, the prevalent use of AI tools like ChatGPT in academic writing has necessitated re-examining the assessment criteria for take home assignments specially in relation to literature based assessments, which predominantly rely on written outputs (Namatovu and Kyambade, 2025). In fact ChatGPT and other similar AI tools have the ability to produce written responses to a wide range of prompts provided based on an assigned task which seemingly maintains coherence, grammaticality, factuality and richness in content even risking the validity of take-home assignments.

While AI-driven tools are transforming traditional educational practices, offering innovative solutions for both teaching and learning (Natsiopoulou, 2025), their unguided usage in composing assignments subverts the academic integrity and risks the expected objectives of take home assignments particularly in the field of literature. This study addresses such evolving concerns by examining how take home assignments can be restructured to resist the misuse of AI tools like ChatGPT.

The objectives of the study were:

1. To examine faculty perceptions of the limitations of the current take-home assignment criteria in light of AI tools like ChatGPT.
2. To identify the key factors of inadequacy that make literature assignments vulnerable to AI tools like ChatGPT.
3. To propose revised assessment criteria and strategies in designing take home assignments to withstand the misuse of AI tools like ChatGPT.

which were set to be achieved guided by the research questions:

1. What are the faculty perceptions towards the limitation of current take-home assignment criteria in the context of Generative AI tools like ChatGPT in use?
2. What specific aspects of the existing take-home assignments make them vulnerable to misuse of AI tool like ChatGPT?

3. What assignment strategies can be developed to promote academic integrity discouraging academic misuse.

Methodology

The study was conducted at a leading non-state Higher Education Institution in Sri Lanka involving participants from the Department of English. The study used a mixed method exploratory study design to investigate the limitations of current take home assignment practices and to propose AI resilient alternatives in the assessment of literature modules. The study involves qualitative methods such as semi-structured interview and document analysis supplemented by a pre/post intervention design which was implemented to evaluate the effectiveness of revised AI-resilient criteria, comparing student performance data from traditional and redesigned assignments, which enabled the triangulation of findings across the aforementioned.

Participants and sampling

A purposive sampling method was used to recruit academic staff members who teach literature courses in the undergraduate programme for the semi-structured interview, based on their experience in designing and assessing take-home assignments and their awareness of AI tools like ChatGPT.

Additionally, anonymous student performance data were gathered from 32 second-year undergraduates enrolled in the BA in English programme, representing both the pre-intervention (traditional criteria) and post-intervention (revised AI resilient criteria) phases with necessary approval of the institution to ensure alignment between qualitative data and quantitative data.

Ethical approval was secured from the faculty and all participants were informed and their written consent was taken. All the grades were gathered from anonymously and confidentiality was highly secured.

Data Collection Methods

➤ Interviews

A semi structured interview was conducted with six lecturers who teach in literature modules in the BA in English undergraduate programme to explore their perceptions of the impact of Generative AI tools like ChatGPT on take-home assignments, what limitations they perceive in the current take home assignment practices and criteria. The interviews were audio recorded, transcribed and thematically analysed.

➤ Document Analysis

Assessment policy documents, rubrics, instructions and student submissions were gathered to analyse to which extent they might have been susceptible to misuse of AI tools like ChatGPT.

➤ Comparative Performance Analysis

Students marks obtained for two take home assignments were compared with the grades obtained for the end examination to examine the discrepancies which suggested misalignments between the demonstrated learning in the end examination and take home assignments. Particular attention was paid to high performance in take home assignments that were not matched to performance in exam setting.

➤ **Pre/ post intervention performance analysis**

A pre/ post intervention performance analysis was conducted to assess the effectiveness of revised AI- resilient assessment strategies. In the pre-intervention phase, student's grades and submissions from traditional take home assessments were collected. During the intervention, redesigned criteria were implemented featuring: personalised or effective prompts, text-specific, unpredictable questions. In the post-intervention phase, student performance under the new criteria was compared to earlier data, also considering the discrepancies between take-home and exam grades as potential indicators of AI reliance.

Data Analysis

Qualitative data gathered from the semi-structured interviews and documents were analysed using thematic analysis (Braun and Clarke, 2006) in order to identify regular practices and concerns related to the misuse of AI tools like ChatGpt to compose literature related take-home assignments.

Quantitative data of the students' grade comparisons were analysed through descriptive statistics and performance differential analysis to identify the common trends and anomalies. AI-detection results from Turnitin's tool were integrated with grade comparisons and thematic analyses to provide a multi-dimensional assessment of AI misuse and the effectiveness of the revised criteria.

Where applicable, cross referencing was conducted between the themes identified in the analysis of interview data and the patterns exhibited in the grade discrepancies at comparative performance analysis.

Findings

1. Faculty awareness of AI risks and limitations of current take-home assignment practices

All faculty participants acknowledged the increasing presence of Generative AI like ChatGPT in students' answers. Five out of the six participants highlighted that the existing marking criteria focusing on language and vocabulary, organization and content are inadequate to assess the students authentic writing contrasted from AI generated writing. The teachers tend to reduce marks in cases where they sense that the writing is not authentic, sometimes deviating from the rubric.

2. Vulnerabilities in designing the take home assignments

Document analysis including current take home assignment prompts and rubrics revealed that the assignments were generic and requiring a single text analysis without referencing any class discussion, authentic experiences or process documenting. Focus on reflective or process based elements is limited and the rubrics heavily focused on the traditional criteria like content, organization and language.

3. Performance discrepancies between take-home assignments and exams.

The comparison between the grades showed that 43% of the students scored above 16/20 on take home assignments which contrasts with the underperformance at the exam to score below 30% in the end examination. Despite the complexity of the exam compared to one take home assignment, the high discrepancies between the grades raised still valid concerns regarding the authenticity of the take home submissions.

4. Effectiveness of AI-Resilient Criteria

Following the introduction of revised assessment criteria, take-home assignments demonstrated greater originality and variation in responses. Analysis using AI-detection tools indicated a reduction in AI-generated content, suggesting that the new criteria effectively promoted authentic student work and reduced reliance on generative AI.

Discussion

The results highlight that traditional take-home assessments in literature studies do not fully align with the intended learning outcomes in the context of AI tools like ChatGPT. The reliance on written products with generic prompts and unsupervised submission environments have posed the take home assignments highly susceptible to misuse of AI tools in writing answers. The grade discrepancies between take-home assignments and examinations provide concrete evidence of potential AI influence or at least a lack of continuity in demonstrated learning. Faculty responses and document analysis indicate that current assessment practices and rubrics lack sufficient controls or contextualisation to discourage misuse. The move toward in-class assessments reflects a pragmatic response by faculty to regain control over the evaluation process. While this shift addresses academic integrity concerns, it also limits the potential for reflective, research-oriented, and process-based learning that take-home assignments traditionally offered.

Conclusion

The study revealed critical challenges to assessment validity in literature contexts in the presence of generative AI. Faculty concerns, analysis of assignments and rubrics and discrepancies in student performance spotlight an increasing

misalignment between the existing take home assignment practices and the realities of AI aided writing.

Teachers having transitioned towards in-class assessments in response to the challenges signals a dilution of pedagogical depth. In response to the challenges, long term solutions may include:

- Contextualized prompts relevant to the classroom discourse
- Oral components or follow-ups to written tasks
- Reflective and process-based assessment
- Revision of criteria and rubric to discourage misuse of AI tools
- Institutional guidelines for ethical use of AI use

Redesigning the take-home is necessary to stand resilient against misuse of AI in literature-based assessment, not in an attempt to eliminate technology but rather to reinforce integrity, authenticity and deep engagement in learning.

Keywords: *Academic integrity, Assessment criteria, ChatGPT, Generative AI, Higher education, Literature education, Process-based assessment, Take-home assignment*

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Digital Secrets: Understanding Facebook Users' Privacy Choices in Sri Lanka

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Introduction

The growth in the number of social media networks has essentially changed the patterns of communication and exchange of information online in the world. The 2.9 billion monthly active users of Facebook across the world have marked the social network as an indispensable component of social life (Meta, 2023). Nevertheless, such popular usage has brought a big question of data privacy and protection of users, especially in the wake of the Cambridge Analytica scandal in 2018, where the stolen data of 87 million Facebook users was highlighted (Isaak and Hanna, 2018).

In spite of complex regulatory systems such as the General Data Protection Regulation (GDPR) adopted in the European Union, huge gaps still exist in the education of users about privacy protection mechanisms and their use. Such phenomenon as the so-called privacy paradox has been previously pointed out where users demonstrate the high degree of privacy concern, but do not express adequate protective (Acquisti and Gross, 2006; Barth and de Jong, 2017).

Most studies have been done in the west though there is little empirical evidence on privacy management behaviors in the non-western societies, especially in developing nations such as Sri Lanka. The proposed research focuses on this gap by determining the role played by trust on Facebook data privacy practices and Awareness of privacy policy in determining user privacy management behavior among Facebook users in Sri Lanka. The purpose of the study is to investigate the direct links between these psychological variables with real privacy protection behavior, and this will contribute to the privacy decision-making in varied cultural backgrounds.

Methodology

In this study, a quantitative research strategy was applied with the help of a cross-sectional survey design. The study was done on active users of Facebook in one of the regions of Sri Lanka known as Vavuniya District because of its diversity in demographic factors due to which there was a high use of Facebook. A convenient

sample technique was adopted as no publicly lucent databases of users were available and the research topic of interest was sensitive in privacy aspects.

There was an online questionnaire that elicited the data over a span of two weeks in time via the social media platform and community network. The instrument was a survey framework containing validated measures, which are measurement scales that were adjusted based on the past literature and were used to span three critical constructs; the measures included Trust in Facebook Data Privacy Practices (6 items), Awareness of Privacy Policies (6 items) and Privacy Management Behavior (7 items). Each of the items was assessed on a 5-point Likert type scale (1-Strongly disagree to 5Strongly agree).

The first data gathering has resulted in 259 answers with 38 of them being discarded because they did not qualify based on the inclusion criteria of being an active Facebook user. After screening the data and removal of incomplete cases and unengaged answers 221 responses were obtained to be analyzed. Both the descriptive statistics performed in the data analysis using SPSS version 26 and the Partial Least Squares Structural Equation Modeling (PLS-SEM) used in SPSS version 4.1.1.2 to determine the measurement model reliability and validity and to evaluate the proposed relationships were performed.

Results and Discussion

The demographic analysis showed that the sample was balanced as 52.9 percent and 47.1 percent of the respondents were Male and Female respectively. Most of these people were between 18 and 25 years of age (57%) and 60.6 % of the sample had degree level education, which makes the sample largely educated. The majority (72.8%) of the respondents used Facebook at least once or more frequently a day, and this meant that levels of engagement could be analyzed quantitatively.

Overall, indicative analysis of the major constructs was found to be moderate in all variables. Privacy Management Behavior had the highest mean scale ($M = 3.46$, $SD = 0.82$) and the lowest mean was Trust in Facebook privacy Practices ($M = 2.92$, $SD = 0.81$), which included overall distrust of the data handling practices of Facebook.

The reliability and validity were demonstrated in the measurement model with superior scores. Internal consistency reliability was above the minor required levels (Cronbach 0.87, Composite Reliability 0.90) and convergent validity (Average Variance Extracted 0.61). Discriminant validity has been determined with the help of the analysis of cross loadings and the Fornell-Larcker criterion.

Table 1. Hypothesis Testing Results

Hypothesis	Path	β	T-Statistic	P-Value	Outcome
H1	Trust → Privacy Management Behavior	0.068	0.903	0.367	Not Supported
H2	Awareness → Privacy Management Behavior	0.581	8.264	0.000	Supported

Through the structural model analysis, the analysis indicated that one of the two hypothesized relationships held statistical significance. The strong positive correlation with Privacy Management Behavior was evident in Awareness of Privacy Policies and Settings (0.581, $p < 0.001$) and proved H2. The corresponding discovery is consistent with the Communication Privacy Management Theory and prior research by other scholars who surveyed empirically and found that users discover protective privacy behaviors when notified (Park, 2013; Trepte et al., 2015).

Different to the anticipations, as well as past literature (Paramarta et al., 2018; Presthus and Vatne, 2019), Trust in Facebook Privacy Practices did not have a significant impact on Privacy Management Behavior ($\beta = 0.068$, $p = 0.367$), and this led to the decision to reject H1. This unforeseen observation would indicate that in the Sri Lankan scenario, users can pursue privacy protection activities out of prudence and self-help as opposed to institutional trust. The variant in Privacy Management Behavior was reported to be 38.7% in the model, with most of the variance explained by the awareness ($f^2 = 0.382$).

Conclusion

This research contains meaningful conclusions about the privacy behavior tendencies of the Facebook users in Sri Lanka as the crucial definition of the issue is not trust but awareness as the main factor of privacy management behavior. The fact that users who better understand the details of the privacy policy can be more inclined toward the protective behavior speaks volumes about the necessity to increase the level of digital literacy and user education when it comes to protecting their privacy online.

The fact that no meaningful correlation existed between trust and privacy behavior indicates that the paradigm is changing accordingly in the realm of user behaviors, and this may be attributed to scandals of global privacy, and the suspicion of social media services. It means that users can be taking self-protection measures whether they trust or not, which is suggesting a more conservative approach to managing their privacy.

The paper brings some contributions to the literature on privacy extending the research to non-Western settings and offering practical implications to developers of the platform, policy makers, and teachers. Education of the user should become the priority of social media platforms by implementing simplified privacy panels, localization, and massive awareness actions. The policymakers are advised to concentrate on digital literacy and open data governance model to enable the users to make effective privacy decisions.

Future studies need to cover greater geographical areas than a single district and add some more variables like digital literacy and perceived risk and designs need to be longitudinal in order to obtain the developing changes in perception about privacy. Comparative studies carried out across platforms with regard to privacy behavior across various social media sets would also yield important comparative information.

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Ethical and Academic Boundaries in AI-Assisted Learning: A Qualitative Inquiry on the Perception of University Undergraduates (Special Reference to the Social Sciences Subject Discipline)

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Abstract

This study explores university undergraduates' perceptions of ethical and academic boundaries in AI-assisted learning, with a focus on the Social Sciences discipline. Employing a qualitative phenomenological approach, data were gathered through in depth interviews with 15 undergraduates from the University of Kelaniya. Findings reveal that students view AI tools as valuable learning aids that enhance productivity, creativity, and access to knowledge. However, uncertainty remains regarding ethical limits and institutional guidance. Students expressed concern about academic dishonesty, inequality, and the absence of clear regulations. The study emphasizes the urgent need for structured AI literacy programs, transparent ethical frameworks, and inclusive policies that balance innovation with academic integrity in higher education.

Keywords: *AI-Assisted Learning, Ethical boundaries, Students perception, Social Sciences*

Background of the Study

Artificial Intelligence (AI) is one of the most conversed topics in the present world. The use of AI and the impact of AI has been discussed and debated in almost all the subject areas/industries in the world. The discussion still continues with the technological advancements and the rapid usage of AI tools. Out of all the sectors, the integration of AI is more visible in education sector because it has been highly utilized in both teaching and learning process and it has significantly redefined the traditional modes of teaching and learning. When this can be noticed as a global scenario, Sri Lanka is also witnessing high student engagement with AI tools. Even though there are massive advantages of integrating AI in education, there are drawbacks linked with ethical usage of these AI tools. Although AI increases productivity and accessibility, it also makes it harder to distinguish between academic dishonesty and genuine learning aids. At the same time, there are conversations happening from policy makers end and significantly very less attention has been paid to understand what students think about this matter. Therefore, there is a critical and timely need to understand how university students perceive these limitations and use AI tools in their studies.

Key Research Problem and Objective

The key research problem of this study is “How do university undergraduates perceive the ethical and academic boundaries of AI-assisted learning?” in focus to the Social Sciences subject discipline. This focus is very important because, Social Sciences haven’t accepted, integrated, and recommended AI tools officially in their teaching and learning process like Science, IT, Engineering sectors have done. Despite of the fact that the usage of AI tools is increasing among Social Sciences university undergraduates, the disciplinary culture, orientation and pedagogical practice question this situation emphasizing the boundaries like appropriateness or inappropriateness and the overall ethical status. Examining this context from undergraduate’s perspective is even more crucial as they use these tools for their studies in spite of rules and regulations that are implemented.

Therefore, the main objective of the study is to understand undergraduates’ perceptions of ethical and academic boundaries in using AI tools for learning focusing on student awareness, acceptance, or misuse of AI in their learning journey.

