Investigating the Perception of Generative AI on University Students in Morocco

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Abstract

Generative artificial intelligence (AI) has become increasingly accessible to university students and educators. This research team investigated the perception of generative AI by students in higher education in Morocco through a comparative study. They surveyed students and professors at the International University of Rabat (UIR) and Worcester Polytechnic Institute (WPI) and conducted follow-up interviews with UIR participants. The findings represented a positive attitude and acceptance from the participants towards generative AI. Subsequently, the research team proposed a policy that allows generative AI to be used as a valuable and ethical tool at higher educational institutions.

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Executive Summary

Introduction

Generative AI has become an important topic surrounding education, changing how students consume and access content. Additionally, it has become increasingly popular with students in terms of assisting them with their schoolwork. Educators and institutions must be aware of this technological revolution and how it impacts both teaching and student learning outcomes. