

The Impact of Artificial Intelligence On Higher Learning Institutions

Bongs Lainjo^{1*}, Hanan Tmouche²

¹Cybermatic International, Montréal QC, Canada,

²Ibn Zohr University, Agadir, Morocco

Corresponding author: bsuiru@icloud.com^{1*}, htsmouche@gmail.com

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Abstract

Artificial intelligence applications in education have attracted the attention of multiple parties, including scholars, educators, governments, and researchers. The article aims to conduct a comprehensive and inclusive review of the proliferation and impact of Artificial intelligence on Higher Learning. Chronologically, the focus has been artificial intelligence applications in higher learning since the early 1950s. There needs to be more literature regarding the adoption of AI in higher education, resulting in a substantial limitation of this article. This article also discusses the role of cyber security in adopting AI in higher education. The authors have also discussed various applications of AI in higher education and the challenges. This article presents some recommendations. More research is needed as the recommendations are based on a limited number of scholarly articles. A Georgia State University case study conducted in 2015 substantiates AI adoption's benefits in higher education.

Keywords: Higher Learning Institutions, Artificial Intelligence, Cyber Security, Predictive Analytics And Student Performance.

1. Introduction

Different sources and authors have identified and presented their respective perspectives on artificial intelligence (AI). What seems to be expected is that AI can be described as a digital platform analogous to the human mind with the capability of achieving formidable outcomes using complex and sophisticated algorithms to solve complicated problems. These tasks are, to a large extent, generally unsolvable by humans, especially in cases where hidden or stealth patterns are undetectable by human beings. These results serve as compelling strategic solutions used by different parties to optimize various operations. From a thematic perspective, this paper explores the extent to which AI has contributed to enhancing higher education initiatives. The article aims to conduct an extensive, exploratory, and, to the extent, possible inclusive review of the integration of AI in post-secondary or higher learning institutions (HLI), highlighting existing gaps and emphasizing possible, potential, and

practical lessons learned and future research strategies. Achieving such outcomes helps managers and policymakers streamline, revise and strengthen their respective organizational missions. Moreover, at the same time, creating a more competitive pathway. The importance of this article in documenting this scientifically based evidence will contribute to addressing some of the missing gaps and help promote future research initiatives.

Readers should therefore consider this part of a more significant outcome. There is compelling, anecdotal and scientific evidence demonstrating how AI has improved HLI operations. Furthermore, given the current dynamics, there is every likelihood that the importance of AI in HLI needs to be adequately emphasized. Positive changes continue to evolve with different operators unabatedly energized and motivated. The challenges continue to make the learning curve (LC) increasingly challenging, especially given the positive correlation between AL/HLI and the LC. This situation confirms the degree of sustainability of AL in HLI. Different team leaders require more effort to keep the resenting parties engaged, motivated, actively participatory, and contributing team players.

Strategies to bring this group on board can sometimes be complex, and it needs to be pointed out here that resistance to the introduction of new technology is not unique or limited to any one institution and should be considered an additional challenge to improving productivity. In most cases, this resistant group is a minority that can neither be ignored nor taken for granted. Every success comes with its nuances. AI and its applications in HLI are no exception. While the article concentrates on answering the research question, "How extensively has AI impacted HLI?" it is also essential to critically examine and evaluate the prevalence of data security and the adverse effects of cybercrime. This is no longer an issue that can be marginalized as it escalates and exacerbates general digitization efforts. Because of the invaluable contribution of cyber security in mitigating or stopping potential hackers, the authors will also include data on current vulnerabilities, interventions, and successes focusing on AL and HLI landscapes. Additional sections covered in the paper include a literature review, contextual four perspectives, setting, dynamics of AI and HLI, analyses of status and gaps, implications of cyber security on AI/HLI landscapes, contributions to future research and prognoses, challenges, findings, research limitations, research question responses, results, findings, research limitations, discussion, and conclusion. General Objective: The article aims to conduct a comprehensive and inclusive review of the proliferation and impact of Artificial intelligence on Higher Learning and its institutions.