Literature Review

The impact of Artificial Intelligence in higher education has been studied in repeatedly by scholars due to the identification of the transformative role it plays in both teaching and learning. Tools like ChatGPT, Grammarly, and other AI-driven platforms are widely adopted by students to brainstorming, searching information, academic writing, facilitating personalized learning pathways, doing research and so on. (Holmes and Luckin, 2016). In addition to these advantages, scholars have brought an important argument forward concerning the ethical practice of using these AI tools. Without having proper guidance and guidelines, students face the risk of engaging unethical practices such as spreading academic dishonesty by presenting AI generation contents as their own. (Cotton et al., 2024) They argue that it’s time to revise academic regulations as they are outdated with the advancement of technologies and the ignorance of this will lead to increase the risk of cheating and plagiarism. Supporting this argument, empirical studies have already revealed the nature of the perception students have towards integrating AI in their studies. For some students, it’s an influential fact which links with digital literacy, accessibility, and institutional clarity.(Smutny and Schreiberova, 2020) But in some cases, students misuse it due to the convenience, work pressure, lack of digital literacy, or lack of guidance. Proving this duality, researchers like Zaho and Han et al., emphasize that even though AI has the potential in enhancing academic performance, the misuse of AI tools leads students to over-depend and loose academic identity. (Han et al., 2025; Zhao, 2024) Some researchers point out that students' acceptance of AI is contingent upon its perceived utility and ethical clarity, with many expressing uncertainties about

what constitutes appropriate boundaries. (Lund et al., 2025; Sukirman et al., 2024) Similarly, Kim et al. and Wang explains the dilemma students have when it comes to finding balance between the AI supported learning and academic identity and authorship. (Kim et al., 2025; Wang, 2024) Most importantly, Han et al. identify a crucial gap in the current discourse which is the lack of representation of student perspective in ethical debates related to AI and higher education. (Han et al., 2025) Further (Jeilani and Abubakar, 2025) emphasize the need and the impotence of institutional support in AI literacy in cultivating ethical and healthy use of AI in academia.

In aggregate, these studies emphasize the need of conducting student-centric studies to find out student's perspective and later consider their opinions when introducing policies on ethical usage of AI in higher education. This study contributes to this global discussion filling the empirical and practical gap by investigating Sri Lankan context of student's perspective on the advantages of AI supported learning and ethical boundaries.

Methodology

Based on relativism (Reality is subjective and shaped by individual experiences) as the ontological position and the interpretivism (Knowledge is co-constructed through understanding participants' perspectives) as the epistemological position, qualitative phenomenological approach has been used for this study. Primary data were collected performing in-depth interviews. Secondary data were collected from research reports and journal articles. Sample was selected using purposive sampling targeting diverse academic disciplines within the Faculty of Social Sciences, University of Kelaniya. Sample size wasn't predetermined as the research was trying to reach the data saturation point. At the end of the data collection process, 15 undergraduates were included in the sample. Data gathered from interviews were analyzed using Braun & Clarke's thematic analysis framework extracting the essence of lived experiences.

Findings

The thematic findings of the qualitative exploration can be discussed under four main themes. And these themes reflect the student's perception on AI supported studying and the ethical use of AI tools.

AI as a Learning Aid: Majority of the students consider AI tools (Specially ChatGPT) as something important and helpful in their studies. They value these tools as they enable access to huge amounts of information, quicker access to knowledge, structuring and organizing thoughts and information, language support, enhance productivity and also stimulating and brainstorming for creative works. Students who

are engaged with many tasks and struggling with timelines, who have language barriers and creative tasks further emphasized the usefulness of AI tools in studies.

- "I use it not as a tool of doing the work for me, but as a source of information and an organizer." (Undergraduate 1, Personal Communication, 2025)
- "In my degree, it's essential to have graphical interpretation, curves, charts, and regressions. AI helps to get them." (Undergraduate 3, Personal Communication, 2025)
- "AI helped me retrieve population statistics and create graphs for my assignment in a short time." (Undergraduate 13, Personal Communication, 2025)
- "It gave me such a relief... a companion to manage heavy workloads." (Undergraduate 12, Personal Communication, 2025)

Ethical Clarity and Moral Boundaries: Despite of the fact that the way students use AI tools, majority is highly aware of academic ethics. There was a broad understanding among students that ethical use of AI tools includes, concept generation, grammar correction, summarizing, paraphrasing, blind copying, content generation etc. The most critical finding is, students mentioned that even though they are aware of ethical concerns they don't have a clear idea about the boundaries. Majority raised the need of clarifying the minimum and maximum extent of using AI in academia. Since there is no clear idea about the boundaries, they tend to set their own limits when using AI based on their individual needs.

- "Ethical use means using it as a tool and creating something new by the human academic." (Undergraduate 10, Personal Communication, 2025)
- "We must not use whatever AI gives but develop it and use in academic tasks." (Undergraduate 5, Personal Communication, 2025)
- "Using AI without understanding or modifying is dishonest." (Undergraduate 6, Personal Communication, 2025)
- "Using AI to create flyers is okay, but if you submit generated essays, it's dishonest." (Undergraduate 9, Personal Communication, 2025)

Misuse and Academic Inequality: All the respondents acknowledged the misuse of AI tools by peers and raised the question of fairness and digital privilege. The unethical activities they have encountered so far includes doing assignments, copying full essays, using it for exam related activities etc. Proving the peer pressure and influence, few students mentioned that they started using AI tools because others are using them. Further they mentioned that withing the social sciences subject discipline some departments are very strict on this matter and some departments are not, which again case the inequality.

- "They brag about using AI to write the whole paper and get away with it. It's very common." (Undergraduate 1, Personal Communication, 2025)

- "I saw they are less capable of completing tasks on their own. AI makes it easy to cheat." (Undergraduate 9, Personal Communication, 2025)
- "Some students were humiliated for submitting full AI-generated assignments." (Undergraduate 12, Personal Communication, 2025)
- "AI can create an unfair advantage when others don't have access to it." (Undergraduate 10, Personal Communication, 2025)

Institutional Role and Student Expectations: Many students emphasized the need for structured guidance and institutional clarity regarding the ethical integration of AI in education. Since there is no university-wide or faculty-wide policies, they don't receive a proper guidance. While some students had received informal guidance from lecturers, most of them expressed the need of receiving a formal and clear AI literacy in academia. They suggest conducting workshops, setting up clear rules, revising teaching and learning methods, reforming exams to cope up with the AI driven teaching and learning environment, especially to help both users and non-users.

- "It's important to teach not only how to use AI, but also how to verify and cite it." (Undergraduate 2, Personal Communication, 2025)
- "I want to know how to prompt properly and identify reliable data." (Undergraduate 9, Personal Communication, 2025)
- "Universities should not ban AI, but train us from the first year." (Undergraduate 13, Personal Communication, 2025)
- "AI should be introduced into the curriculum as a degree component." (Undergraduate 5, Personal Communication, 2025)

Conclusion

This qualitative study on undergraduate perceptions of ethical and academic boundaries in AI-assisted learning revealed that students are widely using AI tools to support their studies. The interest and engagement are rapidly growing. The results confirm that the awareness of ethical usage of AI is visible and the undergraduates have strong understanding of what constitutes fair use and what constitutes cheating. Although many shows maturity and responsible manner in using these tools, they are aware of widespread misuse and lack of institutional support. Further, the students emphasized the need of establishing clear rules for AI-supported learning, providing proper guidelines, enhancing AI literacy and skills and promote fair access and academic discussions. The study was concluded with the strong finding that the students need to enhance their learning process using AI tools rather than replacing it with technology. As undergraduate 1 (2025) stated, no tool is inherently good or bad. It's always the human factor behind it. Ethical use can be taught, but must be practiced.

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Determinants and Challenges of Extracurricular Participation: Evidence from Grade 11 Students in Gampaha District Schools

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Abstract

Engagement with extracurricular activities is one of the variables that significantly contributes to a student's overall development. However, grade 11 students in the Gampaha District exhibit a notable underengagement with extracurricular activities, despite 85% of the schools possessing the necessary facilities. This study was conducted among 419 participants, with the sample obtained through a stratified random sampling process in four educational zones, examining issues related to predictive factors and barriers that influence participation. The information was collected through a structured questionnaire, studied by factor analysis, logistic regression, and predictive probability modelling. All the results indicate a total participation rate of 82.6%. There is a significant disparity between genders, family income, and proximity to school, with the latter being positively associated with participation. Factor analysis revealed four domains, and school-related factors proved highly reliable ($r = 0.756$). Logistic regression showed that personal factors (especially self-confidence) were the strongest, followed by school and social factors as the second and third determinants, respectively. According to the predictive modelling results, there is an 83.7% chance of participation among highly confident students. In summary, the results highlight the importance of confidence-building interventions in enhancing participation.

Keywords: *Extracurricular participation, Predictive Modelling, Student engagement, Self-efficacy, Educational barriers*

Introduction to the Study

Participation in extracurricular activities significantly impacts the social, emotional, and cognitive aspects of students' development beyond the curricula offered. In the Gampaha District of Sri Lanka, the participation level in grade eleven is approximately 70%, which is lower than the 75% in Colombo. Notably, 85% of the schools in Gampaha have proper physical infrastructure. This gap is more notably visible when exam time rolls in in the Ordinary Level, where academic needs tend to conflict with all-round development. The goal of this research is to clarify the reasons why approximately 30% of Gampaha students still struggle to engage despite the availability of modern facilities. In this regard, a multidimensional framework which combines personal, familial, educational, and social determinants is embraced. There

is a paucity of literature regarding the South Asian context, and Western theories, such as Expectancy-Value Theory and Ecological System Theory, cannot adequately address the issue of collectivism orientation in Sri Lanka's education system, which is heavily exam-based. To address these gaps, the current research undertakes a quantitative investigation of psychological and environmental determinants, thereby developing predictive models that inform evidence-based interventions aimed at achieving equitable student engagement.

Methods and Methodology

The study employed a quantitative cross-sectional survey to investigate the determinants of extracurricular activities among 31,663 Grade 11 students in government schools across Gampaha District's four zones: Gampaha, Negombo, Kelaniya, and Minuwangoda in 2025. Using Cochran's formula with a 95% confidence level and a 5% margin of error, the initial sample size was 380, but it was adjusted to 419 to account for non-response and ensure robustness. Stratified random sampling ensured proportional representation, with Negombo (31.5%), Gampaha (26.7%), Kelaniya (22.2%), and Minuwangoda (19.6%) being the four districts represented. Two schools per zone were purposively selected, covering Type 1C (Advanced Level technology courses) and Type 1AB (Ordinary Level programs).

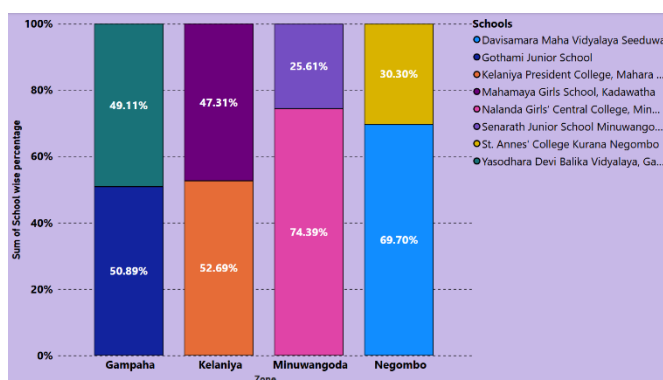


Figure 1: School Distribution within Each Educational Zone

Source: Developed by the researcher, 2025.

This study utilised a validated 35-item questionnaire tailored to the Sri Lankan school context, covering demographics, extracurricular participation, 24 Likert-scale items on personal, family, school, and social barriers, as well as qualitative feedback. Data were analysed using descriptive statistics, Mann-Whitney U tests for non-parametric comparisons, chi-square tests for categorical associations, and binary logistic regression to identify key predictors and participation probabilities. Model diagnostics included Variance Inflation Factors and Box-

Tidwell tests. Analyses were conducted in R Studio, with visualisations in Power BI. Ethical approvals, parental consent, and confidentiality were ensured. Data collection took place during school hours under the researcher's supervision to ensure consistency.

Research Findings and Discussion

This study utilised an effective methodological design to explore a self-agmenting extracurricular activity. The dissertation employs a self-algorithmic design to investigate the phenomenon of extracurricular activity among 419 Grade 11 students in four educational zones of Gampaha District, Sri Lanka. The analysis of the data was conducted using factor analysis, descriptive statistics, and logistic regression, which enabled the research to identify some of the most central obstacles and predictors of participation, providing insightful results regarding how engagement patterns work and the level of educational parity.

Demographic

Participation Patterns

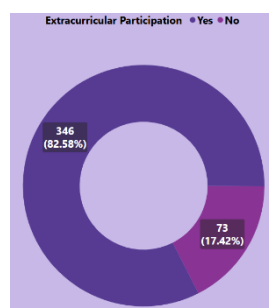


Figure 2: Overall Extracurricular Participation Rate



Figure 3: Participation percentage by Gender

Source: Developed by the researcher, 2025.

A detailed review of extracurricular activities demonstrated a significant difference between demographics. The rate of total involvement was 82.58% (346

students), whereas 17.42% (73 students) were not involved in any extracurricular activity. Gender analysis also revealed a significant balance, with women's involvement at 82.49% and men's involvement at 82.72%, indicating a slight difference of 0.23 percentage points. This approximate equality defies the common gender biases in the educational setting within the South Asian region, and this is a sign of effective fair play policies at the institutional level.

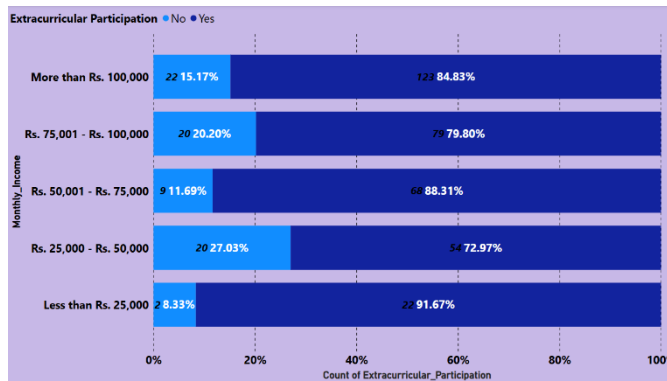


Figure 4: Participation by Family Income Level

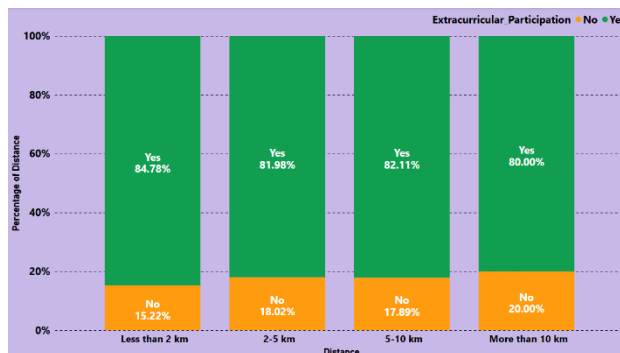


Figure 5: Distance vs Extracurricular Activity Participation

Source: Developed by the researcher, 2025.

The analysis reveals that socioeconomic status significantly influences extracurricular participation, with lower rates observed in middle-income groups. Travel distance also impacts engagement, as participation declines with increasing distance, showing a 4.78% drop between students living within 2 km and those beyond 10 km. Economic and logistical factors interact complexly.

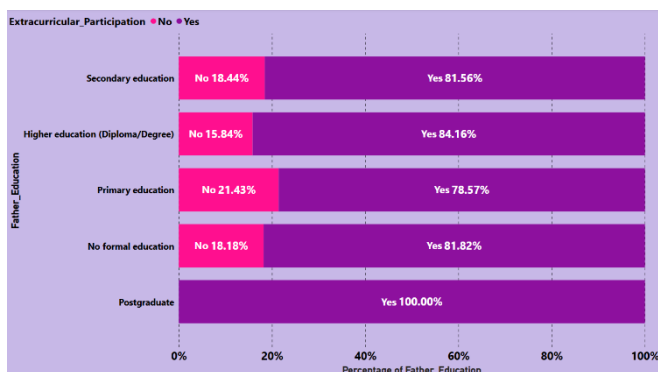


Figure 6: Father's Education Level vs Extracurricular Activity Participation

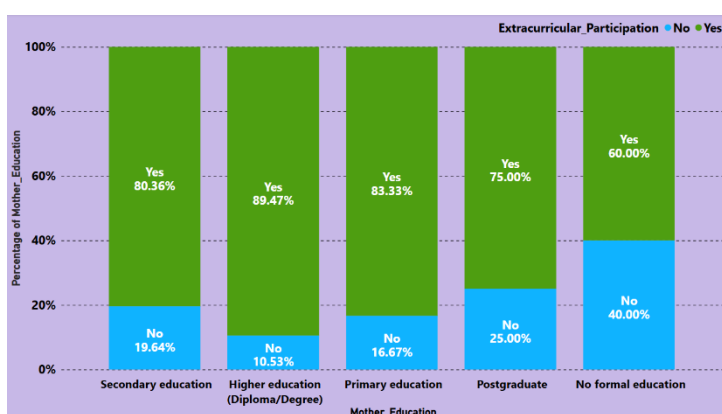


Figure 7: Mother's Education Level vs Extracurricular Activity Participation

Source: Developed by the researcher, 2025.

Parental education has emerged as a significant indicator of higher education enrollment among students. Students in postgraduate degree programs had 100% participation, while those with fathers who had an elementary level of education had 78.57% participation. Maternal education had even stronger effects: mothers with diplomas/degrees showed a 89.47% participation rate, in contrast to non-educated mothers, who had a 60.00% participation rate, resulting in a 29.47 percentage point gap in participation.

