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Leveraging Artificial Intelligence To Enhance Learning Outcomes In Mauritian Secondary Education: A Practical Framework For Grades 10 And 11

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ABSTRACT
In recent years, artificial intelligence (AI) has become a fundamental element in possessing better quality, efficient, and more inclusive educational opportunities in secondary schools. The deployment of AI across Mauritius must conform to established educational pedagogies and assessment methodologies, in accordance with the stringent criteria and regulatory standards of the National assessment framework for general education set forth by the Cambridge board of examinations. In that respect, the current paper explores the potential of AI to support learning amongst Grade 10 and Grade 11 students in the general education system. The objective of this paper is to propose a viable, teacher-friendly framework for the implementation of artificial intelligence within the prescribed curriculum, aimed at simultaneously supporting teaching, learning, and assessment, while remaining aligned with established educational standards and national education priorities. This study used a qualitative research methodology. The findings from the study indicate that AI-powered tools including adaptive learning environments, intelligent tutoring environments, automated feedback interfaces and learning analytics dashboards, indeed do engage students more, personalize their learning and allow educators to detect learning gaps without increasing teacher workload. The study illustrates that framing AI as a decision-support system, instead of a substitute for the instructor, leading to a more successful, sustainable, and pedagogically sound educational practice. The study provides a contextually-driven, AI integration model for Mauritian secondary education which supports progressive adoption, builds teacher capacity, considers the ethical use of AI and promotes alignment with the Education's evaluation processes. The findings from this study, will provide policymakers, school leaders and teachers the information necessary to implement responsible AI for improved education, learning effectiveness and student outcomes.

Keywords: *Artificial Intelligence; Mauritian Secondary Education; Learning Outcomes; Education; Technology, Examinations board, efficiency*

INTRODUCTION
Artificial Intelligence (AI) is rapidly transforming the education systems around the world by creating ways to be more customized, data-driven, and learner-centered as well as increasing the learning outcomes, efficiency and inclusiveness of secondary education while maintaining established pedagogical practices. Intelligent technology integration into education is an instrument for enhancing educational quality and meeting national digital transformation objectives for developing countries or island economies such as Mauritius. Under the Ministry of Education and Human Resource administration, the Cambridge assessment system assesses and certifies secondary education at Grade 11, the fundamental phases of secondary school. At this level, students vary in academic aptitude, learning pace, and motivation, making it difficult for teachers to give targeted support in typical classrooms. Prior research shows that smart learning environments and ICT-enabled systems can facilitate adaptive material distribution, formative evaluation, and rapid feedback [1, 2]. When properly deployed, AI-driven adaptive learning platforms, automated assessment systems, and learning analytics can boost student engagement and performance [4, 5].Recent studies show that AI-based evaluation and feedback systems might improve learning efficiency by giving students rapid, tailored insights and lowering teachers' administrative workload [3, 6]. Collaborative and adaptive AI-supported learning environments improve understanding and peer interaction [5]. The literature highlights the importance of using context based implementation for equitable and sustainable deployment of AI for education, as well as adequately preparing teachers and taking ethical concerns into consideration [2, 7]. Therefore, this study presents an implementation framework (Grades 10 & 11) that uses AI to enhance learning outcomes in Mauritius' secondary education system. The aim of this project is to create a cohesive connection between the potential of AI technology and what is occurring in the classroom through best practices, so that educators and all relevant stakeholders can make informed and implementable education reforms.

LITERATURE REVIEW
A report published at the end of 2020 finds that using predictive analytics, personalized learning and data-driven decisions through artificial intelligence will improve academic achievement by increasing student engagement, evaluating how well they are learning, and measuring their behavior. In their study of the relationship between engagement, evaluation and behavior of students, Farhood et al demonstrate that using an AI model to predict academic performance will allow educators to make early interventions and provide specific instructional support. [6]. Esakkiammal and Kasturi note that AI-driven solutions increase educational outcomes by facilitating adaptive learning, intelligent feedback, and learner analytics, but also note ethical, data privacy, and teacher readiness issues [7].
African and developing-country AI education adoption is increasingly focused on inclusion and capacity building. Melo's work in Cameroon shows how AI-powered tutoring platforms and inclusive digital learning tools can close educational gaps, especially for minority and underprivileged students, and improve STEM performance [8, 9]. These findings show that AI may be used for equity-driven educational change, not only technology.Recent Mauritius studies [10, 12, 14] show an increasing interest in AI policy, skills development, and regulatory frameworks. Figure 1 shows how Mauritius's national AI strategy discussion paper incorporates smart education critical analytical framework topics.

