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Research Article

The Role of AI in Enhancing the Academic Achievement of Slow Learners in the Batticaloa District

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The Role of AI in Enhancing the Academic Achievement of Slow Learners in the Batticaloa District

Abstract. This study investigates the impact of AI powered learning systems on improving the academic achievement of slow learners within the 21st century educational landscape of inclusive education. The research seeks to determine how AI technologies can help identify specific student challenges, reduce learning gaps, and provide customized learning experiences. The ultimate goal is to build self-confidence, increase student engagement, and improve overall learning efficiency in the classroom. A main challenge identified in the study is the digital divide-the lack of technical facilities and internet access for students in rural and underdeveloped areas. To address this, a mixed-methods approach was used, involving 200students, 250teachers, 10 in-service advisors(ADS/ISAs), and

8oparents from all five zones in the Batticaloa District. Data on performance were collected through questionnaires, interviews, observations, and document analysis, with subsequent analysis performed using SPSS software. Findings indicate that AI-based interventions can significantly improve student achievement by creating customized learning paths and adapting the curriculum to individual learning speeds. AI's impact has fundamentally changed the roles of teachers, the tools they use, and the content they deliver. The research also revealed that AI tools can empower teachers to provide immediate and necessary assistance. The study recommends creating localized, interactive AI learning resources, offering comprehensive professional training for teachers, improving the distribution of technical facilities and fostering collaboration with policymakers. By implementing these recommendations, the country can better achieve its future educational goals and adapt to timely technological changes. This study also emphasizes the important of conducting research not only on future technological developments but also on the rapid change occurring in technology today.

Keywords: Slow Learners, AI, Inclusive Education, Junior Secondary, Achievement, Enhance, Technology.

INTRODUCTION

Inclusive Education (IE) is recognized as a fundamental right for all children, established as a significant international document in 1994 at the Salamanca Conference of UNESCO to address special needs, including those of slow learners. This research investigates the role of AI-powered learning systems in enhancing the academic achievement of slow learners within the 21st-century educational landscape. The core aim is to understand how AI technologies can identify specific student challenges, reduce learning gaps, and provide customized learning experiences. The ultimate goals for schools in Batticaloa, Sri Lanka, are to build self-confidence, increase student engagement, and improve overall learning efficiency. To address these findings, the study recommends creating localized, interactive AI resources, offering comprehensive professional training for teachers, and fostering collaboration with policymakers.

Significance

The study focuses AI's potential to enhance academic achievements of personalized and improving learning with challenges faced by slow learners in the Batticaloa District. Studies like those by Lucklin (2018) highlight AI's role in tailoring education to individual needs, motivations and technology. It shows lack of tech in rural areas effects learning and supports teachers providing help to slow learners for better outcomes in schools. Specifically, the lack of technical facilities and internet access in rural areas affect learning with necessary assistance to slow learners. It provides insights for educators, policy makers and researches on leveraging AI in education and addressing educational disparities shedding light on the digital divide with the impact on learning in rural areas in the schools. The curriculum is a document that prepares a child's education for social development, work and social life as it is a fundamental element in the development of learning and development (Open University of Sri Lanka, 2007).

LITERATURE REVIEW

Multifaceted socio-economic challenges faced by students in the Batticaloa district, including poverty, limited access to resources, and familial factors, which contribute to low academic performance and are a key context for slow learning (Dissanayake & Arulmoly, 2023). Traditional, teacher-centred pedagogical approaches in Sri Lanka, highlighting their ineffectiveness in addressing the unique needs of slow learners who require more personalized and differentiated instruction (Fernando & Perera, 2022). Strengths and weaknesses of inclusive education policies in the Batticaloa district, pointing out the lack of resources, teacher training, and individualized educational plans for students with special educational needs, which often includes slow learners (Karunanayake & Rajalingam, 2023). The local need for technology and provides an example of a grassroots initiative that lays the groundwork for more advanced

AI integration (Vanni Hope, 2025). Adequate teacher training in Sri Lanka to effectively use technology for teaching students with learning difficulties. A lack of technical skills and confidence among teachers is a major barrier to adopting new educational technologies (Kulatunga, 2023).