2. Literature Review

2.1 Definitions

The concept of artificial intelligence (AI) started gaining momentum in the early 1950s. Alan Turing was among the earliest scholars who ventured into AI. He proposed a solution to the inquiry about when an artificial system can be said to be intelligent (Akman & Blackburn, 2000). In 1956, John McCarthy provided one of the earliest definitions of AI. McCarthy stated that the study of AI should proceed on the grounds of the conclusion that all features of acquiring knowledge or any aspects of human intelligence can be accurately defined in a way that a machine can simulate it (Russel & Norvig, 2018). Various scholars and researchers have given several definitions of AI since the 1950s. One of the latest definitions is that AI is a feature that enables machines and computer systems to imitate or simulate humans' capacity

to make informed decisions and solve problems (Russel & Norvig, 2018). 5 In recent decades, AI has exponentially developed, and a vast portion of modern society can feel its effects on daily activities. Most importantly, its impact on the general nature of activities carried out in higher learning Institutions is conspicuous. For instance, multiple universities are already using an incipient type of AI to help students and educators solve problems. Deakin University in Australia has IBM's supercomputer Watson which offers students informed advice. The supercomputer operates twenty-four a day, seven days a week, and 365 days a year (Deakin University, 2015). IBM's supercomputer Watson demonstrates the Significant impacts of AI in HLI. AI has transformed the administrative workforce of HLI as it handles many tasks enabling the workforce to focus on other essential tasks. González-Calatayud et al. (2021) state that AI is among the most prominent technologies in all sectors, but its application in education is still limited. They say that most education stakeholders lack knowledge of artificial intelligence, but that will not stop it from becoming the primary tool used in education. The authors claim that the main applications of AI in education include quality assessment, personalization, and tutoring assessment (González-Calatayud et al., 2021). Their study shows that AI can potentially enhance and facilitate learning in virtual, one-on-one, or blended environments. González-Calatayud et al. establish that learners can perform better when AI is integrated with course content. The study also shows that AI-based systems can enhance educator and student evaluation and grading. Nonetheless, AI must be humanized regardless of its substantial benefits, as machines cannot still perform the role of teachers. 6 AI is rapidly shifting the workforce structure, the time dynamic, and the service quality structure in higher learning Institutions (Popenici & Kerr, 2017). An AI-enabled supercomputer can offer sensible feedback during any hour of the day, enabling higher learning institutions to employ less administrative staff to perform related activities. AI has Forced numerous higher learning Institutions to adapt to teach society to function correctly in potentially new life and economy (Cox, 2021). It has the culture of the education system of HLI, changing how teachers educate students and the role played by researchers and scholars. There exists limited literature regarding the effects of AI on higher learning. Although this topic has been open to scientific research for over three decades, it remains substantially underexplored (Chrisley, 2013). This paper is qualitative research that analyzes thirty scholarly articles regarding the impact of AI in higher education.

2.2 Context and Setting

This study briefly examines the history of artificial intelligence and its impact on higher education. In terms of geographical context, this study looks at all learning institutions across the globe, but the researchers have placed more emphasis on American-based higher education institutions. The authors have only considered the technological aspect of higher education. Additionally, the researchers have used various studies to gauge the future impacts of AI in higher education.

2.3 Analyses of Current Status and Gaps

Artificial intelligence in education has been an important field of research for nearly five decades. The number of parties, scholars, and researchers interested in adopting AI in higher education grows yearly (Chen et al., 2020). However, the seven demands of these stakeholders cannot be met because there are limited research articles and very few comprehensive reviews in this field. There are heated debates regarding the potential effects

of AI in higher education. It is currently difficult to completely understand the impacts of AI in higher education; hence more studies should be done to widen the understanding of this topic and create a wider platform for informed debate. The authors have discussed the challenges facing the adoption of AI in higher learning and the possible solutions (Reese, 2019). However, the solutions are based on limited information; hence scholars should conduct more studies to find viable solutions to the challenges.