Factor Analysis and Scale Development

The multidimensional nature of barriers to participation was verified using quantitative research. Kaiser-Meyer-Olkin provided a result of 0.744, indicating sufficient practicability of the sampling. The Bartlett Test of chi-squared equals 1608.53; $p < 0.001$, supporting the existence of proper correlations used to perform factor analysis. The 24-item scale yielded four discernible factors, which explained 26.3% of the variance in the scale.

Predictive Modelling Results

Logistic regression analysis identified Personal Factor 4 ("I feel confident in my abilities to perform well in extracurricular activities") as the strongest predictor of participation. The model achieved 82.8% classification accuracy with excellent sensitivity (98.8%) and specificity (93.2%).

Predictor	Coefficient (B)	p-value	Odds Ratio (OR)	95% CI
Personal Confidence	0.617	<0.001	1.853	1.402-2.449
School Factors	0.444	0.018	1.560	1.080-2.253
Social Communication	0.400	0.024	1.492	1.055-2.110
Family Support	0.160	0.350	1.174	0.839-1.642

Table 1: Logistic Regression Results

The regression equation: $\log(p/(1-p)) = -4.156 + 0.617(Personal) + 0.444(School) + 0.400(Social) + 0.160(Family)$

Personal confidence was the strongest predictor of extracurricular participation, increasing the likelihood by 85.3%. While school and social factors also influenced participation, family support did not show statistical significance. The findings validated personal and contextual influences, with individual characteristics, particularly self-confidence, emerging as the dominant predictor across all specific research objectives.

Predictive Probability Analysis

The usefulness of the model was demonstrated by analysing the profile of students. High Achievers (learners who scored 4.5 on all factors) were likely to participate, with a probability of 95.8%. Students in the At-Risk category, in contrast, had a significantly lower chance of participation, at 28.6%, after achieving a score of 2.0 in all areas of measurement. The findings also showed that self-motivated students with high personal confidence and a middle performance level in other contexts had an 83.7% likelihood of engagement, which highlights the importance of personal confidence as a leading indicator of participation.

Theoretical and Practical Implications

The current analyses indicate that personal confidence plays a primary role in predicting extracurricular involvement, surpassing the influence of environmental factors, and thus contradict existing explanations (Bandura, 1997). Notably, the engagement likelihood for the Average Student category is 67%, which is significant

for designing the interventions. The high % model accuracy of 82.8% enables precision in geographical interventions, and the moderate variance in transportation mode plays a negligible role, implying that transportation infrastructure benefits both socioeconomic classes.

Policy and Practice Recommendations

The study prioritises confidence-enhancement over traditional barrier removal, highlighting a 29.47% gap linked to maternal education. It advocates systematic confidence-building, early identification for low participation, and replicable frameworks to improve educational equity and inform policies in South Asian semi-urban contexts.

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Student Privacy in AI-Enhanced Learning Platforms: A Comparative Policy Analysis of GDPR, FERPA, and India's DPDP Act

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Abstract

The rapid integration of Artificial Intelligence (AI) in education has revolutionized learning environments, enabling personalized instruction, predictive analytics, and adaptive assessments. However, the deployment of AI-powered educational platforms raises critical concerns regarding student data privacy, surveillance, and ethical data use. This study conducts a comparative policy analysis of how different countries and institutions regulate student privacy in AI-enhanced learning systems, with a focus on legal frameworks such as the European Union's General Data Protection Regulation (GDPR), the United States' Family Educational Rights and Privacy Act (FERPA), and India's Digital Personal Data Protection Act (DPDPA). These policies are examined in relation to core principles including data minimization, consent, purpose limitation, algorithmic transparency, and accountability mechanisms. The analysis reveals significant disparities in scope, enforcement capabilities, and adaptability to emerging AI technologies. For instance, while GDPR offers robust protections and rights to data subjects, its implementation in educational AI is often limited by technical and institutional challenges. FERPA, conversely, provides narrower protection and lacks clear provisions for AI-specific concerns such as automated decision-making. India's DPDPA represents a recent effort to balance innovation and privacy, though it remains in early stages of enforcement. The study also highlights institutional-level policies from select universities and edtech providers, illustrating how local governance adapts (or fails to adapt) to national legislation. Drawing from these insights, this paper proposes a set of globally adaptable policy recommendations that prioritize student agency, algorithmic transparency, and interoperable regulatory standards. These recommendations aim to support governments, educators, and developers in creating AI-enabled educational ecosystems that are both innovative and ethically sound. By emphasizing harmonization and best practices, the study contributes to the global discourse on equitable and privacy-conscious AI adoption in education.

Keywords: *Student privacy, AI in education, GDPR, FERPA, Data protection, Policy analysis*

Background & Rationale

Artificial Intelligence (AI) has become deeply embedded in educational environments from adaptive learning platforms and AI tutors to predictive analytics that monitor student progress. These innovations offer unprecedented personalization, real-time feedback, and data-driven decision-making that enhance educational outcomes. However, they also raise critical concerns about student data privacy, ownership, consent, surveillance, and long-term profiling, especially as vast amounts of sensitive information are collected, analyzed, and stored by AI-powered systems. Countries and institutions have begun responding with legal and policy frameworks, yet significant disparities remain. For instance, the General Data Protection Regulation (GDPR) in the European Union emphasizes user consent, transparency, and data minimization. In contrast, the Family Educational Rights and Privacy Act (FERPA) in the United States prioritizes access and control by students and parents. India's recently enacted Digital Personal Data Protection Act (DPDP 2023) introduces a consent-based model but is still in early stages of implementation. These frameworks reflect varying definitions of privacy, consent, and enforcement mechanisms, complicating efforts to establish a unified global standard for safeguarding student data in AI-driven education systems. A comparative study of these regulatory approaches is crucial to identify gaps, strengths, and best practices particularly in the context of the growing influence of AI in learning environments.

Problem Statement

Despite the global growth of AI-driven educational tools, there remains a lack of clarity and consistency in the protection of student data across different jurisdictions. Most existing privacy regulations such as GDPR, FERPA, and India's DPDP were not originally designed with AI in mind, leading to significant policy blind spots around emerging issues like algorithmic profiling, automated decision-making, data reuse, and long-term behavioral tracking. This regulatory misalignment puts student privacy at considerable risk and creates complex compliance challenges for global ed-tech providers operating across borders. Currently, there is no globally harmonized legal framework to protect student data privacy in AI-enhanced learning environments. The inconsistency among national policies and institutional practices increases the likelihood of data vulnerabilities, misuse, and ethical dilemmas. These risks undermine student trust, compromise security, and exacerbate inequalities in access and academic opportunity, ultimately threatening the integrity and equity of digital education systems worldwide.

Objectives

- To analyze and compare key legislative frameworks namely the General Data Protection Regulation (GDPR), the Family Educational Rights and Privacy

Act (FERPA), and India's Digital Personal Data Protection Act (DPDP 2023) in the context of student data privacy within AI-driven educational settings.

- To identify gaps, ambiguities, and limitations in the application of these laws to emerging AI technologies in education, with particular focus on areas such as algorithmic decision-making, data reuse, and behavioral profiling.
- To examine institutional implementation practices across selected countries and universities, highlighting variations in compliance, enforcement, and ethical standards.
- To assess the overall effectiveness of current legislative and institutional measures in safeguarding student privacy in AI-enhanced learning environments.
- To develop and recommend a globally adaptable privacy framework or set of guidelines tailored specifically to the challenges and opportunities presented by AI-powered educational platforms.

Research Questions

- How do the GDPR (EU), FERPA (US), and DPDPA (India) define and regulate student data privacy in the context of AI-powered educational systems?
 - How do these laws address key aspects such as algorithmic profiling, data reuse, behavioral tracking, and automated decision-making?
- What are the strengths and limitations of these regulatory frameworks when applied to real-world, AI-integrated educational settings?
 - How effectively do they protect sensitive student data in adaptive learning platforms, AI tutors, and predictive analytics tools?
- What are the key similarities and differences among GDPR, FERPA, and DPDPA in terms of:
 - Consent mechanisms and age of digital consent
 - Principles of data minimization and purpose limitation
 - Rights of data subjects (e.g., access, correction, erasure)
 - Governance of automated decision-making processes
- How are these policies interpreted and operationalized by educational institutions and ed-tech companies across the EU, US, and India?
 - What best practices, ethical safeguards, or implementation models have emerged?
- What are the practical challenges faced in the enforcement and compliance of these laws in AI-driven learning environments?
 - What barriers exist in cross-border data transfers, institutional capacity, and regulatory oversight?
- Can a unified, globally adaptable policy framework be proposed to effectively safeguard student privacy in AI-enhanced education?

- What core components legal, ethical, and technical should such a framework include to balance innovation with protection?

Methodology

The study employs a qualitative, comparative policy analysis using three methods:

- **Document analysis** of GDPR, FERPA, DPDPA, and supporting AI policy documents.
- **Case studies** of universities and ed-tech providers in the EU, US, and India, focusing on compliance practices, consent models, and AI governance.
- **Expert interviews** with policymakers, data protection officers, and AI ethicists, analyzed using thematic coding and comparative policy mapping.

Data Collection Methods:

- **Document Analysis:** Primary sources such as the official texts of GDPR, FERPA, and the DPDP Act will be reviewed alongside relevant AI-specific guidelines, institutional privacy policies, and policy briefs. Secondary sources include peer-reviewed academic literature, legal commentaries, regulatory reports, and publications on AI ethics and data governance.
- **Case Studies:** Selected universities and educational technology platforms in the EU, US, and India will be analyzed to understand how these legal frameworks are practically implemented. Case studies will focus on how institutions handle student consent, data minimization, algorithmic decision-making, and cross-border data flows.
- **Expert Interviews:** Semi-structured interviews will be conducted with key stakeholders, including policymakers, data protection officers, AI ethicists, legal scholars, and ed-tech developers. These insights will provide a practical understanding of challenges, gaps, and innovations in regulatory compliance and ethical implementation.

Data Analysis:

- **Thematic Coding:** Qualitative data from documents and interviews will be analyzed using thematic coding techniques. Software tools such as NVivo may be employed to facilitate the identification of key themes related to consent, transparency, accountability, fairness, and institutional best practices.
- **Comparative Policy Mapping:** A cross-jurisdictional comparison will be conducted to map and assess the alignment of each legal framework with core data protection principles. This analysis will help identify strengths, limitations, and areas for improvement or harmonization across contexts.

Through this comprehensive qualitative approach, the research aims to produce actionable insights and propose a globally adaptable framework to safeguard student data privacy in AI-enhanced education.

Expected Outcomes

This research aims to produce the following key outcomes:

- **A Structured Comparative Analysis:** A comprehensive and structured comparison of student data privacy regulations from three major jurisdictions the European Union (GDPR), the United States (FERPA), and India (DPDPA) focusing on their relevance and responsiveness to AI applications in education.
- **Comparative Matrix of Legal Frameworks:** A detailed comparative matrix outlining the core features of each regulation, including provisions related to consent, data minimization, data subject rights, automated decision-making, enforcement mechanisms, and AI-specific guidelines, offering a clear visual representation of similarities and differences.
- **Identification of Regulatory Gaps and Ethical Concerns:** Critical identification of policy gaps, inconsistencies, and ethical challenges in the current legal frameworks, especially in relation to algorithmic profiling, behavioral tracking, cross-border data flows, and institutional compliance practices.
- **Real-world Implementation Insights:** Insights into how educational institutions and ed-tech companies interpret and implement these privacy regulations in practice, highlighting context-specific challenges and innovative approaches to AI governance.
- **Proposed Model Policy Framework:** Development of a globally adaptable policy model for safeguarding student data privacy in AI-powered learning ecosystems. This model will be grounded in evidence-based principles such as transparency, accountability, fairness, data sovereignty, and student empowerment.
- **Actionable Policy Recommendations:** A set of recommendations aimed at enhancing interoperability between national legal frameworks, improving student digital rights, and ensuring responsible AI use in education. These recommendations will be relevant for governments, regulators, educational institutions, and ed-tech companies seeking to align privacy protection with innovation.

Findings and Conclusion

Findings

The analysis highlights four major findings:

Regulatory scope and protections

- GDPR provides the strongest rights for students, including access, rectification, erasure, and protection against solely automated decisions. It mandates data

minimization and accountability but faces enforcement challenges in complex AI systems.

- FERPA offers narrower protection, focusing on access to records and parental control. It lacks provisions for algorithmic profiling, behavioral tracking, or automated decisions.
- DPDPA adopts a consent-based model aligned with GDPR principles but lacks explicit AI provisions, making enforcement and institutional compliance uncertain.

Institutional implementation

Case studies reveal substantial variation. European institutions generally conduct Data Protection Impact Assessments (DPIAs) for AI tools, though capacity constraints remain. U.S. institutions largely focus on FERPA compliance, often neglecting AI-specific issues. Indian institutions are in transition, experimenting with privacy policies but facing challenges due to limited regulatory clarity and resources.

Practical challenges

Across all jurisdictions, common challenges include limited institutional capacity, inconsistent enforcement, and weak student awareness of digital rights. Ed-tech providers, operating globally, struggle to comply simultaneously with multiple frameworks, resulting in uneven safeguards.

Gaps and ethical concerns

None of the three frameworks sufficiently address AI-related risks such as algorithmic bias, discriminatory profiling, or the long-term implications of behavioral analytics. The absence of harmonized global standards undermines student trust and exacerbates inequalities in digital learning environments.

Conclusion & Recommendations

This study concludes that while GDPR offers a strong foundation, neither FERPA nor DPDPA adequately address AI-specific concerns. Institutional practices further expose gaps, particularly around enforcement, algorithmic transparency, and meaningful student consent. To address these deficiencies, the paper proposes a set of globally adaptable policy recommendations:

- Establishing minimum global standards for AI in education based on transparency, accountability, and fairness.
- Strengthening institutional capacity through mandatory AI impact assessments and ethics training.
- Enhancing student agency with clearer digital rights, including rights to opt out of algorithmic profiling.

- Promoting interoperability across jurisdictions to ease compliance for global ed-tech providers.
- Encouraging collaboration among governments, institutions, and developers to align innovation with privacy protection.

By emphasizing harmonization, ethical governance, and student empowerment, this research contributes to the global discourse on equitable and privacy-conscious AI adoption in education. The proposed framework is intended to support policymakers, educators, and developers in ensuring that the benefits of AI are realized without compromising student rights.

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From Classroom to Screen: Exploring the Influence of AI-Assisted Scriptwriting on the Creative Development of Film and Television Students

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Introduction to the Study

In the 21st century, Artificial Intelligence (AI) has emerged as a powerful force transforming industries, creative practices, and education. Its entry into domains traditionally reserved for human creativity, such as storytelling, has prompted a global revaluation of originality and authorship. In screenwriting, tools like ChatGPT, Deep Story, and Sudo Write are increasingly popular among students and emerging creatives. How do AI-assisted scriptwriting tools impact the creative development, narrative authenticity, and ethical understanding of Film and Television students at the University of Kelaniya, particularly regarding cultural voice, skill-building, and academic responsibility? This study explores the impact of AI tools on film and television students at the University of Kelaniya in Sri Lanka. As artificial intelligence (AI) tools increasingly shape creative workflows, their impact on the development of original voice and critical thinking among student scriptwriters warrants attention, especially in Sri Lankan higher education. In film and television, where storytelling is both personal and culturally significant, the growing reliance on AI-assisted scriptwriting tools raises important concerns, including the risk of diminished creative independence and the standardization of narratives. Despite global discussions on AI in education, there is a lack of localized research on how students in the Global South, specifically those in Sri Lanka, engage with these technologies. This study aims to fill that gap by exploring how students at the University of Kelaniya use AI tools in their scriptwriting and how these tools influence their creativity and cultural expression. Understanding these dynamics is essential for developing educational strategies that empower future storytellers to use AI critically and ethically.

Aims and Objectives

The primary aim of this research is to examine how AI-assisted scriptwriting affects student creativity in both positive and negative ways. The key research objectives include:

1. Assessing how often and at what stages students utilize AI tools during the script development process.

2. Evaluating students' emotional and cognitive responses to using AI as a creative resource.
3. Comparing scripts created solely by students with those produced using AI, based on established creative criteria.
4. Identifying concerns related to authorship, skill development, and academic integrity.
5. Proposing teaching strategies for the ethical and effective integration of AI in creative education.

Theoretical Framework

This study is grounded in Constructivist Learning Theory, viewing learning as a dynamic and interactive process influenced by cultural context and personal engagement. In this approach, AI tools are not just external aids; they are considered active participants in the learning journey. Depending on their use, AI can either stimulate creativity or restrict originality. Thus, AI serves as a catalyst that can expand a student's narrative potential or, conversely, limit it. For scriptwriting students, particularly those crafting culturally rooted stories, their interaction with AI is not neutral; it directly impacts how they discover, express, and refine their creative voice.

Methodology

This innovative study utilized a mixed-methods research design to investigate the transformative impact of AI-assisted scriptwriting on the creative development of Film and Television students. Grounded in an interpretivist philosophy, the research aimed to capture students' subjective experiences and the evolving relationship between technology and creativity in academia.

