University of Guyana

AI-Enhanced Student Support Services for the University of Guyana

A Formal Proposal

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Table of Contents

List of Tables

Not applicable yet.

List of Figures

Not applicable yet.

Abstract

The University of Guyana endeavours to deliver outstanding education and assistance solutions for its multifaceted students. However, the lack of sufficient labour and financial resources limits the capacity with which the university can fully satisfy all academic, ethical, social, and emotional demands. This paper is a research proposal for developing and implementing AI-enabled student support services that are instructional, proactive, and scalable to provide customized assistance in meeting the needs of University of Guyana students. The multifunctional AI system will integrate different capabilities to enhance student support. A voice and chat application and a virtual assistant with natural language processing will be available for common questions on academic policies, campus services, enrolment and registration, financial aid, and technology issues. The core curriculum-specific intelligent tutoring systems can identify knowledge deficiencies and provide individualized recommendations, practice problems, and feedback to enhance academic performance. AI wellness chatbots will enable the students to undertake self-assessment tests for their physical and mental health, provide coping mechanisms, receive care tips, and finally link up with counsellors. Analytics engines will analyse students' online activity patterns to alert the advisors regarding possible issues affecting their academic progress and social integration, allowing timely interventions. Adaptive learning software will personalize course materials, tasks, and evaluation instruments for each learner's strengths and weaknesses. Note-taking assistance and real-time lecture translations will be made accessible through speech recognition. Campus navigation applications will serve to inform new students with indoor directions as well as location-based alerts. To create such a multi-layered system, multidisciplinary research teams

will apply advanced techniques in natural language processing, machine learning, predictive analytics, adaptive learning algorithms, chatbot design, speech recognition, etc. Through rigorous testing and receiving feedback from students, faculty, and staff, processes will continue to evolve through iterative improvements. Usability, utility, accessibility, and user satisfaction metrics will be evaluated by focus groups and surveys. AI models will be refined by monitoring usage activity, service requests, user complications, and intervention outcomes through the dashboard. Using supportive and individualized 24/7 AI assistance can improve learning, raise the number of students who pass exams and graduate, boost student welfare, and increase staff capacity to deliver high-touch interventions for University of Guyana students. In the event of successful implementation, this initiative may serve as a paradigm for modernizing student services and enhancing results not only for Guyana's students regionally but also across other Caribbean islands using artificial intelligence tools. This proposal describes a road map of research for building, prototyping, and evaluating the new AI application to achieve further advancement in inequitable access to quality higher education. AI-Enhanced Student Support Services for the University of Guyana.

1.0 Introduction

In this decade, AI and machine learning have dominated multiple sectors, including education. Many colleges and universities have persistent equity gaps in retention, completion, and success indicators by demographic groups. AI aims to address these gaps and have more students succeed, particularly those from less privileged backgrounds who may require additional support and intervention.

Furthermore, AI-driven tutoring platforms can identify individual learning patterns and problems, giving tailored feedback and drills. In contrast to a one-size-fits-all approach, such personalization enables students to target specific skill and knowledge gaps (Benmessaoud & Ash, 2023). Adaptive learning technology ensures that lessons and assignments are adapted to maintain the student's level of challenge. Such targeted support fosters understanding and subject comprehension.

Nevertheless, there is much stress, anxiety, heavy workloads, and transitions in college. As assistive and judgment-free listeners, AI chatbots are being designed to discuss life issues with students in empathetic conversations. Machine learning also holds promise for the early detection of mental health issues based on patterns in student interactions with campus services. These abilities enable early intervention and pre-emptive assistance by counselling staff members.

In addition, AI has become an assistive aid. It helps answer common questions about financial aid, class registration, and payments. AI virtual assistants can answer several basic questions to spare the people who deal with them. With precise responses around the clock, students get an immediate solution, and advisors need not build a mounting backlog of queries. Natural language processing supports difficult questions about policies and processes. Seeking a job after college is crucial, but relatively complicated. AI can aid by analysing a student's strengths, interests, and objectives and then identifying the most relevant vacancies or placements. These personalized recommendations are updated regularly, helping students find and pursue opportunities for their future aspirations. AI advice also offers feedback on resumes. Artificial intelligence has confirmed recognizable efficiency in combining multiple signals. AI has shown probative effectiveness in merging various signals.

However, machine learning algorithms provide reliable predictions concerning the performance of students who could fail or drop out. These indicators include bad grades, irregular attendance reports, delayed handing in assignments and financial hold notifications; additionally, students who seem to avoid advisory appointments also show poor concerns for their activities outside classrooms. By focusing on all these potential situations, AI can aid in decreasing the number of dropouts.