METHODOLOGY

General Objective

To know the positions of teachers in implementing AI education in schools with challenges they face, and to investigate the role of Artificial Intelligence (AI) in enhancing the academic achievements of slow learners in the Batticaloa District

Special Objectives:

1. To assess the effectiveness of educational interventions in improving academic performance of slow learners.
2. To identify the specific learning needs and challenges of slow learners in the Batticaloa District.
3. To design and implement educational interventions tailored to the needs of slow learners.
4. To examine teachers' educational background with attitudes and perceptions towards supporting slow learners.
5. To provide recommendations for educators and policymakers on enhancing learning outcomes for slow learners.

Research Questions

1. What is the effectiveness of educational interventions in improving academic performance of slow learners?
2. What are the specific learning needs and challenges of slow learners in the Batticaloa District?
3. How can educational interventions be designed to meet the needs of slow learners?
4. What are teachers' educational background and attitudes with perceptions towards supporting slow learners?

5. How can educators and policymakers enhance learning outcomes for slow learners?

Research Methodology

This is a survey study with a mixed research approach.

a) Method of data collection: Questionnaire, interview, documents were used to collect data in this study. The questionnaire consisted of direct, open-ended questions to collect reliable data.

Table-1: District level based population range - Batticaloa

Names of Educational zones	Batticaloa zone	Batticaloa Central Zone	Batticaloa West Zone	Paddiruppu	Kalkudah	Total
Number of Schools	65	77	68	70	85	364
Number of Teachers	1763	1800	850	1414	1294	7111
Number of Students	25405	36476	12712	20422	23807	119336
Number of Students (SEN in IE)	54	53	34	37	72	250
1AB	10	11	5	9	9	44
1C	12	13	10	15	9	58
Type II	23	15	19	16	28	101
Type III	20	38	34	30	39	161

(Source: Provincial department of education, planning division - 2024)

According Table 1: District level based population range of Batticaloa, the total number of schools in the Batticaloa region, Kalkudah has the highest number of SNE students, while Batticaloa West, Paddiruppu have the least number of schools. Most of the teachers are found in Batticaloa Central and fewer in Batticaloa West.

Table-2: Details of sample population

Names of Educational Zone	Schools (IE)	Principals	Responded (IE)		
			Teachers	Students	Parents
Batticaloa	41	02	51	54	61
Batticaloa Central	31	02	52	53	47
Batticaloa West	25	02	32	34	66
Paddiruppu	28	02	32	37	77
Kalkudah	49	02	73	22	49
Total	174	10	250	200	300

(Source: Prepared by Researcher, 2025)

According Table 2: Details of sample population of Batticaloa region; In schools with IE practices, 10AD**S**/ISAS(SE) and 10principals were selected by purposive sampling method. Similarly 250 teachers selected by stratified random sampling method and 200 students and 80 parents were selected from each zone of five zones by method of simple random sampling.

Data analysis

The data obtained through questionnaires, interviews and documents were subjected to quantitative and qualitative analysis based on the research questions and the obtained data were analysed using the SPSS 29.0 through grid diagrams, circular diagrams and three-dimensional maps, and interpretation and discussion were carried out.