2.3 Implications of Cyber Security on AI and HLI Landscapes

The education sector has been gradually shifting from using conventional methods in teaching to employing technology-oriented methods. While this has significantly contributed to a broader student pool and increased access to education, it has exposed HLI landscapes to severe cyber-attacks. Studies show an exponential rise in cyber-attacks on HLI in recent decades (Li & Liu, 2021). Cyber security breaches on HLI stall critical activities in the affected institutions, compromise vital data, and lead to huge financial losses. The attacks poke painful holes in the overall reputation and integrity of the affected HLI. Scholars and researchers have done numerous studies to establish why cyber security criminals target higher learning Institutions. Most findings revolve around the fact that these institutions harbor large volumes of advanced project research papers, personal information, and medical records in their databases (Fouad, 2021). Higher learning institutions must be more transparent and open to eight cyberinfrastructures. This is because their daily operations require sites to be consistently connected and easy to access. The open and transparent infrastructure exposes HLI to cyber security attacks. The other reason is that leading global higher learning institutions are among the earliest organizations that adopt internet access and digital tools. Their databases contain valuable research material and knowledge coveted by various parties. This has made them some of the most attractive targets for information theft. Unlike corporate networks, HLI takes much time before updating their cyber security systems, making them more vulnerable to cyber-attacks (Alexei, 2021). Furthermore, HLI has limited talented personnel in their IT or cyber security departments. This is because talented cybersecurity graduates are often lured away by big corporations that offer them attractive remuneration packages. However, the dawn of artificial intelligence has significantly transformed HLI's handling of cyber security issues. Studies show that HLI uses AI to improve its cyber security systems (Abbas et al., 2019). The institutions use AI to detect and respond to threats, determine weak points in their systems, and enhance network efficiency. The primary role of AI in the cyber security of HLI is to help them enhance their security infrastructure and minimize the risks of breaches. HLI uses AI to automate the process of malware detection and prevention. Machine learning and AI help these institutions keep up with cyber criminals by helping them automate threat detection and respond efficiently to threats. This approach is better than the conventional approach, which uses manual methods and is software-driven (Sharma, 2020). In recent years, a cyber security personnel has employed nine machine learning techniques to enhance malware detection by bringing together multiple types of data from various anti-malware constituents. HLI also uses IA to detect and stop spam and phishing. Deep learning uses large volumes of information to train networks to categorize images and carry out various activities independently. Deep learning models can complete the designated tasks with excellent accuracy, making them efficient for detecting cyber-attacks that are not characterized. HLI uses these models to detect spam, phishing efforts, and images considered unsecure to the institution's database (Oche, 2019).

Higher learning institutions in the US, such as Harvard University, employ deep learning to detect spam and phishing attacks hidden in emails and random messages. In addition, AI has helped HLI significantly decrease the number of false positives. Before the birth of AI, HLI spent a lot of time and resources on false positives, limiting their capacity to fix real cyber security problems (Proko et al., 2018). Currently, HLI uses AI to identify potential security breaches. This approach has significantly reduced the number of false positives, enhancing their capacity to tackle actual cyber security threats. Through natural language processing, AI offers more accurate predictive intelligence by scanning studies, articles, and news on cyber threats (Grill et al., 2017). As a result, HLI can make more informed decisions regarding cyber threats, saving them time and money.

2.4 Progress and Contributions to Future Research

The authors have made a few recommendations on how HLI can overcome the challenges facing the adoption of AI in higher education. However, the recommendations are based on limited data and are only theoretical. Future research should focus on these recommendations to establish whether they are practical (Xu et al., 2021). Future researchers should make more practical recommendations if they establish that the researchers' recommendations are not applicable. Despite the limited number of publications, the authors felt that one way to entice other researchers was to produce this article. This paper also highlights the gaps that exist in these domains. As a contribution to further research, the author's efforts have significantly identified an invaluable and compelling gap in AI and HLI. The authors also need to emphasize that research and its findings are ongoing and not a one-time event.

3. Research Method

3.1 Research Question Responses

To determine the appropriate responses to the research questions, the authors cross-examined and studied 30 relevant scholarly articles on the impacts of AI in higher education. They also checked the websites and annual reports of various universities and colleges to determine their stand on adopting AI in education. The first research question was how does HLI use AI in education? The second research question was what are the applications of AI in higher education? The third research question was, what is the general impact of AI in higher education (Do the positive impacts outweigh the negative impacts)? The final research question was, what are some of the challenges facing the application of AI in higher education? The researchers have discussed the responses to these research questions in the subsequent sections.

3.2 Limitations

The adoption of AI in higher education is still at its earliest stages; therefore, only a few research studies have been done on the topic. More prior studies need to be relevant to AI's impacts on higher education. The second major limitation of this study was inadequate time and resources. Future studies should allocate more resources to this topic to achieve more accurate results. The global degree of information technology inequality has also contributed to restricting the number of institutional interventions, available AI apps, and more. The authors hope that stakeholders will be more engaged and participatory with time, more funding, more collaboration between public and private sectors, and enhanced focus. A

strategy will deliver more meaningful, inclusive, and pragmatic outcomes.