The study was conducted in four key phases:

Online Survey

A structured questionnaire was distributed to 50 undergraduate and postgraduate students from the Film and Television Studies program at the University of Kelaniya. The survey explored:

- Frequency and motivations for AI tool usage
- Types of AI platforms utilized (e.g., ChatGPT, DeepStory, Sudowrite)
- Perceived strengths and limitations of AI-assisted scriptwriting
- Students' confidence levels when using AI

In-depth Interviews

Semi-structured interviews with 10 selected students and 3 academic lecturers delved into themes such as creative independence, narrative authenticity,

emotional engagement, and ethics in AI writing. This format encouraged rich, nuanced discussions about AI's influence on storytelling.

Script Comparison

A comparative analysis evaluated scripts authored solely by students against those created with AI assistance, using a rubric that assessed.

- Originality
- Plot structure
- Character development
- Emotional depth
- Dialogue quality

This analysis allowed for a measurable comparison of storytelling quality.

Findings and Analysis

The research reveals a complex and often contradictory relationship between students and AI-assisted scriptwriting tools. While many students see AI as a valuable collaborator, significant concerns regarding creative authenticity, ethical dilemmas, and skill dependency persist.

Positive Impacts

Enhanced Ideation and Story Structuring (72%)

Seventy-two percent of students confirmed that AI effectively helps them overcome creative blocks in the early stages of scriptwriting. Tools like ChatGPT and DeepStory significantly aid in generating plot outlines and character profiles. As one second-year student stated, "I used to struggle at the start of every script, but now I use AI for options. It activates my creativity."

Students consistently leverage AI to produce early drafts, enabling them to refine content and integrate feedback efficiently, especially under tight academic deadlines.

Confidence Building and Risk-Taking

For those lacking confidence, AI provides a "safe space" to explore tone, genre, and style, leading to bolder storytelling.

Negative Impacts

Erosion of Authentic Voice (68%)

Sixty-eight percent of students expressed concerns that AI-generated content often lacks emotional depth and does not capture the nuances of Sri Lankan communication. A final-year student remarked, "It's fast and smart, but it doesn't reflect how Sri Lankan people communicate."

Skill Atrophy and Over-Reliance

Educators have noted a troubling trend where students increasingly rely on AI tools for creative tasks, jeopardizing their ability to craft original narratives and develop storytelling skills.

Ethical Ambiguity

Students frequently face uncertainty about how to ethically incorporate AI-generated content. The lack of clear institutional guidelines has resulted in anxiety surrounding plagiarism and citation practices.

Evaluation Dimension	Human-Written Scripts	AI-Assisted Scripts
Emotional Depth	High	Moderate
Cultural Relevance	High	Low to Moderate
Structural Clarity	Moderate	High
Dialogue Quality	High	Template-like
Originality	High	Mixed Results

Table 1: Script Comparison Results

Visual Summary: Student Perceptions

The accompanying chart effectively illustrates that while many students benefit from AI tools for ideation and time management, a considerable number struggle with ethical concerns and cultural disconnects.

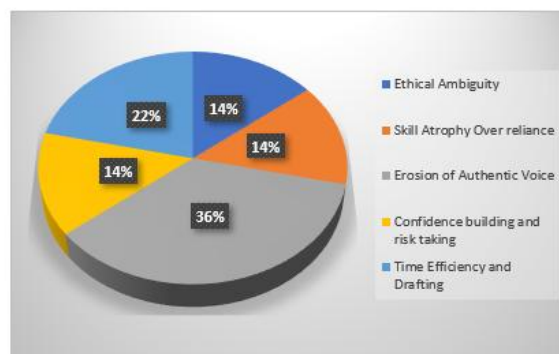


Figure 1: Distribution of key student perceptions about AI-assisted scriptwriting, showing both positive contributions (ideation, confidence, efficiency) and areas of concern (authenticity, skill atrophy, ethical ambiguity).

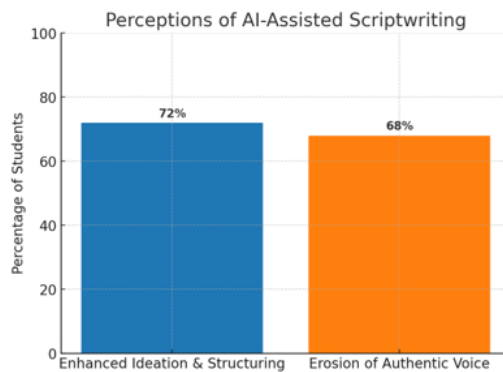


Figure 2: Student perceptions of AI-assisted scriptwriting, comparing its most significant positive and negative impacts.

Discussion

The findings unequivocally show that AI tools reshape students' scriptwriting practices, acting as both enablers and disruptors. When utilized critically, AI enhances brainstorming, narrative scaffolding, and confidence. However, many students lack the critical literacy to assess AI outputs, often confusing productivity with originality. The comparative analysis distinctly indicates that human-written scripts excel in emotional depth and cultural authenticity, while AI-assisted scripts, though well-structured, often lack originality. Significantly, the best creative outcomes emerge from hybrid models where students use AI for structure or dialogue, but humanize the content based on personal and cultural contexts. This highlights AI's potential as a collaborative partner in creativity.

Implications for Pedagogy

To maximize AI's benefits in scriptwriting, the study strongly recommends:

1. Introduce AI Literacy Modules:

Educate students on AI's workings, limitations, and biases to empower them to use AI as a tool rather than a crutch.

2. Incorporate Comparative Assignments:

Encourage students to analyze differences between human and AI-generated scripts to understand the essence of storytelling.

3. Host Ethical Use Workshops:

Establish clear policies on authorship and citation to navigate ethical complexities and maintain academic integrity. These strategies will promote both technological fluency and creative independence.

Conclusion

This study demonstrates that AI-assisted scriptwriting significantly influences Film and Television students at the University of Kelaniya. While AI offers clear advantages in ideation, efficiency, and confidence-building, it also raises important issues surrounding cultural disconnect, originality, skill erosion, and ethical uncertainty. To effectively navigate these challenges, students and educators must adopt a reflective approach. The most effective uses of AI involve collaboration rather than surrendering authorship. By integrating AI literacy, ethical training, and comparative exercises into curricula, educational institutions can prepare students to be skilled writers and culturally grounded storytellers in the age of artificial intelligence.

Keywords: *AI-assisted scriptwriting, Creative development, Human-AI collaboration, Screenwriting pedagogy, Sri Lankan media education, Technological mediation in education, Film curriculum*

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AI-Driven Graphic Design in Higher Education: A Strategic Approach to Enhancing Teaching Effectiveness, Student Engagement, and Inclusive Learning Environments

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Introduction

In the digital age, Artificial Intelligence (AI) is fundamentally transforming how knowledge is created, delivered, and consumed across higher education. One of the most promising applications of AI is in graphic design, where it enables the rapid creation of high-quality visual learning materials such as infographics, diagrams, animations, and data visualizations. These visual tools are central to contemporary pedagogy, particularly as universities aim to improve engagement, accessibility, and comprehension for diverse student populations (Ng, 2021). AI-driven graphic design tools including Canva AI, Adobe Firefly, and DALL·E utilize generative algorithms and machine learning to allow educators to produce tailored, pedagogically aligned visual content with greater efficiency and precision.

This research investigates the integration of AI-assisted graphic design tools in higher education, specifically within Sri Lankan universities, as a strategy to enhance teaching effectiveness, increase student engagement, and foster inclusive learning environments. In addition, the study explores institutional challenges and ethical considerations related to the adoption of AI in instructional design. While AI offers significant advantages, its sustainable implementation depends on both faculty digital literacy and comprehensive institutional policies.

Background and Significance

Visual learning has long been acknowledged as a critical factor in enhancing comprehension and knowledge retention. Traditional approaches to graphic content creation, however, often required specialized design skills or dedicated support staff, limiting scalability and accessibility. Recent advancements in AI have democratized this process, enabling even educators without graphic design expertise to develop professional-quality materials efficiently (Mayer, 2020).

AI-driven design tools respond to natural language prompts, learn from user interactions, and generate visuals that are pedagogically aligned with course objectives. For example, AI can automatically convert complex textual content into flowcharts, concept maps, or interactive animations, thereby reducing cognitive load for learners and increasing clarity. These capabilities are particularly valuable in

technical disciplines such as computer science, engineering, and science, where students often struggle with abstract or hierarchical concepts.

Moreover, in increasingly diverse academic settings, accessibility and inclusivity are critical. AI tools support Universal Design for Learning (UDL) principles by offering multilingual outputs, high-contrast visuals, alt-text descriptions, and layouts suitable for neurodiverse and visually impaired students (UNESCO, 2023). Such affordances ensure that learning materials are adaptable to different needs, enhancing equity and learner autonomy. Consequently, AI-driven visual design aligns with contemporary pedagogical values emphasizing flexibility, learner choice, and equitable access.

Research Objectives

The study investigates the following objectives:

1. To examine how AI-powered graphic design tools are being utilized by university lecturers in their instructional materials.
2. To evaluate the impact of AI-generated visuals on student engagement, comprehension, and participation.
3. To explore the role of AI-assisted visual design in supporting inclusive teaching practices for diverse learner groups.
4. To identify barriers and enabling factors affecting the adoption of AI-based design technologies in higher education institutions.

Methodology

A qualitative case study approach was adopted to obtain rich, context-specific insights into AI adoption in teaching. Data collection included semi-structured interviews with 10 lecturers from Sri Lankan universities representing disciplines such as ICT, humanities, education, and science. Participants were selected based on their active use of AI graphic tools in course design and instructional delivery.

Additionally, the study involved analysis of digital learning artifacts including lecture slides, posters, infographics, and course syllabi as well as institutional policy documents to assess the integration of AI-enhanced visuals into curricula. Thematic analysis was applied to identify recurring patterns related to teaching innovation, student engagement, inclusivity, and ethical considerations (Dall’Alba & Barnacle, 2007).

Findings and Discussion

Enhanced Teaching Effectiveness

All participants reported that AI-assisted visuals substantially improved the clarity, structure, and comprehensibility of their teaching materials. Complex topics,

particularly those involving processes, hierarchies, or abstract relationships, were more effectively communicated through AI-generated diagrams, infographics, and flowcharts. For instance, a lecturer in computer networking utilized AI-generated flowcharts to explain IP routing processes, reducing cognitive load and enabling students to understand technical workflows more efficiently. These findings align with Mayer's (2020) multimedia learning theory, which emphasizes that well-designed visual aids facilitate knowledge retention and deeper understanding.

Time efficiency emerged as a major benefit. Instructors reported that AI tools reduced the time required to design visuals manually or search for online resources. This allowed them to focus more on pedagogical planning and teaching strategies rather than on production tasks, thereby increasing overall instructional quality. AI-enabled automation also supported consistency and standardization of visual content across courses, contributing to coherent curriculum delivery.

Improved Student Engagement

Participants observed that AI-generated visuals positively influenced student engagement and motivation. Instructors noted higher levels of participation and improved quality of assignments in courses enriched with AI-generated visual content. For example, a humanities course that previously relied heavily on text-based slides incorporated AI-generated narrative illustrations, resulting in increased class attendance and more dynamic classroom discussions.

These findings are supported by previous research demonstrating the role of multimedia in fostering learner interaction and engagement. Schmid et al. (2014) highlighted that visual aids integrated into teaching contexts enhance interactivity and collaboration, while Bond et al. (2019) emphasized that modern students expect visually rich and multimedia-enhanced learning environments. AI-assisted graphic design tools fulfill this expectation by enabling the rapid production of high-quality visual content.

Promoting Inclusive Learning Environments

A key theme was AI's capacity to support inclusive learning. Educators used AI platforms to create bilingual content (Sinhala–Tamil), symbolic representations for students with reading difficulties, and visually optimized layouts for learners with visual impairments. These tools offered adaptive functionalities such as contrast adjustment, font modification, and alt-text suggestions for images, making learning materials more accessible to a broader range of students.

Such practices are consistent with UNESCO's (2023) recommendations for inclusive digital learning, which advocate for adaptive and assistive technologies to support diverse learners. AI-generated content, therefore, provides educators with the

flexibility to tailor instruction to meet individual needs while maintaining academic rigor and engagement.

Challenges and Limitations

Despite the benefits, several challenges were reported. Ethical concerns arose regarding potential bias, cultural sensitivity, and intellectual property in AI-generated visuals (Selwyn, 2019). Faculty also highlighted the absence of formal institutional policies and structured guidelines for AI use in instructional design. Digital literacy disparities were noted, particularly among senior staff unfamiliar with generative AI tools.

Furthermore, limited professional development and capacity-building initiatives meant that instructors often had to experiment independently, leading to inconsistent practices across courses and departments. These findings underscore the importance of governance frameworks, training programs, and institutional support to ensure responsible and sustainable AI integration.

Conclusion

AI-driven graphic design represents a transformative opportunity in higher education, enabling educators to enhance teaching quality, improve student engagement, and foster inclusive learning environments. The study demonstrates that AI tools facilitate clarity, efficiency, and accessibility in instructional materials, while promoting interactive and visually rich learning experiences.

However, the successful adoption of AI in educational contexts requires institutional support, ethical guidance, and comprehensive faculty training programs. Universities should develop policies addressing AI governance, accessibility, and intellectual property while providing ongoing professional development to improve staff digital literacy.

Future research should focus on longitudinal studies examining the impact of AI-generated visuals on student learning outcomes, as well as the development of ethical and scalable frameworks for AI integration in higher education curricula. Additionally, interdisciplinary studies could explore AI's potential in combining graphic design with other emerging technologies, such as augmented reality (AR) and virtual reality (VR), to further enhance student engagement and learning effectiveness.

Keywords: *Artificial intelligence, Graphic design, Higher education, Student engagement, Inclusive learning, Instructional design*

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The Role of Feedback methods in Artificial Intelligence Tutoring Systems: Implications for student learning outcomes

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Introduction to the Study

Learning can be defined as a process of pursuing new knowledge from numerous modes, and integrating the new knowledge with the existing knowledge. Learning can be happened at any time, to any Person, hence it is a continuous process. Human can learn throughout his entire life. Traditional learning set up consists with a facilitator, classroom and fundamental tools such as a white board, a presentation running in a projector. However, due to the rapid development in information technology, various new systems been developed. Such new systems could be replaced the traditional methods, and as the result, learning process could be improved.

Artificial Intelligence is the trending technology in world as now, and it spans through every discipline. Education is one of the significant field, where various application of AI is been applied. Intelligent Tutoring Systems (ITS) is a fine example for such application, developed based on Artificial Intelligence. As the name implies, Intelligent tutoring systems is a tutor, which facilitates with numerous features to the user. Instant and real time feedback, personalized learning, error correction, catering to different learners are some of the main functions offered by ITS. Intelligent systems can be used to enhance the effectiveness of programming learning (Fodouop Kouam, 2024). Feedback system is one of the significant function, offered by ITS. Intelligent tutoring systems can provide instant and real time feedback to learners according to the question asked by learner. The feedback is one of the important aspect, so the user can depend on the feedback and can move to the next step of the question. The process can be further interpreted as below,

User can ask the first question, then ITS Would prepare the feedback, user receives the feedback, user may further analyses the feedback and user compile the next question. Having this process several times, the learner can gradually construct the new knowledge.

As mentioned above, the feedback plays an important role in Intelligent tutoring systems. This study mainly focused on how feedback method of ITS will boost the learning process. Hence, the study addressed the research question “ How can feedback method of Intelligent tutoring systems will improve the learning?”.

Method and Methodology

The study has been conducted as a quantitative and inspired by the positivism philosophy. The study population was undergraduate students from the selected Non state university. The research strategy was the experiment method. The total current students in all three academic years considered as the study population. G * power tool (modern software) was used to calculate the sample size and 150 Students got selected to the sample representing all three academic levels. (First year, second year and third year). The reason for getting different academic years, was to gain an understanding of how the usage of ITS Could be affected on different academic levels. However, All the participants are from the same academic discipline, which from Software Engineering. To maintain accuracy of the experiment, all participants were selected from the same discipline.

The participants were divided into Three groups as First year, second year and third year. The participants were selected randomly from all three academic years. The experiment was carried out as pretests and posttests. Both tests were given for every group in order to maintain the quality of the experiment. Prior to the experiment, both the tests papers were prepared. Used standard questions adhering to the syllabus of relevant academic year. Thus altogether, six papers were prepared for all three groups (Pretest & posttest for each academic year). All those six papers were validated by an expert before the pretest. It was also made sure to have advance questions for posttests than pretests. However, both the pre and post test questioned the same concepts. In addition to the pre and post tests, Tutorial and ITS Systems were used in experiments. Tutorial consisted of a single, structured question, which should be answered by students using question and feedback patterns. Three distinct tutorials prepared for three academic years. Hence, the study used following instruments for the experiment.

- Pre test question paper consists with basic programming questions. ex: writing an Algorithms, features in programming
- Post test question paper consists with questions such as develop python programs to a given scenario.
- Tutorial to practice technical concepts in programming such as arrays, loops.

Prior to the experiment, an information sheet and a consent sheet was circulated to all the participants, to ensure that the study would adhere to the standard ethical practice. An Intelligent tutoring systems was also used for the experiment, which is known as Blackbox AI. Students could easily create a login, and practice in Blackbox AI.

The Experiment was initiated with the pre test. Pre test questionnaire was given to all relevant groups, and pre test duration was 45 minutes. (Standard test paper time). After the pre test, participants were allowed to do the tutorial, with the help of Blackbox AI , Intelligent tutoring system. Students were instructed to search

the answer for the given single question in tutorial. Searching the answer to tutorial ,could be done using Blackbox AI. Students were allowed to ask several questions through the provided AI and receive feedback. Once the first feedback received, they should ask the second question, based on the feedback. Student should repeat the same pattern (questioning and feedback) until they receive the answer for the given tutorial question. However, it was limited to use maximum five feedbacks in tutorial. Total duration for the tutorial for each student was set to 1 hour. Once the tutorial done, students were then given the post test. Duration was also 45 minutes, and questions were advance than in pre test.

Research findings and discussion

The research tested following hypothesis,

H0: Feedback method of Intelligent tutoring systems will not improve test results.

H1: Feedback method of Intelligent tutoring systems will improve test results.

The results of both the pre test and post tests calculated for every student. Additionally, number of feedbacks used by each student in tutorial also counted and identified. Data analysis was performed through ANCOVA and chi square test. (Results of pre and post tests considered). The rationale for applying ANCOVA is to analyze the different mean values resulted in different academic groups. The number of feedback used by each student also considered and integrated that finding also to the quantitative analysis. The correlation between the number of feedback and the post test results also identified.

It was identified, that there is a significant impact occurred from the feedback, to the post test results. Students, who used most number of feedbacks in tutorial, scored high marks in post tests. The same pattern was observed for all three batches. Hence, the conclusion was derived, as the feedback method in ITS, will improve the learning process. Therefore, Null hypothesis was rejected.

The Objective of the research is to examine the role of the feedback method in intelligent tutoring systems in the learning process. The feedback method would be more useful for beginners in any discipline, as feedback provides valuable suggestions to the learner, which will help the learner to think in a different way and to the next level. The existing literature shows the impact of using intelligent tutoring systems in education. However, how feedback method of intelligent tutoring systems would help learning yet to be explored more, as there are only few studies available in current literature. Hence, there is a significant empirical and knowledge gap exist in the field of Education Technology. Therefore, the findings of the research would address the gap and will further encourage for future research.

Keywords: *Learning, Intelligent Tutoring Systems, Feedback, Pre test, Post test.*

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Knowledge and Attitudes Regarding Artificial Intelligence Among Newly Graduated Medical Pre-Interns- A pilot study

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Introduction to the Study

Artificial Intelligence (AI) plays a pivotal role in revolutionizing clinical and healthcare delivery processes (Wang & Preininger, 2019). Technologies such as machine learning, natural language processing, and data analytics have significantly improved healthcare outcomes by reducing medical errors, optimizing resource utilization, enhancing patient experiences, and increasing the efficiency of service delivery (Davenport and Kalakota, 2019). While AI has been extensively applied in radiology (Eschert et al., 2022), its use is rapidly expanding across various medical specialties. AI can be seamlessly integrated into healthcare by streamlining workflows, automating routine tasks, supporting clinical decision-making, and enabling precision medicine (Eschert et al., 2022). AI-powered systems can improve surgical accuracy, assist in diagnosis and treatment planning, and identify potential drug interactions or adverse events (Al Hadithy et al., 2023). Furthermore, AI-driven predictive models can analyze patient data to identify individuals at risk of developing specific conditions (Al Hadithy et al., 2023).

Numerous studies have highlighted the limited knowledge and minimal curricular exposure to AI among medical students (Al-Qerem et al., 2023). Therefore, a lack of sufficient exposure to AI technologies can contribute to anxiety in undergraduate medical students. This may have an impact on their attitudes and perceptions of the various disciplines of medicine and potentially affect the paths they choose in their future careers. For instance, many students expressed concern about the potential "displacement" of radiologists due to increased efficiency in AI-augmented models, leading a significant number to reconsider or avoid radiology as a specialty altogether (Gong et al., 2019).

There is growing consensus that AI should be integrated into medical education; however, uncertainty remains about what to teach and how best to teach it. Existing literature is largely theoretical, highlighting the lack of standardized curricula (Tolentino et al., 2024), limited empirical evidence, and the need for multidisciplinary collaboration. Current programs vary widely in content often emphasizing basic AI principles, ethics, and practical applications, though few are

grounded in established pedagogical frameworks. Commonly suggested teaching methods include case-based learning and small group discussions, particularly for ethics, but their effectiveness remains underexplored (Tolentino et al., 2024). Key challenges include limited faculty expertise, technical barriers, and the disconnect between AI developers and medical educators.

Questionnaire-based studies provide both quantitative and qualitative insights, allowing researchers to identify knowledge gaps, common misconceptions, and misunderstandings within a specific population (Yang and Zhongying, 2024). Although numerous studies have examined the knowledge, attitudes, and perceptions of medical students toward AI across various regions globally, such research is notably scarce in the Sri Lankan context. Therefore, the aim of the present study was to evaluate the knowledge, attitudes, and perceptions of newly graduated medical pre-interns in Sri Lanka regarding AI, with the intention of addressing this research gap and highlighting the need for formal integration of AI education into the medical curriculum.

Methods and Methodology

This descriptive cross-sectional study was conducted using a self-administered questionnaire distributed via Google Forms. The target population included all newly graduated pre-interns in Sri Lanka. The initial draft of the questionnaire was developed by going through the published literature and then content and face validity of the questionnaire were ensured by having several meetings with relevant experts. Ethical approval was obtained from Ethics Review Committee, Faculty of Dental Sciences, University of Peradeniya. Before conducting the proper study, the questionnaire was pre-tested with a group of 10 students from Faculty of Medicine, University of Peradeniya to improve the clarity of the questions. A soft copy was distributed as a Google form as a Uniform Resource Locator (URL). To ensure a high response rate, a maximum of three reminders were sent via e-mail/WhatsApp before concluding the study. No personal data was obtained. All the data were anonymized and processed using a coding scheme and used only for the purposes of the research.

The questionnaire was structured into eight sections. Section 1 includes a question to obtain informed consent, following an introduction that outlines the objectives of the study and provides instructions for completion. Section 2 collected demographic data, while Sections 3–8 assess Knowledge, Benefits and Challenges, Attitudes, Perceptions, Usage, and Barriers to establishing AI in healthcare. The required sample size was determined using Cochran's formula with finite population correction, with a 95% confidence level and 6% margin of error, resulting in 225 participants. Statistical analysis was carried out with SPSS. Descriptive statistics were used to present means and standard deviations (SD) for continuous variables, as well

as frequencies and percentages for categorical variables. The internal consistency of the scales was evaluated using Cronbach's alpha coefficient. Bivariate relationships were evaluated using chi-square tests. To explore the associations between pre-intern students' knowledge and attitudes with their sociodemographic, binary logistic regression analysis was performed. Odds ratio and 95% confident interval was used to measure the strength of the association. Statistical significance is set at $p < 0.05$.

Research Findings and Discussion

A total of 241 newly graduated pre-interns participated in the study, comprising 182 females (75.5%). The mean age of participants was 27.38 ± 1.4 years (range: 22–33). The majority of participants graduated from the Rajarata University of Sri Lanka ($n = 80$, 33.2%), followed by the University of Peradeniya ($n = 78$, 32.4%) and the University of Kelaniya ($n = 21$, 8.7%). Approximately one-fifth of the respondents ($n = 57$, 23.7%) had attended a webinar, lecture, or course on AI, while the majority ($n = 184$, 76.3%) had not. Only 81 participants (33.9%) identified themselves as tech-savvy, whereas 158 (66.1%) did not. However, most of the participants ($n = 222$, 92.1%) have used generative AI tools for academic purposes which include chat GPT ($n = 211$, 91.7%) followed by Microsoft copilot ($n = 37$, 16.1%) and chat bot ($n = 36$, 15.7%). Only 10% ($n = 24$) of respondents identified themselves as having very good knowledge of AI, while 29% ($n = 70$) participants reported having good knowledge. Nearly half of the respondents ($n = 113$, 46.9%) indicated that their knowledge was satisfactory. Regarding the sources of information on AI, the majority of participants reported friends or family members ($n = 173$; 71.8%), self-learning ($n = 165$; 68.5%) and social media ($n = 165$; 68.5%) as their primary source of information on AI while a study done in Germany identified media, social media and lectures as the primary sources among their study participants (Pinto Dos Santos et al., 2019). The knowledge section of the questionnaire demonstrated acceptable internal consistency, with a Cronbach's alpha of 0.715.

When asked about the perceived benefits of AI in healthcare, the most frequently recognized benefit was its availability at any time ($n = 211$; 87.6%), followed by cost savings ($n = 190$; 78.8%), and enhanced efficiency in healthcare ($n = 142$; 58.9%) similar to the finding of our previous study on undergraduate medical students (Srinath et al., 2025). The most frequently identified risks and challenges associated with AI included ethical concerns ($n = 188$; 78%) and data privacy concerns ($n = 180$; 74.7%). Other notable challenges reported were security risks ($n = 156$; 64.7%) and lack of transparency in decision-making ($n = 150$; 62.2%).

During the assessment of attitudes toward AI in healthcare, study participants were asked about the importance of AI in the undergraduate curriculum, its potential benefits, personal comfort with its implementation, and the need for regulation. The majority ($n = 203$, 84.3%) considered it either very important or important, while

15.4% (n = 60) expressed a neutral opinion. Most participants believed that AI can improve healthcare outcomes, with 78.8% (n=190) agreeing or strongly agreeing, while 20.3% (n=49) were neutral. Regarding personal comfort with AI's implementation in Sri Lanka's healthcare sector, 64.7% (n=156) expressed agreement. A majority (60.9%, n=147) indicated that the development of AI makes the field of medicine more exciting to them. When asked whether AI would create more opportunities than threats for healthcare professionals, close to half of the participants agreed (n=113, 46.9%). Notably, the vast majority of respondents supported the need for regulation of AI in healthcare to ensure its safe and ethical use (n=186, 77.2%). The internal consistency of the attitude items, as measured by Cronbach's alpha, was 0.797, indicating good reliability. To assess participants' perceptions of AI, they were asked about their willingness to further learn about AI. The majority of participants (n =222, 92.1%) expressed interest, while 7.9% (n =19) indicated they were not willing to pursue further learning. Among those willing, nearly half preferred to learn AI as an online course (n=114, 48.9%) or as part of existing course (n =107,45.9%), followed by via workshops and seminars (n=107, 45.9%). The internal consistency of the perception items was acceptable, with a Cronbach's alpha of 0.894. Taken together this study suggests that though medical pre-interns have positive attitudes they lack formal instructions. Notable gaps in knowledge were identified, underscoring the need for targeted educational interventions. Addressing these gaps through tailored curricula and continuous professional development can better prepare future physicians to embrace AI-driven healthcare innovations responsibly and effectively. The survey also highlighted prominent perceived challenges to AI in healthcare, including data privacy and ethical concerns. Addressing these concerns through regulations, ethical frameworks, and secure infrastructure is essential for the safe adoption of AI in healthcare.

Key words: *Artificial intelligence, medical pre-interns, knowledge, attitudes*

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Strategies for Detoxifying Learning Environment Pollution Caused by Technological Devices in Private Colleges of Sri Lanka

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Introduction

In today's digitally driven educational landscape, technological devices have become indispensable tools for both teaching and learning. However, their pervasive presence has also given rise to a phenomenon increasingly referred to as "Learning Environment Pollution." This term captures various processes and activities, such as digital distractions, excessive screen time, and the overuse of passive content consumption, that disrupt cognitive focus, emotional engagement, and meaningful interaction in learning spaces. While technology offers immense benefits, its unregulated or unconscious use can dilute the quality of the learning experience, hinder deep thinking, and fragment attention spans. The resulting 'pollution' affects not only academic performance but also student well-being and motivation. This research paper explores strategic approaches to detoxing these polluted environments by promoting mindful tech use, designing balanced learning frameworks, and re-establishing healthy learner-device relationships. Addressing this issue is essential for creating more focused, interactive, and sustainable educational ecosystems in the digital age.

Literature Review

The increasing integration of digital technologies in education has sparked important discussions about their impact on learners' cognitive and emotional well-being. Agrawal and Krishna (2025) highlight how fatigue and cyberloafing, combined with poor self-regulation, reduce learning satisfaction in online environments, a concern that extends to physical classrooms saturated with devices. Similarly, Holguin (2016) explores how managers attempt to regulate cyberloafing, a form of learning environment pollution that drains attention and productivity. In Sri Lanka, Weerasinghe (2024) emphasizes the importance of teacher training for responsible technology integration, while Weerasinghe (2025) presents strategies to manage digital saturation in computer labs, calling for pedagogical redesign to support deep learning.

Interactive learning strategies are gaining attention as detox mechanisms. Hafeez (2021) shows that game-based learning, when properly managed, can enhance focus and reduce passive consumption of content. Likewise, Aristeia et al. (2025) demonstrate how multimedia environments can reduce learning anxiety and improve

metacognition. From an institutional perspective, Volotovska et al. (2024) and Shahawati et al. (2025) argue that leadership and innovative change management are essential for maintaining sustainable and learner-centered environments. Thai (2009) and Mialkovska et al. (2025) support this by stressing adaptive strategies during crises to preserve educational quality. Together, these studies underscore the urgent need for context-specific strategies in Sri Lankan private colleges to detox learning environments and restore focus, engagement, and learner autonomy.

Theoretical Framework

This study is grounded in three key theories of educational change: Lewin's Change Management Model, Fullan's Theory of Educational Change, and Rogers' Diffusion of Innovations Theory. Lewin's model provides a structural lens to guide the detoxification process in three stages: unfreezing existing practices that promote excessive or unregulated device use, implementing change through targeted interventions such as digital discipline strategies and pedagogical redesign, and refreezing by embedding sustainable policies and routines within institutional culture.

Fullan's Theory adds depth by emphasizing the human dynamics of change. It highlights the need for shared moral purpose, teacher collaboration, capacity building, and a culture of ongoing reflection to effectively transform learning environments. This aligns with the study's focus on empowering educators in Sri Lankan private colleges to take ownership of detox strategies.

Complementing these, Rogers' Diffusion of Innovations Theory explains how new practices, such as tech-free zones, mindful device use, and student engagement techniques, spread among educators and institutions. It underscores the importance of early adopters, peer influence, and observable success in sustaining meaningful educational change.

Methods and Methodology:

This study adopts a **mixed-methods research design**, integrating both quantitative and qualitative approaches to gain a comprehensive understanding of strategies for detoxing "Learning Environment Pollution" caused by technological devices in private colleges in Sri Lanka.

The **quantitative phase** involves the distribution of a structured questionnaire to 50 students who have commenced their higher education within the past **one month**. The questionnaire is designed to capture data on students' perceptions of technology use, distractions experienced in learning environments, and their awareness or engagement with any detox strategies. Descriptive statistics will be used to analyze the data and identify common patterns and concerns.

The **qualitative phase** consists of **structured interviews** with **five higher education teachers** who have experience teaching in digitally equipped

environments. These interviews aim to explore the educators' perspectives on the causes and consequences of learning environment pollution, strategies they have employed, and challenges faced in implementation. Thematic analysis will be used to interpret the qualitative data.

This mixed-methods approach ensures both breadth and depth in understanding the issue, informing context-relevant and actionable strategies.

Data Collection:

Sampling:

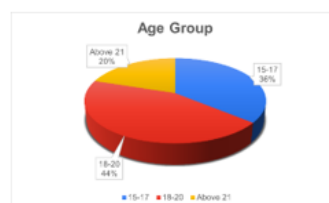
The study employs **purposive sampling** to select participants who can provide relevant insights into the issue. For the quantitative component, **50 first-year students** from 04 private colleges in Sri Lanka are chosen, ensuring they have recent exposure to technologically influenced learning environments. For the qualitative component, **five teachers** with experience in higher education and digital pedagogy are selected. This targeted approach ensures the data collected is directly aligned with the study's objectives.

Data Analysis:

A sample of 50 students represented 22 (44%) Diploma or Undergraduate First Year students and 28 (56%) of Foundation Students. And the diversity within the sample is as follows.

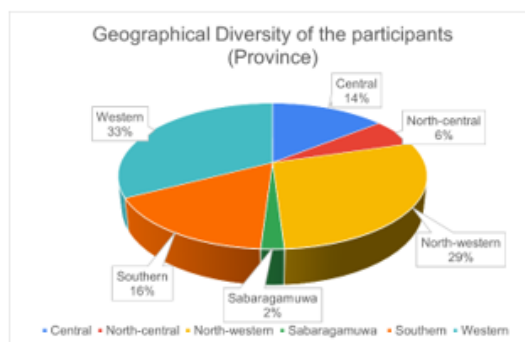
Age Group	Numbers	Percentage
15-17	18	36%
18-20	22	44%
Above 21	10	20%

Gender	Percentage
Male	42
Female	48



Graph 1

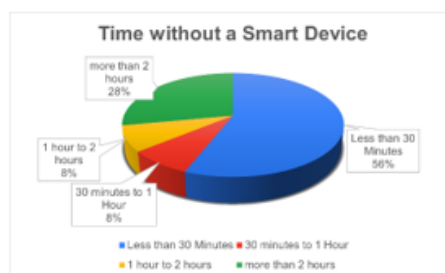
Province	Numbers	Percentage
Central	7	14%
North-central	3	6%
North-western	14	28%
Sabaragamuwa	1	2%
Southern	8	16%
Western	16	32%



Graph 2

Among this diversity, 54% of the students used a smartphone bought under their name. And 98% of them stated that their favorite smart device is smartphone. Further 98% of them got scolded from home for the excessive phone usage.