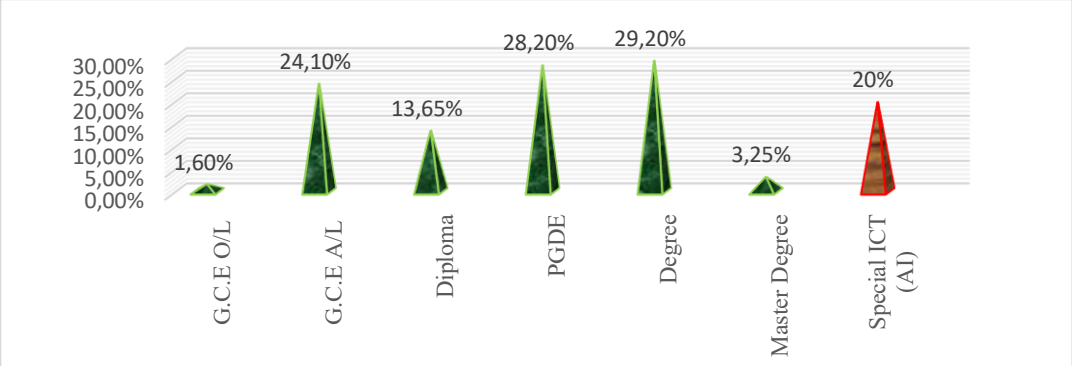

Figure-1: Educational background of teachers

According Figure-1: Educational background of teachers, most of the teachers found in Batticaloa area are graduates (29.20%). However, only 3.25% teachers have master's degrees and 20% teachers have special ICT courses for online teaching learning process of students with teaching practices in Batticaloa District. The data reveals that the largest proportion of teachers are graduate with a Degree, accounting for 29.20% of the total. Also highlights that 13.65% of teachers have a Diploma, and 20% have completed special ICT (AI) courses to support online and classroom teaching here.

Table-3: Teachers' revised response regarding implementation of school-based AI programs with digital transformation include online classroom activities for students

	Strongly Agree	*Agree*	*Neutral*	*Disagree*	*Strongly Disagree*
Marks	5	4	3	2	1
Respondent	48	102	50	30	20
	240	408	150	60	20

Total: 878 Score: 878/240 =3.66

1.00 – 1.8	*Strongly Disagree*
1.81 – 2.6	*Disagree*
2.61 – 3.4	*Neutral*
3.41 – 4.2	*Agree*
4.21 – 5.0	*Strongly Agree*

According Table-3: Teachers' revised response regarding implementation of AI and digital transformation in school-based online classroom activities for the students, typically they are used methods as Likert's scales of correlation coefficient "Agree" indicates AI perceived usefulness (High Mean score). The measure perception of Students and teachers generally "Agree" that AI-based tools and digital activities are useful for personalized learning as providing tailored guidance, content and feedback based on individual student needs and pace.

Spearman's Rank Correlation indicates (3.66) 'accept' and positive of establish relationships (strength and directions) between two ordinal variables. In this study, it would link various Likert's scale mentions "Perceived usefulness" and "Efficacy" These are Likert's score to an outcomes measure as rank of school performance. The Correlation of Perceived Usefulness; Student Engagement Strong Positive Correlation *(r_s ≈+.60 to +.80),* indicates that as students' perception of AI's usefulness increases, their engagement in online classroom activities also significantly increases. Anyway, the majority of the teachers have a positive perception of the practical plan and implementation of school based AI programs with digital transformation within online learning practice in the classroom of Batticaloa District.

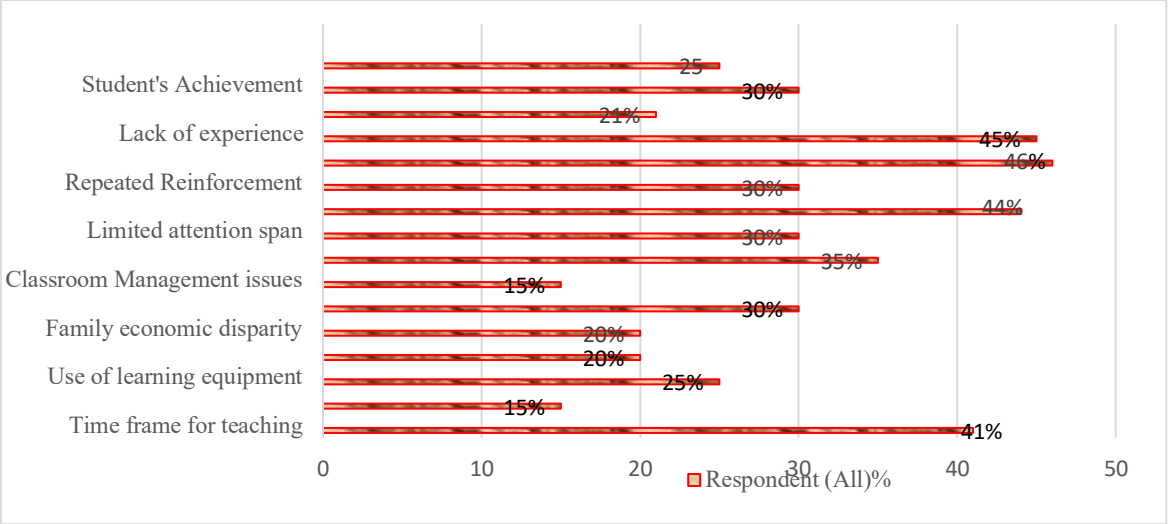

Figure-4: Challenges and learning needs related with AI role in schools

According, Figure-4: Challenges for teachers in AI teaching Emotional and behavioral part (46%), lack of experience(45%), time frame of teaching(41%), lack of proper involvement of parents (44%), Lack of technology(30%) and lack of experience(30%) and loss of human element(20%) were pointed out by most of them. Specially, More learning needs for slow leaners related with AI role in schools as personalized learning(35%), repeated Reinforcement(30%) and adaptive Assessments(21%) were pointed by them. However, the curriculum for AI training (25%) teachers' skills in the AI classroom, assessment and evaluation are better in Batticaloa District.

According Table-4: Response for the AI digital approaches and educational interventions, highest positive responses are highlighted the most positive views on activities, observations, evaluation for special Education of ISA/ADS in zonal. “AI school teaching with online classroom environment” with a value of 3.51. Although moderately positive responses are highlighted several statements received mean values in the mid range of positively.

Table-4: Response for the AI classroom practices

Response for the AI digital approaches and educational interventions	**Mean value**
How you feel about School, AI teaching with online classroom environment?	3.51
What are the supports of parents for enhance achievements of schools?	3.34
The relationship between the school's goal and AI online practices with equity?	3.41
Are you using new AI tools for all subjects with technological supports in class?	3.12
How do you feel about the school principal's support?	3.50
Activities, Observations, Evaluations for AI study of ISA/ ADS in School.	3.44
Support from other teachers in school practice for equity and accessibility?	3.12

Your ICT level of awareness support on AI teaching assessments for the students.	3.40
Organizational, institutional and stakeholder support for school activities.	3.14
According to whether Pre and post interventions assessments, remedial teaching, diagnosis test, and weekly assessments are included AI online activities.	3.46
Can you find fitfully changes of assessment scores and school performances?	3.21
Can you maintain evaluating student engagement and participation in AI class?	3.32
Are you follow tailoring instruction to meet individual needs ever?	3.12
What are the influences of poverty, isolation, resources and targeted materials?	3.29

However, These include the "support of parents for enhance achievements of schools "(3.34), "Relationship between the school's goal and AI online practices with equity" (3.41). However, there are positive opinions from mostly highlight scores, it was pointed out that the support and feedback available to the teachers less in this school practice of each zones in Batticaloa District