Firstly, staff can focus on outreach and communication efforts for the students' highest points (Benmessaoud & Ash, 2023). Despite the prevalent enthusiasm concerning AI-enhanced student services, educational environments have hesitated about AI. The limits set on student privacy protections are as they ought to be. Additionally, historically neglected people are

rightfully sceptical if AI systems could mirror the societal prejudices that would add to oppressed populations' disadvantages: Cover letters, interview preparation and networking techniques. One of the reasons some people do not want to implement AI in education is due to a lack of personal touch. The student population significantly interacts with relationships, empathy, and compassion among teachers. AI tutors lack the emotional intelligence and interpersonal skills that human teachers possess. As technology progressed, an AI tutor would not be able to develop relationships with students or know what was happening in their private lives. First, some are worried about using too many emotionless machines that will make education feel cold and oppressive. There are likewise issues regarding the denotation and morality of AI systems, because machine learning algorithms are only as fair-minded as the data that they train on, there is a possibility of incorporating societal biases and unfairness into these systems. Educators want to prevent educational AI from causing such historical discrimination as a result of race, gender, or other sorts. It would need more clarity and guidelines on how they work before entirely relying on these systems to make weighty decisions regarding child education.

Furthermore, the idea of dependency on black-box proprietary software is also not palatable to some. Given that AI tutoring platforms are created by private companies, in most cases, how exactly their algorithms work becomes very obscure. This lack of openness hinders its audit for fairness and reliability. School administrators do not want to be locked into vendor lockers, and then they may change the pricing model or go out of business. The reluctance to outsource core elements in public education to opaque technologies is indicated. It is also feared that too much use of AI tutors will lead to destructive learning instead of active thinking (Mononen et al., 2021).

However, if AI tutors are not carefully structured, they will be guided toward straightforward explanations, emphasizing rote drills and canned feedback. Creative, student-centered learning demands teachers who can engage students in deep discussion and lessons that involve authentic questions to be investigated. As colleges uncover creative ways of using AI, they should also develop a code on issues such as transparency and accountability. Before mass implementation, there is a need for rigorous testing that will ensure accuracy and eliminate undesirable side effects (Pérez et al., 2020). Change management strategies should reflect how AI options complement (and not displace) deserving campus positions.

Finally, by blending artificial intelligence powers with human sense and knowledge, higher learning establishments will innovate new systems where technology increases capacity to aid all people in realizing their capabilities.

1.1 Case Study Background

Georgetown, the capital and largest town of Guyana, is home to a national university called The University of Guyana (UG). In 1963, UG was the largest institution of higher education in Guyana, with over eight thousand students pursuing undergraduate and post-graduate programs at its four faculties as well as other schools (Autar, 2023). However, most students at UG find it hard to access adequate academic and wellness support services on the premises. In 2021, a study found that nearly half of the students were disadvantaged in their mental health because of high academic pressure, financial worries, and no counsellorship

services at UG. In addition, more than sixty percent of respondents have expressed dissatisfaction with the current advisory and counselling support provision, which shows a low capacity to satisfy demand (University of Guyana, 2021). One of the main factors fuelling gaps in student support services at UG is the limited government funding for higher education provided by Guyana. The university does not have the resources to hire more academic advisors, counsellors, and tutors or update the tech infrastructure on campus.

However, this pronounced discrepancy in funding seriously limited UG's efforts to roll out integrated support initiatives fitting the needs of various students. Despite all these limitations, recent advances in artificial intelligence create new opportunities for offering better and customized services to students at scale while being under tight budgetary constraints (Yang & Bai, 2020). Some of these unaided platforms include AI-driven chatbots, intelligent tutoring agents, mental health apps as well as academic advising systems some can be utilized to substitute the counsellors and advisors in higher education where the institution becomes empowered by serving more students effectively (Autar 2023). These technologies use natural language processing and machine learning to understand student problems, provide personalized resources and guidance, even conversational tutorials. Spotting the chance, UG's management offered a new direction in AI-Enhanced Student Support Services initiative (AISSS) which was intended to address academic and wellness issues on campus. The objectives include minimizing student-advisor ratios, decreasing time that the students often wait for their tutorial and counselling sessions, as well increasing customer satisfaction in provision of services by the university.

Saputra et al.(2023) reported about a pilot two-year project that was funded for supporting the connectivity between AI chatbots and personalized learning as it is in relation to IASSS initiative. The main function of the chatbot will be to help students with enrolment questions as well as payment and registration issues, including directing them toward campus support services. Personalized learning systems will offer targeted academic assistance and training, especially for giant freshman-year classes whose average size is greater than three hundred students. This case study discusses the problems of planning, implementation challenges but also results for efficiency with regard to the performance AISSS initiative's pilot project (Wollny et al., 2021). Some of the key topics covered are students' perceptions about stakeholders, integration with other programs for chatbots and personalized learning platforms, as well as propensity in respect to student behaviour after implementing AI applications. The findings from the study will guide UG administrators on possibly scaling and further enriching AI assistance across different student experience functions due to the pilot results.