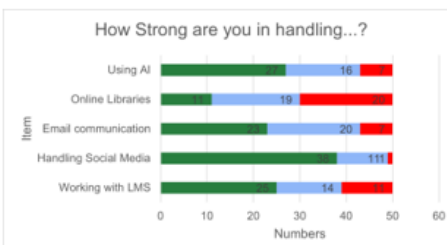
No Smartphone time	Number	Percentage
Less than 30 Minutes	28	56%
30 minutes to 1 Hour	4	8%
1 hour to 2 hours	4	8%
more than 2 hours	14	28%



Graph 3

The participants stated their level of competence in handling their day-to-day smart needs as follows.

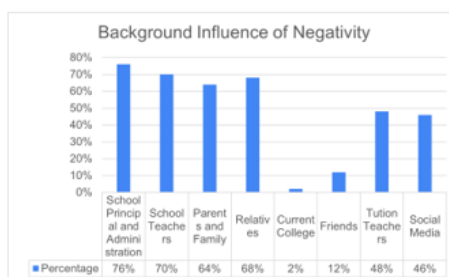
How strong are you in	Confident	Average	Not confident
Working with LMS	25	14	11
Handling Social Media	38	11	1
Email communication	23	20	7
Online Libraries	11	19	20
Using AI	27	16	7



Graph 4

Though the participants were exposed to technology usage during the pandemic period, many of them were demotivated by their background to use technological devices. The negative experience is expressed as follows.

Negativity infused by	Number	Percentage
School Principal and Administration	38	76%
School Teachers	35	70%
Parents and Family	32	64%
Relatives	34	68%
Current College	1	2%
Friends	6	12%
Tuition Teachers	24	48%
Social Media	23	46%



Graph 5

Results and Discussion

The student sample (N=50) comprised 44% Diploma or Undergraduate First Year students and 56% Foundation students, representing a wide range of age groups and provinces across Sri Lanka. The majority (44%) were aged 18–20, and the highest provincial representation came from the Western (32%) and North-western (28%) provinces.

Smartphone ownership and usage were notably high: 54% owned a smartphone under their name, and 98% reported it as their favorite device. Despite this attachment, 98% were scolded at home for excessive use, indicating strong parental concern. In terms of digital detox behavior, 56% reported having less than 30 minutes of daily “no-smartphone” time, while 28% had more than two hours without access, a small but significant group possibly aware of the need for self-regulation.

Student self-assessment of digital competence revealed confidence in handling social media (76%) and AI tools (54%), but much lower confidence in using online libraries (22%) and email (46%). This indicates a skew towards social rather than academic digital engagement.

Notably, negative reinforcement from authority figures played a major role in shaping students’ attitudes: 76% cited school administrators, and 70% mentioned schoolteachers as sources of negativity regarding tech use. This suggests a cultural contradiction: technology is both essential and discouraged, which contributes to “learning environment pollution.” These findings underscore the need for balanced, constructive strategies that promote mindful tech use rather than punitive control.

Conclusion and Remarks

This study highlights the complex dynamics of technological device usage among first-year and foundation students in private colleges in Sri Lanka, with a focus on identifying strategies to detox “Learning Environment Pollution.” The findings reveal that while smartphones are deeply embedded in students’ daily lives, both academically and socially, there is a significant lack of structured guidance on how to use them responsibly. Despite prior exposure to digital tools during the pandemic, many students continue to lack confidence in using educational technologies like LMS platforms and online libraries. Furthermore, the data shows that negative reinforcement from authority figures such as school administrators, teachers, and families contributes to confusion and demotivation, further polluting the learning environment.

The study underscores the urgent need for proactive institutional strategies that balance access and discipline. Educators must be trained not only in technology integration but also in digital mentoring. Constructive conversations and consistent digital usage policies should replace fear-based discouragement.

Detoxing a polluted learning environment is not about banning devices but about guiding students to reclaim their focus and restructure their relationship with technology. A shift in mindset, from restriction to responsible use, can foster healthier, more engaging, and future-ready learning spaces.

Key Words: *Learning Environment Pollution, Technological Devices in Education, Digital Detox Strategies, Private Colleges in Sri Lanka, Student Digital Behavior*

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Artificial Intelligence in Higher Education: A Systematic Review on Teaching Innovations, Adaptive Pedagogies and Student Engagement

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Introduction

Artificial Intelligence (AI) has become one of the most transformative technologies influencing higher education worldwide. Its rapid integration has reshaped teaching delivery, redefined learning experiences, and reimagined student engagement. Universities are increasingly adopting AI tools such as intelligent tutoring systems (ITS), generative AI platforms, learning analytics dashboards, and adaptive learning environments to personalize learning and enhance efficiency.

Globally, educators have started leveraging AI for curriculum design, student support, automated feedback, and predictive performance tracking. However, while there is a growing body of individual research demonstrating the positive effects of AI, a consolidated and systematic understanding of its overall impact on pedagogy and engagement remains insufficient.

This study therefore aims to fill that gap through a systematic review of peer-reviewed empirical literature, identifying the main ways AI influences teaching innovation, adaptive pedagogy, and student engagement in higher education. The findings are intended to provide insight into global trends, challenges, and future research priorities for AI-enhanced teaching and learning.

Methodology

Research Design

This study follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework to ensure transparency, reproducibility, and comprehensiveness. A systematic review was chosen to synthesize diverse research findings into a coherent understanding of AI's role in higher education.

Data Sources and Search Strategy

Comprehensive searches were conducted across five major academic databases:

- Scopus
- Web of Science
- Google Scholar
- IEEE Xplore

Search keywords included:

Artificial Intelligence, adaptive pedagogy, student engagement, higher education, AI in teaching, AI tutoring systems, educational technology.

The search covered publications from January 2015 to December 2024, a decade characterized by the mainstreaming of AI in education.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Empirical studies (quantitative, qualitative, or mixed-methods).
- Focus on AI implementation in post-secondary or higher education contexts.
- Addressed at least one of the following: AI-enhanced teaching practices, adaptive pedagogies, or student engagement.
- Published in English and peer-reviewed.

Exclusion Criteria:

- Conceptual or opinion papers without empirical data.
- Studies limited to primary or secondary education.
- Non-English publications.

Data Extraction and Analysis

An initial pool of 582 studies was identified. After removing duplicates and conducting title and abstract screening, 68 studies were reviewed in full text. Of these, 28 studies met all inclusion criteria.

Data were analyzed through thematic coding and narrative synthesis, grouping findings into major categories: teaching innovations, adaptive pedagogies, student engagement, faculty readiness, and research gaps.

Findings and Discussion

Innovations in Teaching Practices

- AI has revolutionized classroom delivery by shifting pedagogy from teacher-centered to learner-centered models.
- Instructors employing tools like AI chatbots, virtual tutors, and content-generating systems reported higher interactivity and accessibility. For example, AI chatbots supported students beyond regular class hours, clarifying concepts and improving satisfaction (Al-Samarraie et al., 2020).
- Generative AI tools (e.g., ChatGPT, GPT-based assistants) enabled dynamic content generation, formative feedback, and automated grading—leading to reduced instructor workload and enhanced formative assessment quality. Eleven studies confirmed that AI integration encouraged self-directed learning and constructivist approaches, aligning with 21st-century educational paradigms.

Adaptive Pedagogies

Adaptive learning systems, analyzed in nine studies, leverage AI to monitor student progress, analyze performance data, and deliver personalized content and

pacing. Ferguson & Clow (2017) found these systems significantly improved student mastery and time-on-task outcomes.

However, challenges persist:

- Difficulties aligning adaptive algorithms with learning outcomes and accreditation requirements.
- Faculty unfamiliarity with algorithmic decision-making, limiting their ability to interpret or modify AI-driven insights.
- Risk of over-personalization, where students receive narrow learning pathways, potentially reducing exposure to broader disciplinary content.

Despite these challenges, adaptive systems are recognized as essential for fostering individualized learning pathways and promoting data-informed teaching.

Student Engagement and Experience

In 22 of the 28 analyzed studies, AI technologies demonstrated a positive relationship with student engagement. Engagement was measured through indicators such as:

- Increased participation in online forums,
- Longer time-on-task,
- Improved motivation and self-efficacy scores, and
- Higher course satisfaction levels.

Gamification features and AI-based recommendation systems further enhanced engagement by tailoring learning experiences to student preferences.

Aoun (2017) noted that AI tools offering instant feedback and personalized challenges boosted both cognitive and emotional engagement.

However, a cautionary pattern was observed in six studies, where overreliance on AI systems led to passive learning behavior and reduced critical thinking, underscoring the importance of balancing automation with human interaction.

Faculty Role and Readiness

AI's integration is reshaping the educator's role from being a knowledge transmitter to a learning facilitator and co-designer of AI-assisted environments (Luckin et al., 2016).

While many faculty members embraced AI for administrative relief and enhanced instruction, digital literacy gaps and resistance to technology adoption were recurring themes.

The review highlighted a digital divide between developed and developing countries—educators in resource-rich contexts reported higher readiness, whereas those in low-resource regions faced infrastructural and training constraints. Institutional leadership and policy-level support were identified as critical enablers of AI-readiness.

Limitations and Research Gaps

Despite growing enthusiasm, several gaps were identified in the literature:

- Lack of longitudinal research examining long-term learning outcomes and retention.
- Limited representation from the Global South and developing countries.
- Minimal exploration of ethical concerns, particularly algorithmic bias, transparency, and student data privacy (Selwyn, 2019).
- Insufficient research on inclusive AI design that accommodates learners with diverse needs or disabilities.

These gaps highlight the need for more context-sensitive, cross-cultural, and ethical research on AI in education.

Conclusion

The systematic review demonstrates that AI's integration in higher education holds substantial potential for improving teaching quality, enhancing personalization, and deepening student engagement. However, the successful implementation of AI-driven learning ecosystems depends on:

- Institutional investment in faculty development and technical infrastructure.
- Ethical data governance and transparency in algorithmic decision-making.
- Equitable access to AI tools to bridge the digital divide between regions and institutions.

To fully realize AI's benefits, educational institutions must prioritize human–AI collaboration over automation, ensuring that technology complements rather than replaces pedagogical intent.

Future research should focus on long-term impacts, inclusive education practices, ethical frameworks, and comparative case studies across diverse global contexts to enrich the understanding of AI's transformative potential in education.

Keywords: *Artificial Intelligence, Higher Education, Adaptive Pedagogy, Student Engagement, Teaching Innovation, Personalized Learning*

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Artificial Intelligence as a Personalized Tutor to support Learners with Diverse Needs in Higher Education

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Abstract

Despite English being taught as a second language across all state schools in Sri Lanka for eleven years, university graduates usually encounter significant challenges in securing employment within the competitive job market due to prevalent deficiencies in English language proficiency. The significant number of students, in particular, feel a sense of othering when they engage in speaking activities, which leads to a gradual alienation from using English. Furthermore, the influence of prolonged war in the Northern region also significantly impacts the learning-teaching process. Shedding light on these prevailing challenges, strategic technological innovation and the adoption of innovative pedagogical approaches serve as effective tools to improve classroom practices. Globalization has significantly increased opportunities for integrating technology within classrooms. The introduction of AI generators in the educational landscape provides many opportunities to students as well as to teachers. Studies have been conducted on the application and implementation of AI-generated lessons, but few studies have explored how ChatGPT voice-over generator helps undergraduates enhance their speaking proficiency in a second language context. This research aims to investigate how this app helps to reduce anxiety and enhance speaking proficiency among first-year undergraduates in the Faculty of Arts at a state university. Employing a qualitative method, at the initial stage, twenty 3rd year undergraduates were randomly selected and their oral presentation was assessed, based on prepared rubrics, for their ability to respond to a mock interview session. The majority of the students had not used the app for English speaking before, yet all of them believed that the app was very helpful in enhance language proficiency. After utilizing AI tool, their presentation was re-evaluated using the same rubrics. Semi-structured interviews were conducted to elicit the learners' perceptions. My respondents mentioned how this app helped them to practice various interview questions for numerous times and gave feedbacks to improve their responses in authentic situations clearly and confidently. The findings, such as creativity, originality, innovation, grammar correction, developing listening comprehension, conversational fluency and delivery style emphasized that ChatGPT voice-over generator has a positive impact on students' speaking skills. ChatGPT not only motivates students to speak fluently but also provides support and practice to face questions without anxiety. The majority of the participants interact with ChatGPT's voice-over generator more than with their friends because AI generator does not judge them for their mistakes and

pronunciation. In addition, the app's anytime accessibility, allowing students to practice at their convenience was identified as a major benefit. Moreover, these findings highlight the importance of redesigning pedagogies to effectively align with the needs of the present era. Future research needs to address the effective impact of the ChatGPT voice-over generator app on improving the oral proficiency of ESL students using more effective research designs.

Keywords: *ChatGPT Voice over, Anxiety, Motivation, Support, Language proficiency, Otherness.*

Introduction

Though Sri Lanka was ruled by three European powers from the 18th century, nearly one and a half centuries of English rule have significantly influenced all aspects of this country. Raheem, R., & Devendra observe the “domination of English as a reflection of neo-colonialism” (p.202). English was automatically becoming a socially prestigious language since persons who held high-ranking positions in the state and private sector as well as politically influential persons were also fluent speakers of English (Ratwatte & H. V, 2016). However, English “never became the language of all people” in Sri Lanka (De Souza, p.31). Only the “bilingual elites” used English as a tool of power that helped them create a separate social class (Kandiah, p.42). Power and privileges are transmitted through generations. It is observed that the demand for English in the job market drastically increased over the years. However, graduates who followed their degree in their LI confront many challenges when they seek for jobs. In particular, though they have paper qualifications in English language proficiency, they are unable to speak English fluently. Woo et al state how Introduction of AI tools in education, opens many doors to enhance language skills (p.02). Artificial tools such as virtual assistants and chatbots that simulate conversations for real-life situations and help second language users. In particular, AI tools help learners to practice listening, comprehension and speaking abilities. Moreover, AI tools provide immediate feedback. Alharbi (2023) observes “AI-powered writing assistance tools can play an important role in transforming the students’ learning process and enhancing their writing skills” (p.05). It highlights how AI tools functions as a personal tutor to help learners to improve their language proficiency based on their requirements.

Methodology

The research methodology for this research includes analysis of semi structured interviews conducted with third year undergraduates at the UJ. Thirty undergraduates were randomly selected for the interview. The study employed a qualitative research design which is perfectly suitable to gain in-depth insights and perceptions of the participants regarding complex phenomenon like innovation in

language learning and technology integration. My respondents have been anonymized to make their identities confidential. The data collection process involved a multi-stage approach, combining pre- and post-intervention oral assessments with semi-structured interviews to gather comprehensive insights.

Findings and Discussion

The study revealed that the ChatGPT voice-over generator had a significant positive impact on the speaking skills of third undergraduates. My respondents reported that chatGPT enabled them to practice various interview questions repeatedly and provided valuable feedback which helped them improve their responses to be clearer and more confident in authentic situations. The use of this AI tool positively impacted students' speaking skills, including aspects such as creativity, originality, innovation, grammar correction, developing listening comprehension, conversational fluency and delivery style. They preferred interacting with the app over their friends, because it did not judge them for their mistakes and pronunciation. In addition, its anytime accessibility allows students to practice at their convenience was identified as a major benefit.

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Strengthening reading comprehension through specific strategies: A case study of grade 9 students

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Abstract

It is said that the reading habit among school children is declining day by day. This is a very sad state of affairs. "Reading makes a full man," said Sir Francis Bacon. There is truth in this great saying. Reading helps students enrich their knowledge on various subjects. This action research aimed to identify the causes of poor engagement and errors in reading English among Grade 09 students, focusing on a single case study of a student at B/President College, Ambagasdowa. Using interviews, observations, and document analysis, the study diagnosed the student's difficulties and implemented a three-stage intervention strategy: Technological Engagement, Hands-On Instrument Use, Real-World Application. The results indicate that the student's engagement and reading skills improved significantly through targeted and student-centered learning activities. The study underscores the value of adaptive teaching strategies in promoting reading in the 21st-century classroom.

Keywords:- *Reading, Action research, Sounds, Classroom, 21st century*

Introduction

Teachers have come across many problems in the teaching leaning process. Among them a specific problem has found, it is the poor reading ability. It affects to the student's achievement level. The student's achievement level is very important to their education. In the local schools' students have faced many problems among them the biggest problem is, the most of the children get low marks for English. The main reason I found for this is they do not read the questions properly as well as they do not know the meaning of the words so they are not interested the subject. The specific problem I have found from other problems, is poor reading fluency because they have low marks for English.