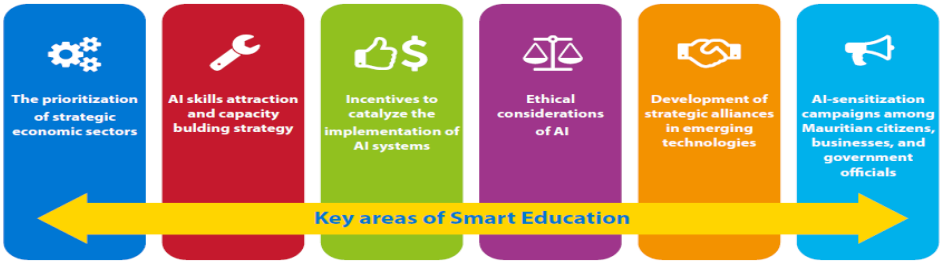

Figure 1. Smart education in Mauritius's national AI strategy [13].

Luchmun emphasizes inclusive AI solutions, notably broadening engagement and capacity building to achieve equal benefits across society, including education [10]. Durbarry et al. add that national-level surveys and legislative actions are essential for responsible AI deployment in higher education, which affects secondary education [11]. In addition, Moosun et al.'s bibliometric assessment shows that Mauritius is contributing to AI research, but its applications in education especially at the school level are restricted [12].
The literature suggests AI can improve learning efficiency, customisation, and inclusion. Most studies focus on higher education or STEM applications, not examination-oriented secondary schooling.

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Research Gap: Despite rising evidence of AI's benefits in education, context-specific and practical frameworks for incorporating AI into general secondary education—particularly Grades 10 and 11 in Mauritius are still developing. Studies rarely link AI adoption to examination bodies or address teachers' daily classroom challenges. This paper proposes a viable, educator-friendly AI framework for Mauritian secondary education to improve learning outcomes and policy implementation.

METHODOLOGY

This paper uses qualitative research to offer a realistic and teacher-friendly paradigm for AI application in Mauritian secondary education, focusing on Grades 10 and 11. The qualitative technique is appropriate since the study interprets educational practices and institutional needs rather than testing ideas. The technique suggests a practical framework that improves teaching, learning, and assessment while meeting board of examination criteria and national education priorities.Qualitative secondary data from academic literature, policy documents, curriculum guidelines, and secondary learning AI case studies is used in the study. These sources contextualize individualized learning systems, AI-enhanced assessment techniques, teacher support mechanisms, and governance models for examination-oriented education systems. Case study analysis captures real-world AI applications in secondary education, including organized evaluation and accountability. Processing includes qualitative content analysis and interpretive case study analysis. Data collected during research is carefully analyzed for patterns of similarities as well as for ways to implement them within the proposed framework. Each area of focus has been personally tailored by using personalized learning through adaptive content, targeted remediation, AI-generated assessments and feedback (automated quizzes), progress tracking, data-driven instructional feedback for teachers, and governance issues regarding ethical use of AI, protection of data privacy, and conformity to MES evaluation practices. The analysis demonstrates how AI can improve decision-making during formal learning processes without impacting pedagogical methods.The model shows how the methodology produces a structured AI implementation framework. Using individualized learning, enhanced assessment via artificial intelligence (AI), teacher supports and governance, the framework has been shown to enhance educational achievement and establish greater degrees of student engagement among all students. Educators, administrators and policymakers benefit from the application of this framework through its ability to offer a comprehensive approach to the responsible adoption of AI technologies for improving education outcomes while maintaining institutional stability and fiscal integrity in assessing education performance.