1.2 Problem Statement

The integration of artificial intelligence in the learning environment transformed global student support services by embedding innovative technology to improve learners' educational environments. However, AI adoption in universities is non-homogeneous and each institution has its own challenges as well opportunities that stem from the peculiarities of their respective environment. This is especially true in the case of the University of Guyana, which lies within an interesting educational and cultural setting. Although AI's ability to enhance student support services has been established, its current implementation at the University of Guyana is still in

the early phases. With a variety of students, the university faces specific challenges in ensuring student support is sufficient. There are various challenges, ranging from tailor-made academic counselling to speedy administrative support. The current support structure within the University of Guyana may not completely utilize AI capabilities, leading to poor student satisfaction, retention, and knowledge acquisition. This gap is further highlighted by the already launched preliminary chatbot on the university website, which has not been fully assessed regarding its effectiveness and user reception. This research aims to determine the unique character of needs and preferences inherent in the University of Guyana's student population related to AI-enabled support solutions. It aims to know how AI technologies, especially chatbots, can be adapted to suit the peculiar needs of this university's students. The study aims to evaluate the efficiency of this particular chatbot and compare it with other global practices and applications.

1.3 This exploration is crucial for several reasons

- Tailoring AI to Specific Contexts: Comprehension of what AI can be customized to suit the unique cultural, technological, and pedagogical environment of the University of Guyana.
- Enhancing Student Experience: Increasing students' contentment by providing timely, personalized, and culturally responsive AI-driven support.
- Operational Efficiency: Evaluating using AI to improve the support services for making them more efficient by coping with routine inquiries and tasks.
- Data-Driven Decision-Making: With the use of AI to introduce data-driven conceptions that proactively address student needs and improve their learning journey.

- Global Competitiveness: In order to allow the University of Guyana to be connected with international reform in education and keep competing through applying atmosphere that is relevant enough regarding technology.

1.4 Purpose of the proposed study

The mission of the University of Guyana is to give quality education and support services necessary for academic excellence. Unfortunately, lack of resources and human capacity makes this impossible. Nevertheless, the advent of new AI systems opens up further economic and sustainable opportunities for UG to improve its student support infrastructure.

This proposal aims to give a broad background of the study tests whether AI-based chatbot virtual assistant adaptive learning systems are feasible and acceptable in facilitating academic advising, mental health services provision, and writing support to UG's other core areas. The objective of this study is to know whether and how deploying AI tools can enhance the ability of UG in students' academic decision-making, aid campus resources, core skills development, and student welfare promoting resilience. To provide more tailored and personal support, that is to focus on each student's strengths, needs, skill levels, or interests. Allow on-demand access to educational resources and 24/7 advice for students to take control of their learning process. This study will focus on undergraduate students at UG and may also consider the special needs of graduate students and student subgroups such as first-generation and international learners.

Data will be obtained from quantitative and qualitative methods to measure the effectiveness of prospective AI applications, student and staff attitudes, and level of acceptance. Quantitative characteristics will manifest their presence in the form of students, rates of utilization, levels of satisfaction, and main results such as overall pass rate percentages saved for courses accompanied by respective writing proficiency improvement scores. Stakeholders' perceptions of the strengths and weaknesses of AI tools will be gathered qualitatively through surveys, interviews, or focus groups. Evaluating AI student services' effectiveness, pros, and cons will enable UG administrators to determine which is fit for use or need not be used.

1.5 Research questions and objectives

The research aim of this study is to design an AI technology that can provide superior academic and wellness support services for students at the University of Guyana. Specific research objectives are;

- To identify the key aspects of AI-infused services that can improve student success. Try to evaluate the current literature regarding AI technologies in student support at tertiary level and suggest implementation strategies that can be applied for UG scenario.
- To create a prototype of an AI dedicated to natural language processing, machine learning and conversational approaches in an effort toward providing individualized academic and wellbeing support. Use a student sample cohort to quantify the system usability, accuracy, usefulness and performance metrics influence of AI systems on students.

The following key research questions will guide the inquiry process:

1. What are the high priority needs and challenges of students from governance institution, University of Guyana concerning enhanced AI-engaged support services?
2. What student success outcomes should be awarded priority in this improvement through AI-enhanced service delivery?
3. What components and features should the AI system incorporate to offer personalized, effective, proactive-focused academic counselling and care coaching services for students of UG?
4. What utility and use do the students consider delivered by AI systems, considering their needs and challenges on an individual level?

2.0 Literature Review

2.1 Chapter content

The emergence of AI in higher education is one area that has attracted scholars who have looked into the likelihood for its revolutionary involvement with student support services. Barrett et al. (2019) identified chatbots, predictive analytics and personalized learning as some of the AI that can be applied to higher education settings. Additionally, the authors emphasized potential benefits that AI could bring to students and teachers. The authors also pointed out some issues like privacy or ethical problems. They then highlighted how AI could enhance the inclusion of education for minority groups, stating that technology has a transformative potential in learning.