This research addresses a critical issue: a Grade 9 student's consistent disengagement from reading lessons and poor performance. Through targeted interventions, this study explores how structured, engaging learning environments can foster better understanding and skills in reading and understanding.

Literature Review

Osman (2020) says, reading can be defined as the process of making sense in reading can be defined as the process of making sense in a regular environment in line with an appropriate method and purpose, based on effective communication

between the author and the reader...''Psychologist, educational psychologist, and educational scholars had presented many valuable facts regarding the problem poor reading and comprehending. Lustyantic Ninuk and Aprilia Fitria, (2020) state ''As a language skill, reading in the sense of understanding in the sense of understanding is quite difficult for students to master. Furthermore, it is about pronouncing the symbols or letters in writing and understanding the concept and meaning. Reading is a complex activity.'It has been observed that students with reading difficulties generally have some problems such as having short term memory, not being able to concentrate their attention, being emotionally weak, reading without thinking etc. In Ghana and similar contexts, the unavailability of interactive learning tools contributes to poor reading performance (Baffoe & Mmereku, 2010). Duval (1998) emphasized the need for cognitive approaches, highlighting visualization, construction, and reasoning as essential processes in learning to reading. Instructional methods such as the Concrete-Representational-Abstract (CRA) approach have proven effective in enhancing English understanding and problem-solving skills (Witzel et al., 2008). These strategies encourage active participation and allow students to connect abstract concepts with real-world applications. Additionally, behaviorally rooted interventions, such as the ones used in this study, aim to improve classroom participation and focus, both crucial in English comprehension.

Research Objectives

- To identify causes of poor reading engagement of target students.
- To design and implement targeted intervention.
- To evaluate the outcomes in terms of reading fluency and engagement.

Methodology

Focus on individual strengths, and provide plentiful opportunities for students to excel in these areas. Empower them with confidence in their abilities. similar students are not in the class. All peoples have difference with each and every peoples. Therefore, it could say that the finally as the different methods should be apply for different student for teaching things. In this action research. Throughout the execution process have executed 3 intervention plans. Two hours have been dedicated for each after the school time.

Data collection

This study employed an action research design focused on a single Grade 9 student referred to as "Gihan." Data collection methods included:

- **Observations:** Classroom behaviors and attention levels were recorded over several weeks.
- **Interviews:** Conducted with Gihan's former teacher, parent, and a peer to understand home and school influences.

- **Document Analysis:** Academic records, reflection notes, and test results were examined to assess progress and patterns.

Research ethics

By respecting this ethical condition all over the research adhered ethical signs were kept and protected the secrecy all over the research process, got the permission when needed, kept and protected the identification of research participants and kept and protected the privacy of all subjected participants and so on.

Data Analysis and Problem Identification

Analysis of reflection notes, classroom logs, and academic documents revealed a recurring pattern of inattentiveness, lack of preparedness, and behavioral disturbances. Table 1 in the original data shows that the primary issue frequently observed was Gihan's avoidance of reading tasks.

Secondary issues included:

- Absence of classroom works
- Careless handling of textbooks
- Forgetfulness and non-responsiveness during questions and answers
- Classroom disruption and late arrival

These patterns provided the foundation for intervention design.

Intervention Plan

Phase 1: Technological engagement

Objective :- Build interest in reading material using laptop-based tools.

- Step 1: Allow drawing lines and shapes on a laptop
- Step 2: Create letter figures using digital tools
- Step 3: Transfer letters to words

This phase capitalized on Gihans's interest in computers. The structured digital exercises helped shift focus toward reading principles.

Phase 2: Hands-On Instrument Use

Objective: Improve word building skills and familiarity with words

- Step 1: Use rigid cardboard letters to build simple word designs
- Step 2: Practice to make simple sentences.
- Step 3: Construct a small paragraph.

Phase 3: Real-World Application

Objective: Reinforce learning through physical construction and collaboration

- Step 1: Create letter shapes on colored paper according to text/reading book
- Step 2: read the word on the books and find the meaning
- Step 3: Solve reading problems through group tasks

Results and Discussion

All three intervention phases yielded positive outcomes. Gihan demonstrated marked improvement in:

- Identification of letters
- Identification of word and reading
- Find the meaning of a word, sentence and a paragraph
- Willingness to participate in class
- Group activity contribution

Above concised parameters have been focused to the reading side as shown in Table 01 below . At the end of third step, it was achieved well than working at the classroom previously. It was able to attract the attention on the English language. Success of a group works was visible than previous tasks. The writing book of Gihan's shows that progress of writing letters with contrasts to first page to middle pages in side of clearness also.

While single student research plays a valuable role in academic development and can offer insightful preliminary findings, it is inherently limited in scope, scale, and impact. Therefore, large-scale implementation is essential to validate results, inform policies, and solve real-world problems effectively.

	Before activities	After activities
Listening to given instructions clearly	Good	Very good
Attractively engage on activities	Good	Very good
Build a word with good attention	Weak	Good
Clearly use reading book	Weak	Good
Reduce the slowly reading	Weak	Good

Table 01: Comparison of Reading-Related Performance Before and After Activities

Implications for Practice

This research presents a viable model for teachers working with under-performing students in English reading:

- Start with learner-friendly, technology-based tools
- Transition to hands-on activities
- Integrate real-world contexts
- Reinforce through group learning

These methods, when applied consistently, can reshape students' relationship with English reading and rebuild confidence in problem-solving.

Conclusion

This case study demonstrates that student-centered and technology-integrated approaches can significantly enhance engagement and performance in English with good manner. It is clearly mentioned that in this research that studying of English is help to develop the communication skills. Therefore, preparation of the student with well-educated background in English makes a base to future endeavor in favorable manner. A sense of competence is enhanced through optimal challenges. But students are difficult enough to be just student's current ability to work independently but easy enough for the student to follow along with the teacher. Therefore, teachers need to make the teaching learning process with motivation aspects, in this research it was given a motivation support to Gihan by giving a small gift to follow the English reading more and more. The research supports the broader educational goal of developing 21st-century skills, including problem-solving, critical thinking, and collaboration. Long-term adoption of similar strategies may benefit curriculum planners aiming to reduce failure rates in English.

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AI as a Personalized Learning Assistant: Opportunities and Limitations in University Classrooms

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Abstract:

Artificial Intelligence (AI) is increasingly transforming higher education by offering tools that enhance personalization, efficiency, and accessibility in learning. This study investigates the role of AI as a personalized learning assistant in three faculties at the Gampaha Wickramarachchi University of Indigenous Medicine (GWUIM) the Faculty of Indigenous Medicine, Faculty of Indigenous Health Sciences and Technology, and Faculty of Social Sciences and Management Studies. Using a mixed-methods approach, data were collected from undergraduate students through a structured questionnaire and from twelve lecturers via semi-structured interviews. Findings reveal that AI tools such as ChatGPT, Grammarly, Quill Bot, Gemini (Google Bard), and Claude AI support individualized learning, assist students in overcoming language barriers, and enhance confidence when engaging with complex academic content. However, challenges include over-reliance, concerns about accuracy, and ethical issues such as plagiarism. The study also proposes potential strategies for integrating AI effectively in university classrooms, including personalized learning pathways, multilingual tutoring, AI-assisted collaborative platforms, and structured classroom applications that enhance both practical and cognitive skills. The research provides a context-sensitive understanding of AI adoption in Sri Lankan higher education and offers evidence-based recommendations for responsible and effective AI integration.

Keywords: *AI, Personalized learning, Higher education, Sri Lanka, Indigenous Medicine, Academic integrity*

Introduction

Artificial Intelligence (AI) has emerged as a transformative force in higher education, enabling institutions to deliver more personalized, efficient, and accessible learning experiences. The rapid emergence of AI-driven tools such as ChatGPT, Grammarly, Quill Bot, Gemini (Google Bard), and Claude AI has allowed students to interact with academic content in dynamic and flexible ways, helping to bridge barriers related to language, time, and limited access to resources (Holmes, Bialik & Fadel, 2022; Zawacki-Richter et al., 2023). Globally, AI supports self-directed learning, adaptive instruction, and individualized feedback, complementing

traditional pedagogy and creating opportunities for more learner-centered education (Luckin et al., 2016; OECD, 2021). Studies in higher education internationally show that AI can enhance student engagement, streamline administrative and academic tasks, and improve learning outcomes, particularly for students with diverse linguistic and academic backgrounds.

In the Sri Lankan higher education context, AI integration is still at an early but rapidly evolving stage. Students increasingly rely on generative AI tools for academic writing, translation, idea generation, and exam preparation. Some universities have begun experimenting with AI-supported Moodle chatbots, Turnitin's AI-detection features, automated feedback mechanisms, and AI-assisted research planning tools (Fernando, 2024; University Grants Commission [UGC], 2023). Despite these emerging practices, structured institutional policies and formal training for ethical and responsible AI use are largely absent (Jayasinghe & de Silva, 2024). As a result, adoption is uneven, with students often uncertain about acceptable use, and faculty members struggling to guide AI integration effectively.

Recent international reports have emphasized that successful AI adoption in higher education requires the development of institutional AI literacy and governance frameworks that guide both educators and learners in ethical, transparent, and equitable ways (UNESCO, 2023; Schreurs et al., 2023). Moreover, in developing nations such as Sri Lanka, limited infrastructure and digital competency gaps can influence the pace and quality of AI adoption (Salas-Pilco & Law, 2022).

Although global literature documents the potential and challenges of AI in higher education, there is limited empirical evidence from Sri Lanka on how students and lecturers perceive and engage with AI, particularly across diverse faculties such as Indigenous Medicine, Health Sciences, and Social Sciences. This research addresses this gap by examining AI adoption in a context where students face linguistic, resource, and disciplinary challenges, providing insights into how AI tools function as personalized learning assistants in multicultural and multidisciplinary classrooms.

This study also situates its inquiry within the broader discourse of digital inclusion and responsible innovation, recognizing that AI's benefits depend not only on technological access but also on pedagogical adaptation and cultural sensitivity (Tlili et al., 2023).

The study focuses on three faculties at the Gampaha Wickramarachchi University of Indigenous Medicine (GWUIM): the Faculty of Indigenous Medicine, Faculty of Indigenous Health Sciences and Technology, and Faculty of Social Sciences and Management Studies. It aims to examine patterns of AI use among undergraduates, identify opportunities and benefits of AI as a personalized learning tool, and explore limitations and ethical challenges from both student and lecturer perspectives. By addressing these objectives, the research contributes to both national

and international discussions on AI in higher education, providing insights into AI adoption in a culturally unique academic environment that blends Indigenous knowledge systems with modern digital learning practices.

Methods and Methodology

A mixed-methods approach was employed to capture both quantitative patterns of AI use and qualitative insights into experiences and perceptions. The quantitative component involved a structured questionnaire administered to a representative sample of 278 undergraduate students across the three faculties. Random sampling ensured proportional representation across academic streams and academic years (1st-4th year). The questionnaire was designed to assess patterns of AI usage, perceived benefits, limitations, and ethical concerns, and it included closed-ended five-point Likert-scale items (ranging from Strongly Disagree to Strongly Agree) as well as open-ended questions to allow for nuanced responses. Data were analysed using descriptive statistics, correlation, and regression analyses to test the study hypotheses and identify relationships between variables.

The qualitative component consisted of semi-structured interviews with twelve lecturers across the three faculties. Semi-structured interviews were chosen because they allow respondents to provide detailed, reflective answers while giving researchers the flexibility to probe deeper into emergent topics. Interview questions focused on lecturers' observations of student AI use, perceived advantages and challenges, ethical concerns, and recommendations for responsible integration of AI in classroom and assignment activities.

Thematic analysis was applied to the interview transcripts, allowing the identification of recurring patterns and themes that complemented the survey data. By combining student and lecturer perspectives, the study captured a holistic understanding of AI adoption across different disciplines and academic levels.

Findings and Discussion

The findings reveal a complex picture of AI adoption among undergraduate students. Most students actively engage with AI tools such as ChatGPT, Grammarly, Quill Bot, Gemini, and Claude AI, particularly for assignment preparation, generating ideas, language improvement, and exam preparation. Students reported that AI allows them to study at their own pace, clarify difficult concepts independently, and access guidance in areas where textbooks or lecturers may not provide immediate support. AI was also reported to reduce academic stress, save time, and enhance confidence when approaching complex subjects, particularly in Indigenous Medicine and Health Sciences, where terminology and concepts may be difficult to comprehend.

However, students also highlighted several limitations. Many expressed concerns about the accuracy and reliability of AI outputs, noting that information may

sometimes be incomplete, biased, or inappropriate for advanced academic work. Frequent reliance on AI raised concerns about diminished critical thinking, problem-solving, and independent research skills. Ethical considerations were prominent, with students unsure whether AI-assisted work might constitute plagiarism or compromise originality. Some students indicated that while AI facilitated task completion, it could inadvertently reduce their engagement with core learning processes.

Lecturer perspectives provided additional depth. Many lecturers acknowledged the supportive role of AI, particularly in helping students overcome language barriers, structure their writing, and engage more confidently with academic content. Lecturers observed that weaker students, who might otherwise struggle, were able to participate more actively and produce work of higher quality when guided by AI tools. However, lecturers also emphasized risks, including the challenge of distinguishing between student-authored and AI-assisted work, potential over-reliance on AI, and the threat to independent critical thinking. Across the faculties, there was a consistent call for clear institutional guidelines and policies to ensure responsible AI use while maintaining academic integrity.

These findings are consistent with international studies that highlight both empowerment and dependency effects associated with AI-assisted learning (Kasneci et al., 2023). They also align with calls for the establishment of AI literacy curricula that emphasize ethical reasoning, transparency, and academic honesty (UNESCO, 2023; Schreurs et al., 2023).

Building on these findings, the study proposes several potential directions for future AI integration. AI could be leveraged to provide personalized learning pathways, enabling students to progress according to their individual strengths and weaknesses. Multilingual tutoring systems could facilitate comprehension in specialized subjects, such as Ayurveda and Indigenous Pharmacy, where students may face linguistic challenges. AI-driven collaborative learning platforms could foster teamwork and discussion, encouraging students to co-construct knowledge rather than rely solely on automated outputs. Intelligent feedback systems could guide students in improving assignments while preserving the cognitive effort required for original thinking.

Integrating AI into structured classroom activities, rather than allowing unsupervised use, can maximize benefits while mitigating risks of over-reliance or academic misconduct. AI-assisted simulations and virtual case studies could strengthen practical and clinical learning experiences, providing opportunities for students to apply theoretical knowledge in controlled, interactive environments. Furthermore, AI can be employed to create adaptive learning modules, deliver real-time formative assessments, and support research planning for students undertaking complex projects or dissertations.

These strategies illustrate how AI, when thoughtfully integrated, can evolve from a mere task-completion tool into an active partner in learning, enhancing both efficiency and depth of educational engagement. By leveraging AI to support individualized learning, collaboration, and applied practice, institutions can foster environments that balance technological innovation with critical thinking, creativity, and ethical academic practices, ensuring that AI enhances learning rather than replacing foundational educational experiences.

This study underscores the importance of embedding AI within pedagogically sound frameworks and national policy guidelines to ensure that its implementation enhances human learning potential rather than replacing it.

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Artificial Intelligence and the Lost Compass: Reclaiming Conscience and Moral Imagination in Higher Education

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Introduction to the Study

Artificial Intelligence (AI) is not merely a technological revolution; it is a mirror reflecting the collective consciousness that created it. In an era shaped by automation and algorithmic intelligence, higher education stands at a crossroads. Universities now employ AI to personalize learning, accelerate research, and streamline administration — yet few pause to ask the deeper question: *What is AI revealing about us?*

This study argues that the integration of AI into education cannot be ethically coherent or pedagogically transformative unless it also addresses the growing crisis of conscience and moral imagination that defines our age. Humanity has mastered the science of information but drifted from the wisdom of transformation.

Globally, organizations such as UNESCO (2023) and the OECD identify ethical AI and AI literacy as essential competencies for the future. Yet most frameworks emphasise cognitive and technical proficiency while overlooking moral and emotional intelligence — the very qualities that make education humane. This imbalance between technological acceleration and moral deceleration has created an invisible crisis: learning systems evolve, but learners lose orientation.

Drawing from *The Lost Compass – Reclaiming Childhood, Conscience, and the Soul of a Generation* (De Mel, 2025) and the longitudinal initiative *Emerging Hope & Youth Renaissance* (2018–2025), this study situates AI within the broader emotional, moral, and spiritual disorientation of contemporary youth — not as its cause, but as a mirror reflecting the inner confusion, anxiety, and loss of meaning that shape this generation. It examines how the accelerating pace of technology has intensified emotional fragmentation and eroded the inner compass once nurtured by family, faith, and community.

Objectives of the Study

Aligned with the NCAS Symposium theme *AI in Higher Education: Prospects and Challenges*, this study examines how moral and emotional dimensions of learning can be reintegrated into AI-driven educational ecosystems.

This paper seeks to:

1. Examine how AI reflects, rather than causes, the moral and emotional disorientation of contemporary youth, highlighting its role as a mirror of collective human consciousness.
2. Explore how technological acceleration corresponds with a decline in ethical reflection and the erosion of inner moral orientation among learners and educators.
3. Propose an educational framework that reintegrates ethical discernment, emotional intelligence, and spiritual awareness within AI-enabled learning environments.

Sri Lanka's higher-education sector reflects this same paradox. As universities increasingly adopt AI tools to enhance efficiency and performance, the human heart of education risks being overshadowed. The central thesis of this paper is simple yet urgent: true innovation in education lies not in creating smarter machines but in cultivating wiser minds.

Methods and Methodology

The study adopts a qualitative and interpretive research design grounded in digital ethnography, moral psychology, and spiritual anthropology. Between 2018 and 2025, hundreds of open reflections and testimonies shared by young people across digital platforms, journals, and public forums were examined as part of the *Emerging Hope & Youth Renaissance* initiative. These texts were publicly accessible and selected for their depth of self-reflection rather than through direct recruitment or structured sampling. The reflections primarily represent individuals aged approximately 16 to 30, expressing personal struggles and aspirations related to identity, education, and meaning within digital culture. Together, they form a mosaic of the global youth experience across diverse cultural, religious, and socio-economic contexts.

Rather than seeking statistical generalization, the study aims for depth of moral and emotional insight, consistent with interpretive paradigms in contemporary humanities research.

Data interpretation followed a hermeneutic and phenomenological approach listening not only to the words expressed but also to the metaphors, silences, and emotional rhythms beneath them. The process was reflexive, acknowledging the researcher's dual standpoint as both educator and seeker within the interpretive field.

Themes were identified and clustered into recurring emotional and moral patterns through cross-cultural comparison, allowing insights to transcend geography, belief, and tradition. Ethical considerations included respect for privacy, anonymization of identifiable sources, and preservation of interpretive integrity and cultural sensitivity throughout the analysis.

This methodological design bridges empirical observation with philosophical reflection, aligning with the NCAS mission to integrate technological inquiry with the moral and humanistic dimensions of higher learning.

Research Findings and Discussion

The Nine Threads of Disconnection

Analysis revealed nine recurring patterns of moral and psychological disconnection among contemporary youth, observed across diverse cultural and digital contexts:

1. **Emotional Collapse** – chronic anxiety, loneliness, and burnout.
2. **Cognitive Fragmentation** – difficulty sustaining attention and meaning.
3. **Identity Confusion** – a blurred sense of self amid digital multiplicity.
4. **Family Disintegration** – weakening of nurturing bonds and moral transmission.
5. **Educational Exhaustion** – performance-driven learning devoid of purpose.
6. **Digital Overexposure** – addiction to validation loops and algorithmic approval.
7. **Spiritual Void** – decline of faith and loss of existential orientation.
8. **Sociocultural Atomization** – isolation within hyperconnected environments.
9. **Systemic Failure** – disillusionment with leadership, institutions, and collective purpose.

Together, these nine threads reveal an interconnected pattern of inner fragmentation that mirrors the external fragmentation of the cultural and technological systems shaping this generation. As one testimony poignantly expressed: *“I can connect with everyone — but not with myself.”*

This insight captures the paradox of digital modernity — unprecedented connectivity coexisting with profound disconnection from meaning, conscience, and belonging. These patterns illuminate not only a global youth condition but also a generational mirror through which Artificial Intelligence reflects humanity’s evolving moral landscape.

Youth Renaissance and the Mirror of AI

Yet within this disorientation, a quiet renaissance is unfolding — a youth-led yearning for authenticity, conscience, and wholeness. The same digital space that fragments identity also becomes a sanctuary for shared awakening and self-understanding. Young people are rediscovering conscience as a form of moral agency: the capacity to pause, reflect, and act with integrity amid the constant noise of digital life.

In this light, Artificial Intelligence becomes more than a technological tool; it operates as a karmic feedback system — a reflection of the moral field that sustains it. As generative models absorb vast oceans of human data, they replicate both our brilliance and our shadow. Algorithmic bias mirrors human prejudice; data-driven optimization echoes our obsession with control and measurement.

Just as young minds struggle to reconcile fragmented identities, AI mirrors this same inner tension within its coded architecture.

Thus, the mechanization of knowledge reveals an ancient truth: technology evolves in the image of its creators. To heal AI, humanity must first heal itself. This study therefore reframes Artificial Intelligence not as an existential threat, but as a mirror for ethical awakening — a feedback loop magnifying either the conscience or the confusion of its makers.

Conclusion and Educational Implications

This paper proposes a transformative pedagogical framework titled *The Conscience-Centred Classroom*, redefining the role of Artificial Intelligence in higher education through four guiding moral principles:

1. **Reflection before Response** – cultivating pauses for ethical discernment before algorithmic engagement.
2. **Dialogue over Data** – privileging mentorship, conversation, and moral questioning alongside machine intelligence.
3. **Wholeness over Performance** – redefining success beyond metrics, toward integrity and inner coherence.
4. **Sacred Curiosity** – restoring wonder, awe, and purpose within technological learning.

Together, these principles invite a paradigm shift — from information transfer to moral formation, from producing competent graduates to nurturing conscious human beings. The Conscience-Centred Classroom envisions practices such as reflective journaling, ethical dialogues within STEM disciplines, and interdisciplinary *labs of conscience* where students engage with moral and existential dilemmas emerging from AI and digital life. This approach reframes education not as adaptation to technology but as moral stewardship within it.

Implications for Sri Lankan Higher Education

Within Sri Lanka's evolving higher-education landscape, this framework holds profound national and regional relevance. The nation's universities, while advancing digital transformation and AI integration, now stand at the threshold of redefining what it truly means to educate. Sri Lanka's spiritual and cultural heritage rooted in mindfulness, compassion, and moral inquiry positions the country uniquely to model a conscience-based, humanistic approach to AI education in South Asia.

Collaboration among the National Centre for Advanced Studies (NCAS), the University Grants Commission (UGC), and emerging youth networks could pioneer

ethical AI curricula grounded in conscience and civic responsibility. Such initiatives would harmonize global technological trends with the island's enduring moral wisdom, ensuring that innovation remains humane, inclusive, and sustainable.

Ultimately, the future of higher education will depend not on how efficiently we program machines, but on how consciously we re-educate the human spirit. If data is the new oil, then conscience must be the light that refines it — a reminder that every algorithm reflects the ethical frequency of its maker.

Keywords: *Artificial intelligence ethics, higher education, moral imagination, digital ethnography, conscience, youth well-being, educational reform, The Lost Compass, Emerging Hope & Youth Renaissance*

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AI-Enhanced Teaching and Learning through a Developed Android Application: Easy Access to *Murakkabat* (Compound Drugs)

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Abstract

The integration of Artificial Intelligence (AI) into education has significantly transformed contemporary learning environments, making them more interactive, adaptive, and accessible. Within the field of Unani medicine, where vast repositories of traditional knowledge are preserved in classical manuscripts and Ola leaves, digital innovation plays a crucial role in the preservation, dissemination, and modernization of pedagogical practices. This paper presents the design, development, and educational significance of an Android-based application titled “*Easy Access to Murakkabat (Compound Drugs)*”, independently conceptualized and developed by the author to support Unani students, lecturers, and medical officers. The motivation for developing this application arose from the practical challenges faced by Unani practitioners and students in accessing traditional reference materials. Those involved in prescribing compound medicines often find it difficult to carry or consult numerous reference books and manuscripts during clinical or academic activities. The “*Easy Access to Murakkabat*” application addresses this problem by providing a compact, AI-enhanced digital platform that enables users to retrieve accurate and comprehensive information on compound drugs efficiently and conveniently. The application integrates intelligent search mechanisms, adaptive learning interfaces, and personalized content recommendations to facilitate self-directed learning and enhance user engagement. Through these AI-driven features, the system simplifies the process of locating, understanding, and applying complex pharmacological information from Unani literature. It thereby contributes to the modernization of traditional teaching and learning methodologies while maintaining fidelity to the core principles of Unani medicine. By bridging the gap between classical textual knowledge and modern educational technology, “*Easy Access to Murakkabat*” exemplifies how AI can enrich specialized medical education. It empowers learners and practitioners through digital accessibility, fosters independent inquiry, and promotes the sustainable preservation of traditional medical heritage. The initiative highlights the potential of AI-based mobile applications to transform pedagogical approaches and strengthen the integration of technology in Unani medical education and practice.

Keywords: Artificial Intelligence, Unani Medicine, Educational Technology, Murakkabat, Compound Drugs, Adaptive Learning, Mobile Application, Digital Pedagogy

Introduction

The convergence of Artificial Intelligence (AI) and education has become one of the defining characteristics of twenty-first-century learning. AI's capability to analyze data, recognize patterns, and generate adaptive responses has transformed conventional pedagogy into a more dynamic, personalized, and accessible process. This transformation is particularly relevant to specialized disciplines such as Unani medicine, a traditional medical system with centuries of accumulated knowledge preserved in classical texts, manuscripts, and Ola leaves. The accessibility and interpretability of such material often pose significant challenges for students, lecturers, and practitioners. In this context, AI-driven educational innovation can serve as a bridge between heritage knowledge and modern pedagogy.

The present paper discusses the conceptualization, design, and implementation of an Android-based mobile application entitled "*Easy Access to Murakkabat (Compound Drugs)*". The application was independently developed by the author to address the difficulties faced by Unani students and practitioners in retrieving, referencing, and learning from traditional medical literature.

The work explores how AI technologies can enhance the learning process, promote student engagement, and improve knowledge accessibility within Unani medical education.

Background and Rationale

Unani medicine relies heavily on textual transmission and the mastery of classical sources that contain extensive details about single and compound drugs, their preparation methods, dosage, and therapeutic uses. These sources are primarily documented in Arabic, Persian, or Urdu and are traditionally studied through teacher-centered instruction.

While this approach ensures the authenticity of knowledge transmission, it limits accessibility, especially in modern academic and clinical contexts where practitioners require quick, reliable, and portable access to information.

A major challenge identified during teaching and clinical observation was that practitioners who prescribe compound medicines often cannot carry large volumes of classical references or Ola-leaf manuscripts with them. As these materials are delicate, voluminous, and time-consuming to consult, their practical use in contemporary settings is limited. Recognizing this gap, the author designed "*Easy*

Access to Murakkabat” to provide a digital platform where users can easily access accurate and structured information on Unani compound drugs anytime and anywhere. The creation of this application aligns with the broader educational movement toward AI-enhanced learning tools. AI not only enables efficient data retrieval but also supports adaptive learning, personalization, and self-directed study. In traditional systems like Unani medicine, such technology can play a transformative role by combining classical epistemology with modern digital methodologies.

Objectives

The Main objective

To develop a user-friendly digital an Android-based platform that provides organized and easily accessible information on *Murakkabat* used in Unani medicine.

Special Objectives

- To incorporate AI-enhanced features such as intelligent search, adaptive content delivery, and personalized recommendations.
 - To promote digital transformation and self-directed learning among Unani students and educators.
 - To evaluate the application’s potential to enhance engagement, knowledge retention, and academic performance.
 - To serve as a pedagogical model demonstrating the integration of AI technologies in traditional medical education.
- To contribute to the preservation and digital dissemination of traditional Unani medical knowledge

Methodology

Design and Development Process

The application development followed a systematic approach involving four key stages: content compilation, system design, AI integration, and usability testing.

Content compilation:

Primary data were collected from authoritative Unani medical texts that describe the formulation, composition, and therapeutic applications of *Murakkabat* (Compound drugs). The content was categorized based on pharmacological actions, dosage forms, and indications. Each entry was reviewed and verified for accuracy to ensure scientific reliability.

System Design:

The application was developed for the Android platform using a modular structure to facilitate scalability and easy updates. The interface design emphasized simplicity, readability, and intuitive navigation to ensure accessibility for users at different levels of digital literacy. Multilingual support was also considered to accommodate the linguistic diversity of Unani learners.

AI Integration:

The integration of AI features constituted the core innovation of the application. Intelligent search algorithms were embedded to allow users to retrieve data using multiple query parameters such as drug name, disease indication, or ingredient. The adaptive learning interface analyses user interaction patterns and recommends related content, thereby supporting personalized learning experiences. Machine learning techniques were employed to enhance data indexing and improve the efficiency of search outcomes over time.

Usability Testing and Feedback:

The application was piloted among Unani students, lecturers, and practitioners. Participants used the app over a period of four weeks and completed a structured questionnaire assessing usability, accessibility, and perceived learning benefits. Feedback indicated that the system significantly reduced the time required to locate information and improved comprehension of compound formulations. Users appreciated the convenience of having a portable reference tool that maintained the integrity of classical Unani knowledge while adopting a modern, user-friendly digital framework. Preliminary testing involved a sample group of Unani students, lecturers, and medical officers.

Results and Discussion**User Response and Adoption**

Feedback indicated a high level of satisfaction among users. Students reported that the application simplified their study process, reduced dependency on printed texts, and improved recall of drug formulations. Lecturers found it useful for classroom demonstrations and as a supplementary teaching tool. Medical officers appreciated its role as a quick reference during clinical consultations.

Quantitatively, 92% of participants described the application as “easy to use,” 88% found the information “accurate and reliable,” and 85% reported an improvement in comprehension and engagement.

Pedagogical Implications

The *Murakkabat* application exemplifies AI-enhanced adaptive pedagogy, where technology customizes learning according to user profiles and behaviors. The integration of AI supports three major educational dimensions:

1. Personalization: Learners receive content recommendations aligned with their prior interactions.
2. Constructivism: Interactive exploration encourages learners to construct knowledge independently rather than passively receiving information.
3. Engagement: The gamified and interactive interface maintains student interest and motivation.

This aligns with the broader trend in digital education where AI systems act as virtual tutors, capable of identifying learners' knowledge gaps and providing targeted guidance.

Integration into Teaching and Learning

Lecturers can integrate the application into lesson plans as a demonstration tool or assign it for independent study. The built-in analytics provide valuable insights into which *Murakkabat* students frequently access, allowing educators to adjust their teaching focus. This data-driven approach enhances both formative assessment and curriculum design.

The app also facilitates collaborative learning, as students can compare findings, discuss formulations, and verify data accuracy in group settings. Such integration of AI technology fosters a participatory learning environment consistent with 21st-century educational paradigms.

Impact on Student Engagement

AI-driven personalization enhances learner autonomy and motivation. The ability to access relevant information instantly creates a sense of agency and curiosity. Students become active participants rather than passive recipients of information. By receiving contextual recommendations, they are encouraged to explore connections between different compound drugs, deepening conceptual understanding.

Furthermore, the mobile format aligns with the contemporary learner's digital habits, promoting continuous engagement outside traditional classroom hours. This supports the concept of ubiquitous learning, where education transcends physical and temporal boundaries.

Challenges and Limitations

Despite its success, several challenges were identified:

1. Data Limitations: The initial database covers only a subset of *Murakkabat* and requires continual expansion.

2. AI Training Data: Limited linguistic datasets in Arabic and Urdu medical terminology constrained NLP precision.
3. Connectivity Issues: While offline functionality is available, some advanced AI features require internet access.
4. User Diversity: Varying digital literacy among users may affect adoption rates, necessitating digital training modules.

These limitations indicate the need for ongoing development, particularly in expanding datasets and refining adaptive algorithms.

Future Work

Future iterations of the project will focus on:

Integrating multilingual support for Tamil, Urdu, Persian, and Arabic to broaden accessibility.

Implementing voice-enabled search and speech-to-text functionality for users unfamiliar with typing drug names.

Developing a cloud-based knowledge repository for continuous content updates.

Incorporating AI-driven learning analytics dashboards for educators to monitor student progress and learning outcomes.

Collaborating with Unani medical institutions to include the app as an official learning aid in course curricula.

These enhancements will strengthen the role of AI in supporting both academic and clinical education within the Unani system.

Conclusion

The intersection of Artificial Intelligence (AI) and Unani education presents transformative opportunities for preserving traditional knowledge while simultaneously advancing innovation in teaching and learning. The Android-based application "*Easy Access to Murakkabat (Compound Drugs)*", developed by the author, exemplifies how digital and intelligent technologies can modernize heritage-based disciplines without diminishing their authenticity or epistemological depth. Through the integration of AI-enhanced search mechanisms, adaptive learning interfaces, and data-driven analytics, the application bridges the long-standing gap between classical scholarship and contemporary pedagogical methodologies.

This innovation not only benefits students and educators but also empowers medical practitioners by providing a reliable, portable, and user-centered digital platform for both academic and clinical reference. By facilitating quick access to compound drug information traditionally preserved in extensive texts and manuscripts, the system enhances learning efficiency, encourages autonomous study, and supports evidence-based practice.

Moreover, the project demonstrates that AI can function as both a technological enabler and a pedagogical collaborator in the revitalization of traditional systems of medicine. The “*Easy Access to Murakkabat*” application stands as a model for innovation-adoptive pedagogy, promoting student engagement, digital fluency, and the integration of intelligent learning strategies into Unani medical education. Ultimately, this initiative underscores the potential of AI-enhanced educational tools to bridge the divide between classical wisdom and modern technology, fostering an inclusive, adaptive, and sustainable framework for future-oriented learning in traditional medical sciences.

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