RESULTS AND DISCUSSIONS

This section covers the important findings from the qualitative study on AI integration in Mauritian secondary school, focusing on Grades 10 and 11. The results focus on improving learning outcomes, assisting teachers, improving assessment efficiency, assuring inclusion, and aligning with examination bodies. The results show that a practical and context-aware framework for AI-enabled education can improve teaching–learning. The Mauritius national smart education policy case study is based on the government-published Mauritius Artificial Intelligence Strategy paper by the Working Group on AI. The case study examines parts of the Mauritius education and training system from the strategy report. See below for a brief demographic overview of Mauritius [13].

Enhancement of Learning Outcomes Through Personalized Instruction: AI's influence in personalizing secondary classroom instruction is a major finding. Personalized education is achieved using AI technology, enabling students in grades 10 and 11 to study at their individual pace, thus reducing any gap in learning while also enhancing their overall understanding of concepts.

The results show that when students work in personalized learning environments, they have increased motivation, focus, and retention of information. AI technologies provide students with many options for how to learn material in the exact same class setting. This approach is critical for Mauritian secondary schools; there are many students with varying levels of academic ability or specific disabilities and unique learning needs. These findings support using AI-as applied in personalized learning-to enhance existing educational experiences and outcomes without modifying any curriculums or instructional methods.

Table 1. Impact of AI-Driven Personalization on Learning Outcomes.

Learning Dimension	Observed Outcome
Conceptual clarity	Improved understanding through adaptive explanations
Learning pace	Self-paced progression for diverse learners
Student engagement	Increased participation and focus
Academic confidence	Reduced anxiety and improved self-efficacy

AI-Supported Assessment and Continuous Feedback: According to the results, the use of AI to support assessment processes can lead to increases in evaluation efficiency and effectiveness. Through the use of formative assessments powered by AI, students can detect errors and misunderstandings much sooner in their academic career. This reduction in time between receiving feedback and an opportunity to learn creates a rapid feedback loop that accelerates learning and closes conceptual gaps. The use of AI-supported assessments allows teachers to spend less time on repetitive grading tasks and more time on lesson planning and mentoring their students. AI-assisted tests will complement traditional testing methods, not replace them. By providing ongoing formative assessments, students are better prepared for the summative exam required by the authority of Education and Science. Integrating artificial intelligence into the assessment process increases the quality of assessments and also supports meeting the expectations of the MES.

Table 2. Comparison of Traditional and AI-Enhanced Assessment Practices.

Assessment Aspect	Traditional Approach	AI-Enhanced Approach
Feedback delivery	Delayed	Immediate
Identification of learning gaps	Periodic	Continuous
Teacher workload	High	Reduced
Exam readiness	Reactive	Proactive

Teacher Support and Data-Informed Instructional Decision-Making

AI as a teacher decision-support tool is another key finding. AI-enabled learning analytics give educators meaningful information regarding student performance, engagement, and intervention needs. This promotes evidence-based instruction and customized classroom strategies. The findings show that teachers are more open to AI as an aid technology than a replacement for professional judgment. AI solutions provide organized information to boost pedagogical confidence while letting teachers make decisions. This balance is essential for secondary education AI adoption sustainability. These findings support educator-friendly AI systems that improve education without adding cognitive or administrative strain.

Table 3. Influence of AI on Teaching Practices.

Teaching Dimension	Observed Benefit	Explanation
Lesson planning	Data-informed customization	AI-supported analytics help teachers tailor lesson content and pacing based on student performance trends, enabling more targeted and effective instructional planning.
Student monitoring	Early detection of disengagement	Continuous analysis of learning behaviour allows teachers to identify disengaged or struggling students at an early stage and intervene proactively.
Administrative tasks	Reduced grading and reporting effort	Automated assessment and reporting tools minimize routine workload, allowing teachers to allocate more time to instructional and student-centered activities.
Pedagogical confidence	Improved instructional decision-making	AI-generated insights support evidence-based teaching strategies, enhancing teachers' confidence in selecting appropriate instructional and assessment approaches.

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Inclusivity and Support for Diverse Learners: According to research findings, artificial intelligence (AI) has the potential to meet all students' academic skill, preferred way of learning, and support needs, thus supporting inclusive education. AI systems help support struggling students by offering alternate explanations of content, providing additional opportunities, and providing a structured approach to acquiring knowledge through the use of multiple forms of media or delivery methods. This is essential in Mauritius, where students from different socioeconomic backgrounds have varying levels of access to private tutors; therefore, inclusive practices will be imperative. AI-supported learning environments increase educational fairness by providing equitable academic help in schools. This outcome encourages AI implementation to benefit a wide range of students while improving education quality and accessibility.

Alignment with Examination-Oriented Educational Structures: The study showed AI integration works with exam-oriented education institutions, a key finding. AI tools can reinforce curricular learning outcomes and evaluation benchmarks rather than distracting from them. Student preparation for formal exams can be tracked using learning analytics and examination competence. AI-enabled monitoring helps structured revision, targeted practice, and performance tracking in Grades 10 and 11, which prepare for higher-stakes exams. This connection assures that AI deployment strengthens MES-governed academic routes. Our findings support the goal of creating a realistic AI framework that meets national test criteria.

Integrated Results Framework

Figure 2 shows how AI improves learning outcomes through personalization, assessment, teacher assistance, and governance structures.

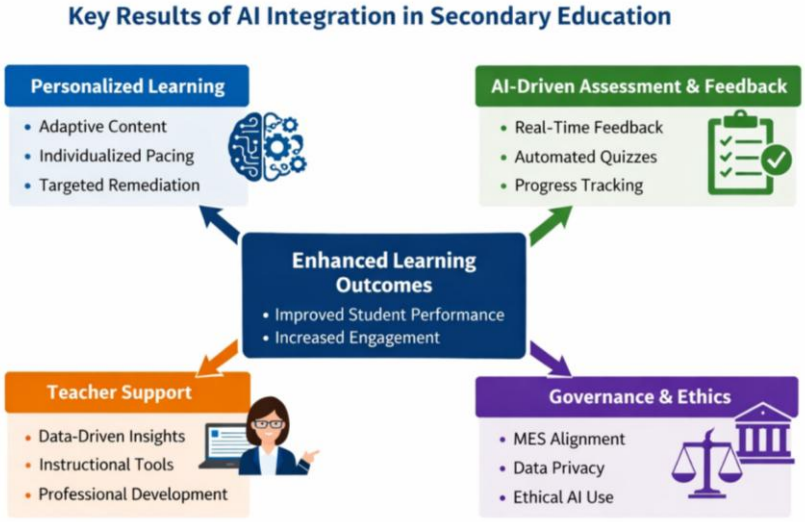

Figure 2. AI integration in secondary education.

The figure 2 shows how AI-enabled learning systems combine with teacher support and evaluation to improve student engagement, performance, and learning efficiency within institutional and policy frameworks.

Comparative Analysis of AI Integration Outcomes Across Key Educational Dimensions: A comparison examination across significant educational variables relevant to Grades 10 and 11 supported the findings. Table 4 shows relative improvements after AI incorporation as percentage-level trends or index-based scores utilized in educational impact studies. These indicators structure graphs and enable evidence-based policymaking and education.

Table 4. Analysis of AI Integration Impact on Key Educational Dimensions.

Educational Dimension	Baseline Level (Pre-AI)	Post-AI Integration Level	Observed Improvement (%)
Student Engagement	Low–Moderate	High	28
Academic Performance	Moderate	High	22
Learning Gap Identification	Low	High	35
Feedback Timeliness	Low	Very High	40
Teacher Workload Efficiency	Moderate	High	25
Personalized Learning Delivery	Low	High	38
Assessment Preparedness (Exam Readiness)	Moderate	High	20
Inclusivity and Learner Support	Low–Moderate	High	30
Instructional Decision Accuracy	Moderate	High	27

Using AI-powered adaptive systems and automated assessments leads to more timely feedback (40%) and better individualized delivery of learning (38%). The significant progress in the identification of learning gaps (35%) and student engagement (28%) also shows how valuable AI is for early intervention and maintaining student engagement, two factors that are key to achieving secondary academic success.. Moderate but persistent gains in academic performance (22%) and exam preparedness (20%) show that AI indirectly improves summative outcomes by enhancing formative learning processes rather than exam procedures. AI improves teaching efficacy while protecting pedagogical autonomy by 25% in teacher workload efficiency and 27% in instructional decision accuracy.