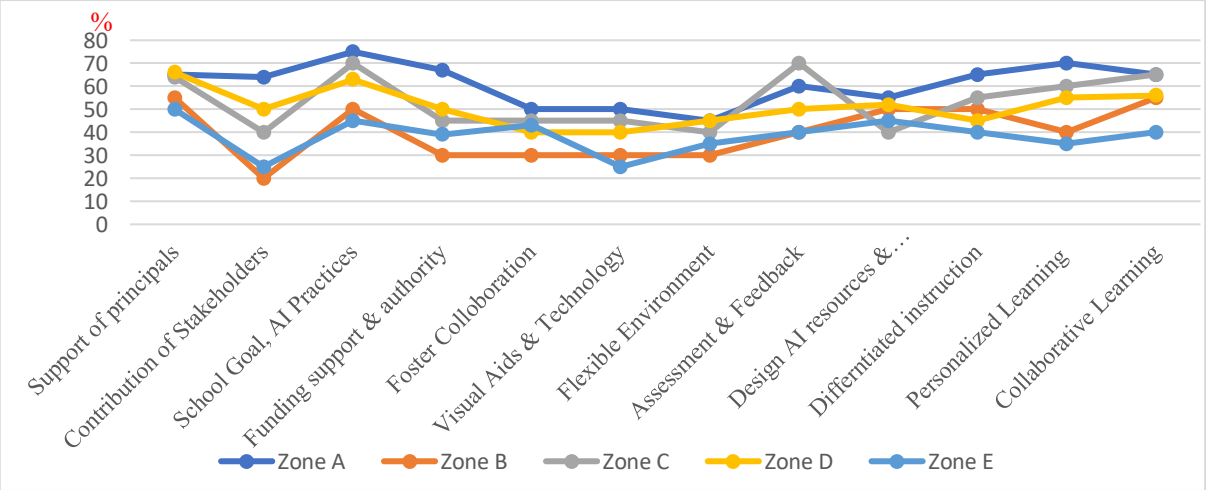

Figure-2: Perception for the digital transformation with AI technology

According Figure-2: All participants' perception for the digital transformation with AI technology, reveals significant regional variations in perception among schools in this five Zones at Batticaloa District. Zone A and Zone E generally show higher % of positive perception across most indicators. Kalkudah zone had a positive perception of indicators of "School Goals with AI practices" and " Support of principals', " Collaborative Learning" The Zone showed the best bullying and the least bullying Zone than other Zones related with AI transformation. Further that this indicates that while some schools may have strong administrative support, they might struggle with the practical implementation of technology or creating a collaborative learning with flexible environment in all schools of Batticaloa District.

CONCLUSIONS

- The main challenges of teachers in AI teaching, emotional and behavioral part(46%), lack of experience (45%), time frame of teaching (41%), lack of proper involvement of parents (44%), Lack of technology (30%), lack of experience (30%) and loss of human element(20%) are found.
- Learning needs of slow learners in AI schools as personalized learning (35%), repeated Reinforcement (30%) and adaptive Assessments (21%) are found.
- The curriculum for AI training (25%) teachers' skills in the AI classroom, assessment and evaluation are better in Batticaloa District.
- Most of the teachers found in Batticaloa area (29%) are graduated. However, 3.25% of the teachers have master's degrees; Only 20% teachers have received special ICT (AI) training to teach there.
- There are rarely support and feedback for teachers regarding curriculum restructuring activities, support of stakeholder, school performance and enhance achievements of students in five zones teaching (Principals70%, Teachers80%, ADS/ISA80%)
- It suggests that educational interventions with AI digital approaches are followed by mostly school each five zones (Principals80%, Teachers70%, ADS/ISA70%).
- In schools, remedial and active teaching, Pre and post interventions assessments and practical projects are followed somewhat better in classroom approaches. (Principals70%, Teacher 80%, ADS/ISA75%).
- The study finds strategies for support and enhance of slow learners as visual aids and AI technology, flexible environment, collaborative learning, assessment feedback, personalized learning and differentiated instruction in the zones of Batticaloa. (Principals80%, Teachers85%, ADS/ISA70%).
- The study finds implement educational interventions tailored to the needs of slow learners as collaboration (Foster), monitoring feedback, teacher training and parental involvement.
- This study finds learning needs of slow learners such as personalized learning, repeated reinforcement and adaptive assessment (Principals80%, Teachers75%, ADS/ISA70%).