However, Barrett et al. (2019) pointed out that AI offers a variety of uses. It is the use of AI in teaching, learning activities, administrative processes, and student support services. Regarding natural language processes, machine learning and data analysis help to create more strategies for students within the framework of saving costs on higher education. One of the primary applications is AI tutoring and feedback systems that can be partially or fully substituted with only human professors and teaching assistants.

Meanwhile, AI tutors like chatbots are available 24 hours a day and ready to answer questions on assignments and policies. They can also deliver preliminary guidance on course-related matters and refer students to the correct materials in the learning management system or textbook, while these chatbots improve, they can engage in more elaborate

conversations through natural language communication. Administrators get the opportunity to synthesize institutional data through AI automation, which provides insights such as recruitment predictions and student outcome forecasts. Suppose the recruitment teams analyse historical admissions and enrolment data. They can target potential applicants in future applicant pools based on their academic profiles, demographics, and location. A comparison of historical student mobility trends permits the calculation of retention risk for every subgroup and cohort. Automated predictive analytics takes away much of the calculus for administrators.

However, it maintains statistical integrity in producing models that drive day-to-day operational decisions about recruitment, advising, student support service staffing levels, course availability, and graduation pathway design. AI can also combine publicly available labour market statistics with a school's past employment results to determine projected career opportunities for each degree program. Essential information for the experts advising students on what field might be more profitable after graduation. These illustrations are only some of the numerous AI applications for higher education advanced by Barrett and others that transform this sector. Impact innovation comes from the compounding effects of many minor improvements over time, accrued through consistent investment and research. However, while the advance may be slow, AI's expansive scope proposes that one day, it could revolutionize learning across all primary institutional functions.

2.2 Utilization of AI's potential

On the other hand, because international higher education is trying to evaluate how AI's potential can best be utilized, tracking implementation efforts and evaluating efficacy remain major tasks. Further, AI demonstrated potential in essays and open-ended marker feedback individualized with comprehensive detail on lexical choice, logic flow, and grammar. The software can show you where corrections must be made and provide useful samples of correct structure and style. Delegating simple tutoring, questions, and routine feedback to machines helps professors focus on deep-assisted discussions with students. AI's predictive analytics allow for scalable, personalized learning in a classroom. To do so, predictive models analyze students' engagement patterns along with scores from quizzes and comments on discussion boards to decide how best each student can be supported. This feature enables the system to push customized interventions for specific students so they can identify gaps early on and maintain adequate treatment dosage and challenge level while fostering motivation through relevance and emphasizing concept relationships. With the assistance of adaptive learning platforms supported by artificial intelligence, individual learners' strengths and development areas can be tailored into unique pathways.

Boeding (2020) delved into the practicalities of AI chatbot implementation at three universities in the United States of America. The research highlighted each institution's unique challenges and goals, with a common aim to enhance student services. The study provided insights into the factors influencing the successful adoption of chatbots, emphasizing the role of structural and political frames. The study focused on structural and political frames, among the focus areas regarding chatbot adoption. The structural frame focuses on process, hierarchy, and policy—formal organizational structures that dictate technology use. Political frames concentrate

on the opposing interests of different stakeholders. According to Boeding, barriers around legacy systems and data access need to be addressed. Getting buy-in and resources also required winning support from administrator silos.

The first case study was of a third-level institution implementing chatbots designed with AI features to help reduce the response time of students' queries. The main objective was to shorten the waiting time for typical questions about admissions, academics, and fees. Structural issues included synchronizing the chatbot with several campus databases and directories, which were independent. As an early adopter creating the innovation advantage, this university saw increased support from above in terms of dealing with political obstacles.

The second example involved a private non-profit organization focusing on retaining the student body through personalized support. The chatbot used predictive analysis to spot at-risk students based on engagement patterns that guided them to relevant campus resources. Structural challenges included data privacy and transparency concerns, given social-emotional sensitivities. Convincing the faculty was a major political challenge. The approach that supported rather than replaced advisors fostered adoption.

In the third case, a community college implemented measures to enhance enrolment accessibility for minority and disadvantaged populations. Inclusion rather than efficiency was the goal, and to achieve this task, an AI chatbot trained on dialogue data from representative communities provided culturally acceptable assistance in guiding admissions options and financial aid. Such structural barriers cast the spotlight on the digital divide as attempts were

made to make this chatbot available using various platforms, such as voice interfaces in Spanish. Diversity and inclusion were prioritized to a political extent during implementation due to campus activism.

Through a structural and political lens, Boeding shines a light on implementation complexities to offer leaders thinking about strategic AI investments to improve student experiences or outcomes with practical insights and improve the systemic and human aspects of innovation management across stakeholder ecosystems, from technical integration to user adoption. The references show that AI chatbots have potential and point to the contextual difficulties in associating automation with existing academic models.