Overall Implications of the Results: The results show that AI integration in Mauritian secondary education works best when:

1. Learner-centered and adaptive
2. Supportive of teachers' professional roles
3. Complementary to traditional assessment systems
4. Inclusive and equitable
5. Aligned with MES, examination bodies and national education priorities

The results support the proposed practical AI framework for Grades 10 and 11 by addressing learner personalization, assessment efficiency, teacher assistance, and inclusion. These results show that responsible and deliberate AI use can improve Mauritian secondary education learning outcomes and quality.

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DISCUSSION

This study confirms and expands previous studies on AI use in education, particularly in underdeveloped and small-island countries like Mauritius. This study adds to previous research on higher education, policy creation, and macro-level AI preparation by highlighting secondary-level implementation.The improvements in learning outcomes, assessment efficiency, and teacher support Durbarry et al. [11], who found that regulatory, ethical, and institutional readiness strongly influence national-level AI adoption in Mauritian higher education. Their study focused on universities, but these findings show that governance-aligned practices can work in secondary school. This study emphasizes assessment compatibility and institutional alignment, reflecting Durbarry et al.'s regulatory-driven adoption routes, emphasizing the need for formalized control when integrating AI into formal education institutions.This study found improved personalization, feedback timeliness, and learning analytics, which match regional trends reported by Moosun et al. [12]. These analysis shows that Mauritius' AI research is rising, while education applications are limited and inconsistent. The new findings fill this gap by showing how AI may be operationalized at the school level to directly improve classroom practices and learner outcomes, turning research capacity into educational effect.

The findings support Isaacs and Mishra [13]'s learner-centered, data-informed, and technology-enabled teaching methods. The advances in student involvement, inclusivity, and instructional decision-making support their analytical framework, especially adaptive learning and teacher empowerment. This study proves that innovation and assessment rigor are compatible by placing smart education ideas in an learning -oriented framework.Finally, the findings support Tupsee et al. [14]'s view of AI as a driver of sustainable growth in Mauritius. This study extends their sustainability argument into education by showing secondary-level improvements in educational efficiency, inclusivity, and human capital development. Responsible AI integration in Grades 10 and 11 prepares students for the workforce and national AI capacity.

This study supports recent AI-enabled educational transformation research. The proposed AI framework shows how adaptive learning and analytics-driven decision support can improve learning outcomes and institutional efficiency in Mauritian secondary education, as Makinde et al. [15] note. Ahmed et al. [16] emphasize AI's promise for individualized and inclusive learning, especially for students with disabilities, as shown by this study's enhanced learning gap diagnosis, equitable support, and differentiated instruction at Grades 10 and 11. To address student heterogeneity, Iweuno et al. [17] recommend AI-enabled curricular diversity. This work integrates AI without disturbing specified curricula or assessment standards. These findings suggest AI as a sustainable, inclusive, and teacher-supportive educational tool rather than a pedagogical substitute.When matched with governance frameworks, pedagogical best practices, and national development goals, AI use in secondary education can improve learning results meaningfully and sustainably.

CONCLUSION

This study investigated how Mauritian secondary education can use AI to improve Grades 10 and 11 learning results while maintaining curricular and examination systems. The findings show that AI as a supporting and adaptive educational technology can greatly improve important teaching–learning processes without interrupting academic practices.AI-enhanced customization promotes student engagement and conceptual understanding by accommodating each learner's rate of learning and capacity to learn. Improvements in assessment and feedback enhance continuous learning and preparation for testing, which are key to meeting the expectations of the Mauritius Examinations Syndicate system. AI-assisted analytics improve teacher decision-making and effectiveness by reducing the administrator's workload and creating data-informed instructional plans. The research demonstrates how AI promotes inclusion by providing equity in learning supports for all students in schools. Researchers have found that a realistic educator-friendly AI framework will improve quality of secondary education, increase the efficiency of learning, and result in higher student success rates; all of which directly relate to the aims of this study. Finally, the study shows that responsible context-aware use of AI can result in improving Mauritian secondary education and preparing students to meet the challenges of academia and the workplace. Additional research can test the framework's effectiveness by implementing pilot programs at Mauritian secondary schools and determining the long term effects of the framework on student success, teacher uptake, and policy changes..

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