4. Findings and Discussions

Higher learning institutions use algorithms designed using AI to market themselves to prospective students. The institutions also use the algorithms to equally and efficiently allocate resources, estimate the size of a class, and strategize curricula. The number of higher learning institutions that use AI increases daily. These institutions use machine learning to guide students throughout the learning process. This enables students to schedule their course load automatically without seeking help from the administration (Radianti et al., 2020). Conventionally, HLI employs career services personnel and guidance counselors to help students make informed decisions concerning their future careers or personal lives. However, AI is gradually phasing out guidance counselors and career services personnel. HLI use AI to recommend career paths, courses, and majors to students. 12 The AI-based tools used by HLI make recommendations to students depending on learners' performance with similar data profiles. For instance, when an AI-based tool discovers that a student is struggling with mathematics, it steers them away from mathematics-oriented majors or career paths (Bozkurt et al., 2021). Another use of AI in student support is to offer timely financial aid. Higher education institutions use information about students to determine the right time to offer them microloans. For instance, AI can help HLI realize when students need money to help them complete the semester and avoid dropping out. Some higher education institutions use a form of AI called predictive analytics to support students. Early warning systems use predictive analytics to analyze big data concerning academic and non-academic activities that a student engages in. As a result, the systems can identify learners that are highly likely to fail, drop out, or experience mental health problems.

The other area where HLI use AI is instructing students (Roll & Wylie, 2016). They create AI-based systems that precisely respond to a student's progress and pace. AI-based systems examine the student's progress and automatically deliver or recommend specific course sections for the student to revise, consult, or review. However, there are some potential applications of AI by HLI, but their future is still uncertain. One of them is altering international and domestic student recruiting procedures. Studies show that the recruiting teams of higher education institutions can better focus their efforts by developing algorithms that can forecast the prospective students that are more likely to be taken in and enrolled (Chen, Chen, et al., 2020). The algorithms can also identify the enrolled learners who are more likely to advance and graduate. 13 AI can also help HLI design and implement student retention strategies that are less reactive and more proactive. This can help them immediately identify red flags and early warning signs in learners who are highly likely to fail academically (Schiff, 2021). This way, higher education institutions can develop student retention plans that anticipate student difficulties rather than react to student failures. Finally, research shows that HLI can use AI to improve their reputational value and bottom line. By targeting and acquiring learners who are fit for the institution, the school can attain higher graduation rates and make students score better grades (Udupa, 2022). As a result, the school will gain international recognition and a better reputation. *Figure 1* below shows a summary of the applications of AI in higher education.

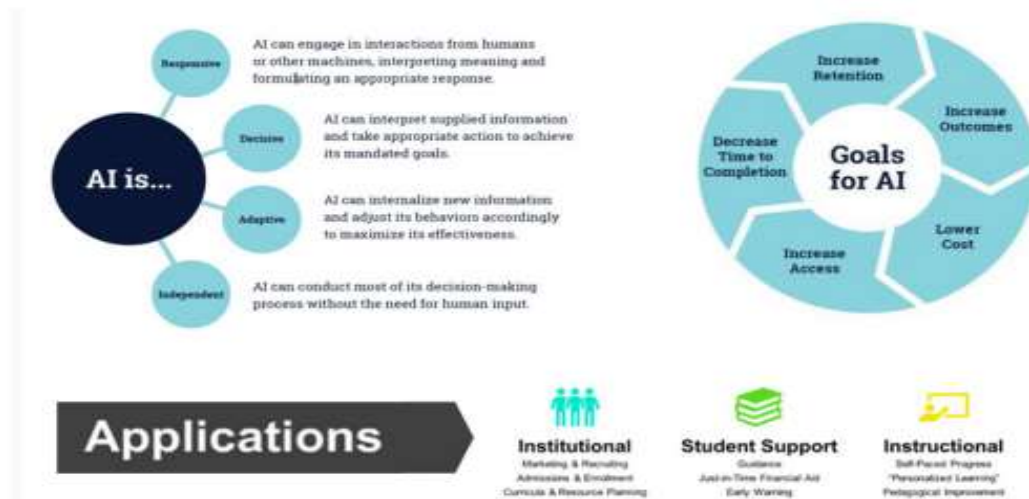


Figure 1 (Amigot, 2019): Application of AI in Higher Education

Based on the applications the authors have discussed above, it is clear that AI will significantly transform higher learning in numerous ways. Figure 2 below shows what higher education might look like in the coming years if it successfully adopts AI.