2.3 Implementation of AI-based chatbots

Rahim et al. (2018) conducted research on AI-based chatbots used in universities, particularly regarding their applications to Malaysian institutions of higher learning. The investigation concluded that several factors influence success in adoption. The study also offers relevant information to organizations interested in improving student services using AI chatbots. Organizational compatibility was the primary drive of the level of fit between what chatbot had to offer and the systems and processes that were already established within the university. The technical capabilities of the IT personnel hired by the university are also essential for effective implementation. From a technological perspective, perceived usefulness and user-friendliness determine whether chatbots will be adopted as a part of an existing channel. Secondly, the findings demonstrate that personalized and context-based interactions lie at the crux of chatbot

adoption. Individuals prefer to have conversational agents that understand context, use personal data with tailored advice, and interact like humans.

Therefore, organizations must choose chatbots that have intense natural language processing and machine learning capabilities. Additionally, the authors also indicate barriers to adoption arising from privacy issues on data collection and use. Although such data practices and policies that are transparent might curtail the adoption barriers, it is students' adoption that entails monitoring chatbots for continuous improvements and modifying them to achieve high accuracy.

Thus, the Rahim et al. study is of practical value to higher education leaders in utilizing AI chatbots for academic advising and administration, as success relies on factors that are organizational readiness, user-centred design choice, and communication skills. The study also results in the development of adoption frameworks for global higher education. As the use of AI chatbots among students for better experience increases, these results are essential to institutions that undertake digital transformation projects globally, not only within Malaysia.

2.4 AI's implications within the educational sector

Chen, Chen, and Lin (2020) offered a thorough exploration of AI's implications within the educational sector. The article discussed the evolution of AI tools in education, emphasizing their role in enhancing administrative and instructional functions. The authors also highlighted the adaptability of AI systems for personalizing educational content. The authors stressed some

advantages that advanced applications of artificial intelligence brought to the education sphere. Enabling more personalized and customized training is one significant advantage of analysing individual students' strengths, weaknesses, interests, and progress for tailor-made content and feedback rather than the traditional one-size-fits-all approach to curricular standards. According to the authors', personalized learning has increased advanced student performance, satisfaction, and retention rates. AI fosters uniqueness in learning practices. While all students can have the same homework or take similar tests, a machine learning algorithm can create different exercises and test items for each learner. Differentiation helps to address students at the point of their abilities.

Correspondingly, AI can scaffold when necessary and give those who are lagging the support to understand concepts while letting high achievers advance. The authors also explored the AI implications for administrative tasks in education. AI has the potential to automate low-level tasks that involve objective parts of assignments, such as grading, thereby allowing teachers time to mentor and offer qualitative commentary. It can also perform data analytics to provide information relating to such things as the rate of attrition among students.

Chen et al. explained how learning analytics supported by AI may signal educators about those who might underperform or quit classes. Early intervention enhances student success. In contrast, to support the implications of AI, the authors explored how AI is poised to disrupt pedagogical roles. An illustration mentioned was AI tutors offering additional instruction to bolster essential classroom teachings of important concepts. As it develops, an AI tutor may take on the role of a teaching assistant or even perform digital lectures. The authors emphasized

advanced deep learning approaches that allow AI to assess and adjust its teaching strategies. In the future, with physical classes, there may be AI instructors who could assume responsibility for basic activities such as lectures or marking school assignments and enable human teachers to focus on personalized counselling.

Chen, Chen, and Lin identified some limitations of AI education applications. One disadvantage is the inability to identify and deal with such delicate details as sarcasm or humour that human teachers handle intrinsically. Students also frequently manipulate adaptive AI systems in order to receive simpler material rather than honestly interact. In this regard, the authors pointed out that AI in education should not seek to replace fully, but instead improve teaching quality and effectiveness.

Finally, the authors provided a detailed overview of the AI transformation in education. From supplemental support for personalized instruction and data-driven decision-making to ultimately providing full lessons virtually, AI has great potential as a disruptor. Chen, Chen, and Lin outlined some promising directions yet warned that technological optimism should be balanced; AI does not inherently possess core human teaching functions such as empathy. Extensive research and development focusing on AI's weaknesses will contribute to optimizing its benefits. Through strategic deployment centred on the assistance of both learners and educators, AI could bring about radical innovation that mainly enhances the quality of availability, equality, engagement, and improved performance.

2.5 Enhancing AI Applications in Higher Education

Zawacki-Richter et al. (2019) systematically analyzed empirical studies on AI applications in higher education. The research revealed a significant focus on the technological aspect and highlighted the need for closer collaboration between educators and technologists. Zawacki-Richter et al.'s analysis revealed the prevalent focus on technology issues highlighted in their reviewed studies. Most of the content in the research focused on explaining the technical capabilities provided by AI systems and tracing their use. Fewer efforts were directed toward researching the pedagogical value or effect of using the available instruments. For instance, several studies described artificial neural networks, predictive algorithms, or natural language processing techniques to create adaptive learning platforms and intelligent tutors' automatic essay-scoring programs using AI-based educational technologies. At the same time, there was a lack of empirical analysis on whether and to what extent these technologies supported student learning outcomes, understanding skills, and other essential educational outcomes. Most of the studies merely listed technical capabilities without conducting critical evaluations based on attributes such as effectiveness, usability, or impressions from an instructor's perspective and student's point of view. Only those who attempted to perform minor appraisals instead of meaningful evaluations in real educational settings. As Zawacki-Richter et al. points out, further research is necessary to move away from technical descriptions and toward pedagogical validation and optimization of AI tools based on evidence.

Zawacki-Richter et al.'s second important observation concerning developing AI applications for higher education is collaboration between experts from various fields during conception, design, and research. From the very beginning, pedagogical understanding and

technical knowledge need to be integrated in order to develop educationally relevant tools that have an impact. However, the review results indicate that most of these studies were carried out by computer scientists aimed at technology demonstration without paying much attention to pedagogical fitness. Since computing capabilities are required to implement ideas about teaching and learning, curriculum contexts, and learners' requirements, Instructional design is essential in creating systems that improve rather than hamper educational practice.

Similarly, in this study, Zawacki-Richter et al. found that developers with little educational experience may fail to incorporate these aspects into designing tools without utility or real integration in actual classrooms. In that case, with technical input, educators may have unrealistic expectations or not fully use their potential. Effective collaboration among these disciplines is necessary to cultivate informed, strategic use and optimization of AI tools. The survey points out that though most of the research remains tightly connected with either technological or pedagogical fields, it does not show any attempt at a viewpoint stemming from an interdisciplinary approach. Creating synergistic teams that cut across computer science, education, learning analytics, and other related fields will be crucial to nurturing novel AI innovations for higher institutions. The study recommends that the higher education sector prioritize interdisciplinary and design-based research.

Thus, funding and research agendas ought to emphasize developing AI in terms of co-design rather than pure technological invention. There is a need for teams joining experts with backgrounds in computer science, education, human-computer interaction, and other areas, along

with teachers and students. Integration, iterative prototyping, user feedback, and pedagogically grounded evaluation are the main directions to be considered.

2.6 Building capacity around AI literacy and competencies

For AI to become more mainstream, organizational fluency, developing competencies, and a policy framework around artificial intelligence should be considered important. The incorporation of both AI skills and operational knowledge in terms of professional development, standards for teaching credentials, and accreditation practices is a factor that will further encourage adoption. The fostering of institutional readiness and staff digital competencies will improve integration. As such, it could focus on things like the rigour of methodologies in AI research, open-access platforms and datasets to further innovation, as well as ethical guidelines for academia via particular fields or systems. The authors argue that AI research in the universities is dynamic and precariously fragmented, highly technical matters are emphasized. This would necessitate a sophisticated interdisciplinary collaboration spanning across the technical field and pedagogical terrain. It should focus on the formation of collaborative teams and design-driven, verified road to AI innovation.

Nevertheless, the research highlights necessary patterns that can uncover present AI development in higher education and design an approach to transform academic performance as a whole by setting up these technologies into ingrained platforms. This can help in addressing the defining challenge of driving AI from hype to functional reality.

2.7 The Impact of Chatbot Technology on Sustainable Education

Chatbot technology was discussed by Deng and Yu (2023) in depth as its effect on sustainable education. The effectiveness of the chatbots in improving different learning results and areas where there is a lack was discussed within this article. Deng and Yu have provided a timely analysis of the use of chatbot technology to advance sustainable educational outcomes. According to the authors, chatbots utilize artificial intelligence to imitate conversation and create individualized learner assistance. Accordingly, if carefully designed and implemented, they have considerable promise of raising educational equity in a scalable manner.

Nevertheless, as Deng and Yu finally suggest, chatbots' limitations and potential need to be given careful attention. The authors give a summary of new chatbot applications in education. Simple chatbots are digital tutors that can explain concepts, provide practice questions, and score them, allowing the teacher to focus on more challenging areas of instruction. Better chatbots promote individualized and adaptive learning by determining students' knowledge, adjusting the content complexity, and correcting misconceptions. The scaling of chatbots is one key advantage that has been highlighted; once created, they can support large populations of students almost simultaneously. This helps reduce resource constraints that lead to barriers to learning. Several research papers state that chatbots can benefit learning processes and outcomes. For instance, it has been demonstrated that chatbot tutors have shown the ability to boost performance scores on knowledge application tests compared with teacher-led remediation.

Other studies show that chatbots can increase learner motivation by creating a friendly and human-like dialogue, which encourages learners. Chatbots help in the learning experience by replicating peer-learning processes. Considering such findings, Deng and Yu mention that chatbots have a unique potential to promote more equitable inclusivity for quality learning support across students. Some students who will greatly benefit are those lacking other scaffolding resources in their school and home environments. Deng and Yu point out that the educational value added to chatbots depends on their design. Most of the current chatbots are inefficient when it comes to deeper comprehension. They might seem to be engaging in a meaningful conversation through pattern recognition and response scripts without understanding semantic meaning. While these chatbots provide factual information, they fail to demonstrate complex understanding, reasoning, or the ability to transfer knowledge from one context to another. Deng and Yu state that this considerably limits their educational ability.

Meanwhile, chatbots cannot evaluate learner needs or adaptively individualize instruction. Their personalization is limited. Deng and Yu comment that as chatbots are rule-based logic programmers, they do not have the capacity for more sophisticated dynamic decision-making required to comprehend an individual student's evolving learning process. Despite such advances as self-supervised machine learning, which may one day make chatbots more powerful than they are today, they are recipients of poor models of how to learn. Deng and Yu eventually conclude that the best educational uses for chatbot technologies seem to be as supplementary forms rather than substitutes for human teachers. Chatbots can efficiently widen students' chances to cultivate and apply routine areas of the knowledge domain areas under teacher supervision.

Nevertheless, full realization of the potential of artificial intelligence in education will take even greater evolution. Ultimately, genuinely personalized and fair learning should consist of the best characteristics that advanced technologies and human teachers can offer. Finally, to their disadvantages, Deng and Yu introduce chatbots as a complementary learning tool with considerable untapped potential. Their analysis provides a realistic, balanced view. In the case of Deng and Yu, it is argued that educators can increase availability and satisfy all learners' requirements through thoughtful use of scalability in chatbots with human oversight to compensate for their weaknesses. This pragmatic approach enables schools to gradually introduce groundbreaking AI in the classroom without over-pursuing quick changes. They conclude that chatbots should undergo constant testing and adjustment, but should not necessarily be seen as the final product. Such measured adoption of these technologies can steer our educational systems onto a trajectory that incrementally leads to better results.

3.0 Methodology

3.1 Research Purpose Restated

This study intends to introduce AI-enhanced learning support interventions at the University of Guyana to improve academic success outcomes. In particular, chatbots and natural language processing technologies will be used to offer academic advice, psychotherapy sessions, mentoring for writing services, and others that are essential but should become more reachable yet scalable. On the other hand, a design-based research approach will be used in this project to work with different University of Guyana stakeholders to develop and revise AI system prototypes that would better meet student support needs.

3.2 Data collection

Initially, the researchers will undertake interviews and focus groups with 30 students and ten faculty members; quantifiable statistics on using existing student support services and success indicators will also be studied to identify service gaps. Second, these results will be used to prototype an AI chatbot advisor and writing support tool. These tools will use natural language processing to analyse student questions and needs, give answers from a knowledge base, and redirect students to human support services where necessary. The prototypes will be piloted with 50 student volunteers to get usability responses regarding value addition. This will continuously refine the system's performance and user satisfaction. Refined prototypes will then scale to a six-month implementation involving upwards of five hundred students in order for us to test

support utilization, user satisfaction, and correlational impacts on student success outcomes such as GPA and retention. Mixed measures will measure pilot and scaled prototypes, including system analytics usage, surveys, interviews, and university student success data.

3.3 Expected Timeline

Duration	Activity
Months 1-3	Stakeholder interviews and data analysis
Months 3-5	Prototype 1 pilot & refinement
Months 6-7	Prototype 1 pilot & refinement
Months 8-11	Prototype 2 Development
Months 12-17	Prototype 2 6-month implementation
Month 18:	Final evaluation and reporting

3.4 Expected Costs

It has been estimated that this project will cost USD 250,00 in aggregate terms. A ballpark figure for national personnel costs to support a full-time project manager, AI engineer, student support specialist, and administrative assistant will total 60% of the budget. The student, faculty, and staff incentives for the focus group will be 5%. Prototype software development, data infrastructure, and cloud computing costs will make up 30%. The remaining 5% will promote dissemination via conferences and journals.

4.0 Expected outcomes and implications

Establishing AI-enhanced student Support for a University like Guyana could present multiple benefits to students and administrators alike. One significant expected product is better student advice and course mapping. A system that would incorporate AI chatbots or recommendation systems could present students with personalized advice on the selection of courses, planning pathways toward degrees, and availability of campus resources according to their interests, performance data, and career aspirations. This would improve their learning process and their chances of graduating on time (Hwang & Chang, 2021).

Secondly, AI writing assistants and tutoring apps can offer personalized assistance to hone students' communication abilities. With so many students facing problems with research, essay writing, and grammar, such tools would permit them to have focused help on their terms. This would not only enhance grades but also develop critical thinking and language skills that are essential in the labour market. Other research possibilities could focus on AI's ability to enhance the mental health of students due to automated check-ins, self-help recommendations, and risk monitoring. However, early addressing of issues such as stress, anxiety, or loneliness can positively affect health and academic performance.

Additionally, AI solutions for administrative functions might work wonders to solve many of the students' frustrations with tasks such as enrolment, financial aid applications, and class registration. The use of AI, as mentioned above tools, could enable the delivery of better support services at a lower cost, serving more students at this particular university. Usage

analytics would also give information on the emerging needs and challenges of various student groups. This would support better, evidence-informed, fair policymaking. For responsible AI utilization and privacy with regard to the users, heavy reliance on algorithms and miscommunication will also need regulation through governance frameworks. Following investigations on the use of AI applications for functions such as tutoring, feedback, and advice in preference to human service provision will significantly contribute toward effective integration strategies.

Overall, understanding how AI can complement and boost support services for students at the University of Guyana will enable efforts to promote affordability and access by enhancing engagement satisfaction through success. However, a careful approach that weighs the benefits against ethical issues will be essential as these promising technologies are tested and assessed.

4.1 Proposed solution

Although the University of Guyana enrols more than 8,000 students on different campuses, it somehow fails to offer enough student support services for such a large and diverse community. Therefore, the researchers recommend establishing an AI-augmented student service system to increase the availability of services and individualize assistance by being proactive about it. The system would provide AI-enabled chatbot 24 hours a day through the university's website and mobile app. There were opportunities for the students to get clarification, make connections with resources, and sort out issues, including enrolment, financial aid, mental health problems, and disabilities, among others (Okonkwo & Ade-Ibijola, 2021). The chatbot was

capable of guiding students through the processes, responding to FAQs, collecting data for staff follow-up and escalating complicated conversations to human personnel. It would use natural language processing to comprehend different questions and issues.

Furthermore, struggling students would be contacted by the AI system. On the basis of data such as grades, assignment submissions, library loan history, badge swipes for attendance, and course survey responses, the AI would be able to mark students at risk. Personalized texts and emails would be sent to these students indicating where they could get relevant university resources and support services. Staff would be relieved of the administrative burden in AI system allowing them to focus on more complex, high-value support. It would gather data, direct ordinary process such as the filing of disability accommodations documentation and provide pre-filled forms for appointment requests (Patel & Shahapurkar,2022). This would decrease the response time and get students helped quickly.

Access to an AI dashboard illuminating students that require intervention due to their risk scores would be available for staff. They can therefore better allocate manpower where necessary. Minor issues and questions would be automated using the system, resulting in reduced caseloads. This AI student support system would need to be integrated with technology, and an initial investment towards change management should also occur. It is capable of significantly enhancing student experiences and performances. Increased retention and graduation rates bring in more tuition dollars and improved recruiting through word-of-mouth endorsement. For a while, it has also been essential to link many struggling students with available access and support on financial resources. The University of Guyana has an opening to be a pioneer in

implementing AI way for inclusive, fast, and individualized student services at scale. This proposal provides the framework to start on that road today.

5.0 Conclusions:

The proposed implementation of AI-boosted practices for student assistance would bring numerous advantages not only to students but also to staff members at the University of Guyana. The combination of chatbots, virtual assistants, adaptive learning platforms, and predictive analytics tools has a large potential to enhance academic advising, mental health support administration processes, and outcomes for learners. It is possible to offer an AI chatbot round-the-clock and personalized instructions on course selection, degree planning, enrolment issues, financial aid applications, etc., as a result of this problem. Using dialogues and frequently asked questions, the chatbot would be continuously updated with its knowledge base to provide more accurate information that is useful for students. Further, the conversational agents could be employed for mental health screening procedures, counselling referrals, and ongoing check-ins to ensure student well-being. These services would be available outside standard office hours and increase the reach of campus counsellors.

However, students' permission should be required to use the data for identifying periods of peak demand and augmenting mental health services accordingly. Change to a higher level of automation and smart administration would lead to improved efficiency for the staffers, as well as alleviate frustrations from students. Machine learning algorithms can drive applications and forms to be processed, enrol students in courses, handle payments and refunds, and generate student IDs, among a good number of other operational tasks. This way, staff would concentrate on their individualized counselling and guidance.

In addition to this, adaptive learning platforms fuelled by AI might develop personalized learning trajectories that would consider each individual's development, knowledge gaps, and style of studying. These systems vary the content, speed, and method accordingly in real time to improve comprehension and recall. Data on these platforms can also help shape initiatives aimed at improving pedagogy and curriculum design. Various predictive analytics tools capable of analysing campus-wide data, including admission statistics, demographics, course grades, engagement patterns, and other parameters, help identify at-risk students early on. Automated nudging campaigns via emails, texts, or chatbots could then prompt struggling students to take advantage of appropriate academic support resources as soon as possible. Enrolment, retention, and the forecast of demand in the future could also be predicted through risk models to accomplish planning. Though investments in knowledge, development, and upgrading equipment, along with user-readiness training, are the initial requirements to blend these technologies, long-term returns would surpass costs.

In the foreseeable future, there is a great opportunity for the University of Guyana to become an AI-empowering leader in student support by using modern innovations. This transformation can be actualized through a cost-benefit analysis breakdown and a change management strategy.

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