RECOMMENDATIONS

Ensuring student safety and equal access to technology is crucial in Sri Lankan district schools. Prioritizing high-quality internet connectivity and hardware investments in schools, especially in rural areas, is essential. Educators need training to develop confidence and expertise in using technology to enhance teaching. Protocols for technology use in classrooms should be established, and content should be tailored to meet unique learner requirements. Teachers should focus on promoting critical thinking, creativity, and knowledge that goes beyond traditional tasks. Continuous ICT training for teachers is vital, and curriculum materials should be developed to teach students about technology applications and ethical risks.

Regular audits of technology systems are necessary to ensure inclusivity and equity for students from marginalized backgrounds. The primary goal should be to enhance human interactions, protect social and emotional learning, and prioritize

student progress and well-being. Current and target training programs must be implemented to develop the educator's confidence and expertise in the use of AI tools to enhance human led teachings. In 2026 educational restructuring, the protocols for the use of AI's classroom should be disseminated. Provincial and zonal level officials must intensify the continuous of the ICT knowledge of the teachers, the workshop and the workshops. Creating curriculum volumes for students to teach students about AI policies, applications and ethical risks.

REFERENCES

Dissanayake, P., & Arulmoly, C. (2023). Socio-economic factors and their influence on academic achievement in rural Sri Lanka: A case study of the Batticaloa District. *Journal of Educational Research*, 45(2), 112-125.

Fernando, S., & Perera, L. (2022). The effectiveness of traditional teaching methods for students with learning difficulties in Sri Lankan classrooms. *Sri Lanka Journal of Education*, 18(1), 54-68.

Karunanayake, C., & Rajalingam, N. (2023). Inclusive education policies and their implementation in the Eastern Province of Sri Lanka: A review of challenges and opportunities. *International Journal of Educational Development*, 98, 102715.

Kodituwakku, S. (2020). The digital divide and its impact on rural school education in Sri Lanka: A study of selected provinces. *Journal of Information Technology in Education*, 19, 581-600.

Kulatunga, D. (2023). Teacher competency and professional development in using technology for special needs education in Sri Lanka. *E-Learning and Digital Media*, 20(3), 324-340.

Rajapakse, A., & Jayawardena, S. (2022). Intelligent tutoring systems for remedial education: A review of global best practices. *Journal of Computers in Education*, 9(2), 245-260.

UNESCO. (2023). AI and education: Guidance for policy-makers. UNESCO Publishing.

Vanni Hope. (2025). Bridging the digital divide: Smart Board Project at Miani Technical Institute, Batticaloa. Vanni Hope. https://vannihope.org/education-support/smart-classrooms/bridging-the-digital-divide-smart-board-project-at-miani-technical-institute-batticaloa

Wettasinghe, A., & Hasan, T. (2007). Investigating the efficacy of the use of ICT for slow learners: Case studies in Singapore Primary Schools. *International Journal of Human and Social Sciences*, 1(1), 6-12.

National Institute of Education, (1991*). Classroom management and Inclusive education,* Part-1. Maharagama: Department of Teacher Education, National Institute of Education.

UNICEF. (2013). *Examples of inclusive education of SriLanka*. Retrieved from: http://www.unicef.org/rosa/inclusiveSlk.pdf

Ministry of social welfare.(2003). *National policy on disability for Srilanka*; Sethsiripaya Battaramulla SriLanka. Retrieved from: http://www.unicef.org/srilanka/disablitypolicy(1).pdf

Salomi,D. (2021). Slowlearning- causes, problems&solutions, *International journal of management technology and engineering, 8*(2249-7455).

LIST OF ABBREVIATION: ADS-Assistant Director in Service, ISA-In -Service Advisors, AI- Artificial intelligence, SNE- Special Needs Education