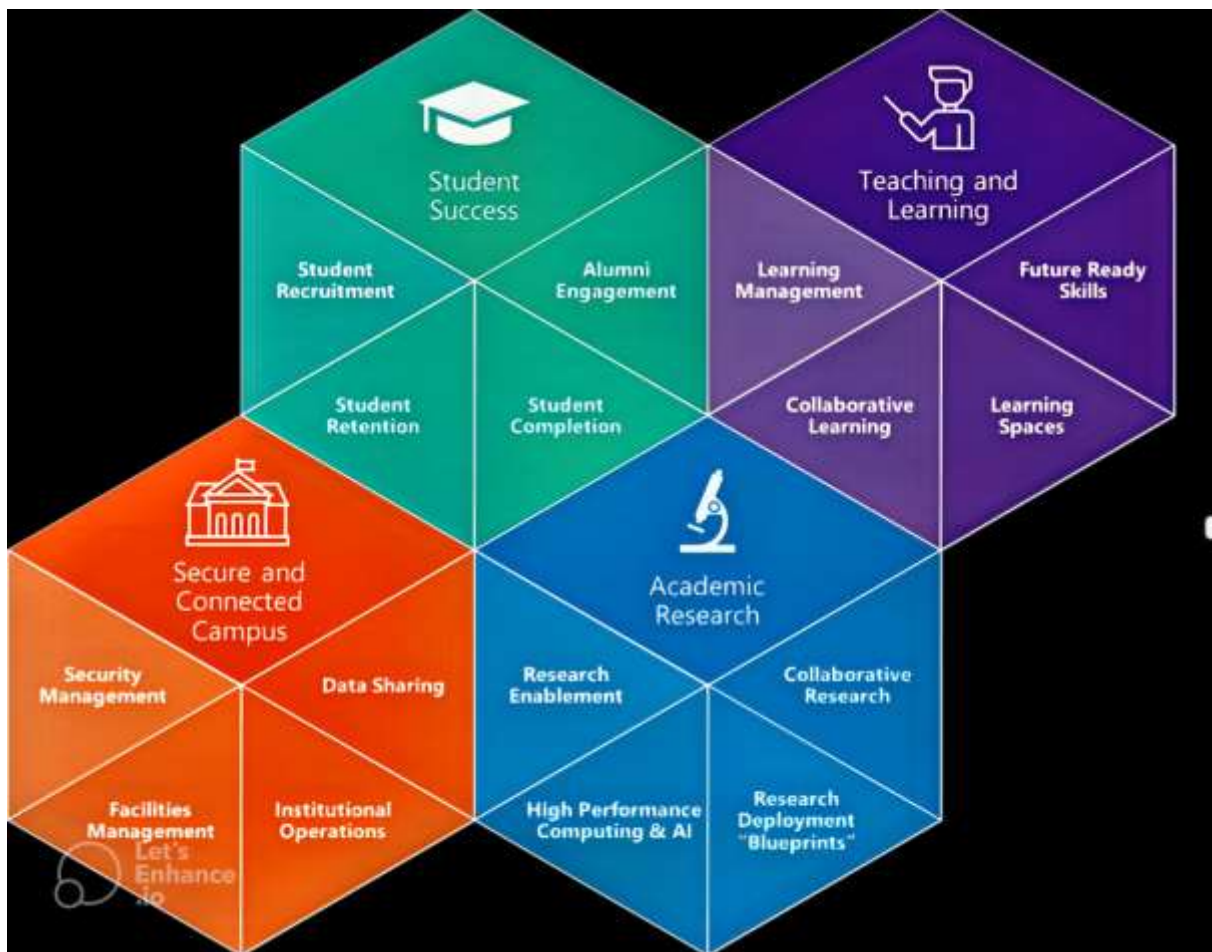


Figure 1 (Microsoft Research, 2021): The future of higher learning

4.1 Challenges and Recommendations

Artificial intelligence has positively transformed the teaching and learning process in HLI in numerous ways. Nonetheless, its application is not uniform across various higher education institutions due to the challenges facing the institutions trying to adopt it. One of the major challenges is that the development and application of AI in HLI lack an all-inclusive public policy. In most countries, AI lacks strong policy support despite its incredible potential for enhancing higher education (Li, 2022). The executive boards of Figure 2 (Microsoft Research, 2021): The Future of Higher Education 15 HLI lack adequate financial and ethical support to enable them to focus on using AI to enhance student performance. Currently, the applications of AI in HLI are primarily supported by private sector corporations such as IBM, Light Side, Pearson, Coursera, and McGraw-Hill, while government support is still lagging in various countries. The growth of public policy to support the use of AI in HLI across various nations is still at its earliest stages. Studies show that it might take more than a decade to reach its advanced stages (Pence, 2019). Policymakers should make inquiries from relevant stakeholders to enable them to design policies that can offer solutions and regulations regarding the application of AI in HLI. Universities and colleges must partner with private

and public research institutes to enable them to realize significant insights regarding the use of AI in higher education (Artificial Intelligence Board of America, 2021). They can use the insights to convince policymakers to design and implement the desired policies. The second major challenge facing the application of AI in tertiary education is that it lacks the key features necessary for promoting equity and inclusion in higher learning. Given the current conditions, a full-scale application of AI in higher education is highly likely to deepen the existing divides and inequalities (Sanusi et al., 2022). This is because disadvantaged individuals in society might get marginalized from AI-based learning. This can result in the digital divide, a new type with a big rift in applying data-based intelligence for brilliant decision-making. Policymakers must design and implement policies that promote equity and inclusion. One of the key aspects they must consider when designing these policies is previous experiences regarding digital rights. They must close the gender gap, the 16 educational gaps between rich and poor students, and the benefits of AI to marginalized populations (Pence, 2019). Government authorities must ensure that all higher learning institutions have the necessary infrastructure, including reliable internet connections, adequate ICT hardware and personnel, lower data cost, and adequate electric power. The third major challenge is ethical and transparency issues. Higher learning Institutions must address ethical and societal concerns when applying AI in education (Kromydas, 2017). The application of AI in tertiary education is an endeavor that requires a substantial volume of an individual's data. Multiple stakeholders in higher education have raised questions regarding the measures implemented by HLI to ensure the security and privacy of the data. Some stakeholders have also questioned how these institutions can use the sensitive data they gather. HLI experiences significant setbacks in simultaneously using sensitive data while protecting and respecting the privacy of the students (Reiss, 2021). HLI must ensure they obtain permission from every student before gathering and using sensitive data about the student. The process must be anchored on fairness and transparency. The student's data privacy and confidentiality remain crucial and cannot be adequately emphasized. Relevant policies that are not adequately enforced are a disservice to the student population. Furthermore, for such interventions to be effective, they need to be proactive instead of reactive. At this stage, the onus is on the key stakeholders and policymakers. Case Study: Georgia State University and Pounce Introduction In the last quarter of 2015, Georgia State University approached Mainstay, formerly AdmitHub, with a significant setback. GSU was struggling to tackle runaway 17 summer melt that had rapidly risen from twelve percent to approximately nineteen percent. Initially, GSU used text messaging to engage students and counsel them on various issues that negatively impact their lives. However, text messaging requires a huge budget to hire and deploy staff to manage personalized conversations with all admitted learners appropriately. GSU could not afford the budget, but it could also not afford to lose more students; therefore, it turned to AdmitHub for help.

Pounce Admit Hub got to work and designed and developed an AI-based online tool known as Pounce to aid scale GSU's personalized student communication. They created Pounce as a custom virtual assistant for Georgia State University student admissions (Page & Gehlbach, 2018). The virtual assistant was designed to aid learners by instantly providing accurate answers to learners' numerous inquiries around the clock, gathering essential survey information, and sending relevant data regarding enrollment activities and timely reminders. A Randomized Controlled Trial with Mainstay Randomized controlled trials (RCTs) are the

global calibre for assessing the effectiveness or efficiency of a program. They are the most reputable methods of determining the things that work and those that do not. Professors Lindsay Page, Hunter Gehlbach, and Mainstay implemented the appropriate RCT at GSU. They gave half of the newly admitted freshmen access to Pounce, and the remaining half was used as the control group. Pounce's First Day at Work 18. The stakeholders switched on Pounce in early April 2016. Immediately, 3114 enrolled learners began texting. They represented a ninety percent opt-in rate among the enrolled learners with valid cell phone numbers in the United States. Figure two below shows the numbers of students who sent messages to Pounce on its first day at work and the opt-in rate.



Figure 3 (Mainstay, 2016): The number of students who texted Pounce on its first day at work and the opt-in rate

Mainstay admits they were thrilled with the learner engagement but could not forecast how transformative Pounce would be for GSU's admission team. Mainstay's staff worked alongside GSU's team and witnessed how Pounce's fast and accurate responses supported the admission team by significantly reducing its workload.

4.1.1 Messaging Activity

By the time the RCT program ended, sixty-three percent of all the enrolled learners in the treatment group had interacted with Pounce on at least three different days during the registration process. On average, it had sent and received sixty text messages (Page & Gehlbach, 2018). The enrolled students sent more than fifty Figure 3 (Mainstay, 2016): The number of students who texted Pounce on its first day at work and the opt-in rate 19 thousand messages throughout the enrollment process, but less than one percent needed to be handled by GSU staff. Pounce handled more than ninety-nine percent of the messages, while others were taken care of by Mainstay staff managing Pounce's learning process as shown in figure four below.



Figure 4 (Mainstay, 2016): The messages handled by Pounce and those sent to GSU staff

Further analysis of the gathered data indicates that Pell-receiving learners sent an average of 31.7% more texts to Pounce, while first-generation receiving learners sent an average of 9.4% more texts as shown in figure five below. This implies that Pounce resonates well with underserved learners; hence it can be used by higher learning institutions that seek to engage this kind of student.

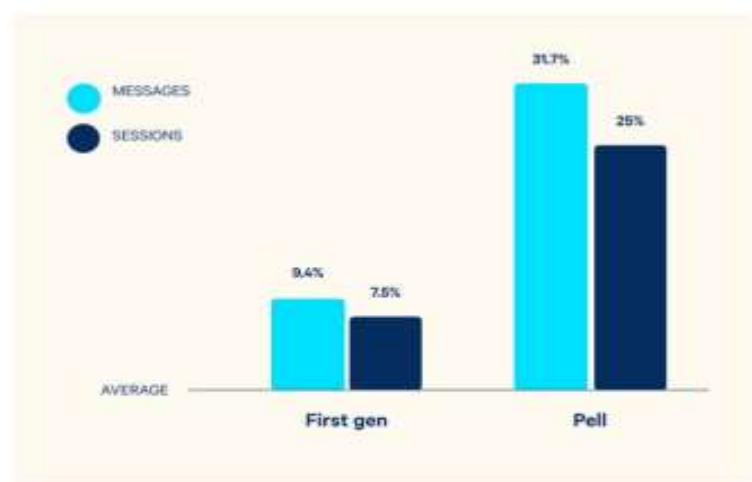


Figure 5 (Mainstay, 2016): First-generation and Pell-receiving learners

The team further broke down the data with respect to demographics of engagement by race.

Figure six shows the percentage of Asian-American, Hispanic, and AfricanAmerican students who texted Pounce or attended the sessions.

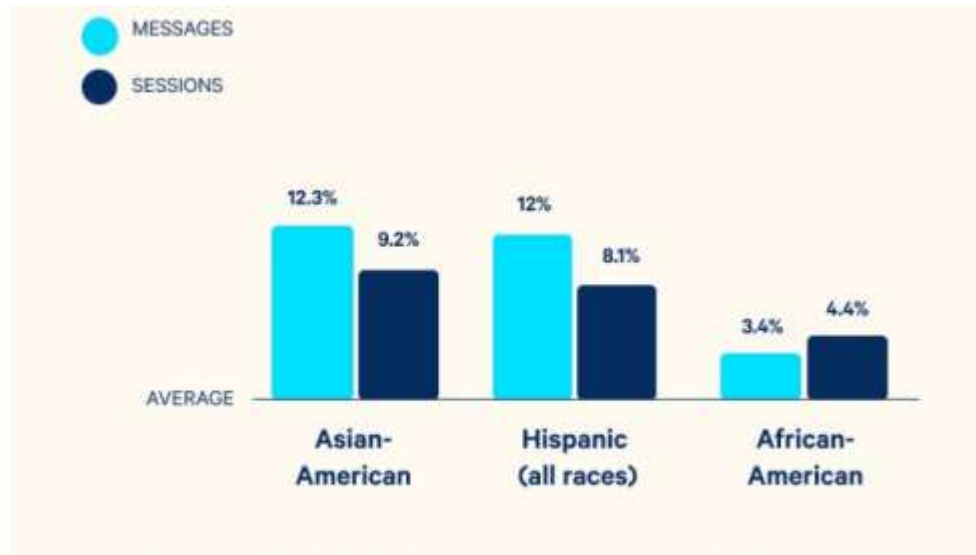


Figure 6 (Mainstay, 2016): Student engagement based on race

4.1.2 Pounce's Reception

Students received Pounce well, with most of them giving it positive reviews. GSU learners loved exchanging text messages with Pounce (Page & Gehlbach, 2018). Figure seven shows that ninety-four percent recommended that GSU implement Pounce in the subsequent years' admission process, and eighty percent rated five or four out of five stars.



Figure 5 (Mainstay, 2016): Student Satisfaction

Students who rated pounce five or four stars cited various reasons such as the virtual assistant's casual language, convenience, and its ability to personalize messages. One student in the focus group commented that it made the assignment process very easy. Figure eight below shows some of the students' comments.



Figure 8 (Mainstay, 2016): students' Comments

The team in charge of the RCT program noticed that students in the focus group who interacted with Pounce felt free to ask questions that might be classified as "stupid" if presented to human beings. The learners in the focus group appreciated the immediate responses and were glad they could ask questions at any hour of the day (Page & Gehlbach, 2018). Figure nine below shows a screenshot of Pounce answering questions at 1:06 am and guiding students through complicated procedures.

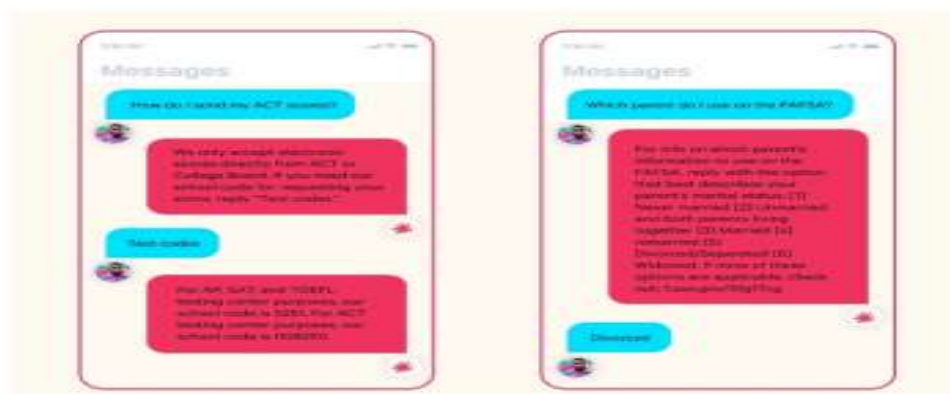


Figure 9 (Mainstay, 2016): Pounce answering questions at 1:06 am and guiding students

4.2 Results

There were significantly high completion rates of critical enrollment procedures in the treatment group than in the control group. Additionally, since students informed Pounce of the changes in their decisions in real-time, GSU got better control of the students in the treatment group, enabling them to help students who were on the verge of giving up the enrollment process (Page & Gehlbach, 2018).



Figure 6 (Mainstay, 2016): The impacts of Pounce on different enrollment activities.

Figure 10 above shows the impacts of Pounce on different enrollment activities. The negative outcome of Free Application for Federal Student Aid (FAFSA) verification is an improvement because it implies that more learners had flawless FAFSAs hence the institution's financial aid office did not have to verify the FAFSAs. For the treatment effect: GSU experienced a 3.3 percent rise in enrollment while summer melt decreased by 21.4 percent as shown in figure eleven below.



Figure 11 (Mainstay, 2016): The increase in enrollment and the decrease in Summer melt

The case study was Carried out at Georgia State University, where an AI-based online tool,

Pounce, aided new and prospective students during their transition to university from high school. Pounce matched student information with text-based outreach to enable learners to finish tasks that required the students to go through long and complicated procedures. For instance, Pounce would reach out to students who failed to complete the Free Application for Federal Student Aid (FAFSA) and provide them with step-to-step guidance through the application procedure. Pounce manipulated AI to tackle an ever-growing series of learner problems, questions, and challenges (Page & Gehlbach, 2018). Pounce was designed to efficiently scale to reach thousands of students and get more intelligent over time. This case study is a perfect example of how higher learning institutions significantly benefit from integrating data and artificial intelligence. Higher learning institutions rely heavily on effective communication with numerous critical stakeholders, and AI helps them to achieve their objectives perfectly. In 2021, GSU integrated Pounce with course content for the first time since its implementation in 2016. The school's administration authorized Pounce to remind students about their classes, exams, assignments, and quizzes through emails and text messages. Currently, Pounce allows students to text questions to their professors and receive answers through text messages and emails. It also allows students to answer short practice questions on the eve of the exam period to gauge their preparedness (Ascione, 2022). Since the integration of Pounce with course content, the overall student grades have increased by an average of eleven points. The school administration states that sending students emails and direct messages regarding course content, academic support, and class assignments enhanced their probability of scoring at least a B. It also increased first-generation students' likelihood of proceeding to the next class (Ascione, 2022). The first-generation students who participated in the 2021 case study scored better final grades than their peers; they earned eleven points more than their peers.

6. Conclusion

In conclusion, the future of higher education partially depends on AI development. The adoption of AI in higher education is still at its earliest stages, but it is benefits to the sector remain unquestionable. Cyber security plays a significant role in the successful and effective adoption of AI in HLI, as universities and colleges are common targets of cyber attackers. However, in recent years, AI has helped them enhance their cyber security. The authors experienced a few limitations, such as inadequate time during the study. The adoption of AI in higher education is currently experiencing a few challenges, but future scientific research and Technological advancement will help overcome them. Effective leadership, especially among king stakeholders, remains one of the invaluable contributions to the success in the process of integrating AI into HLI.

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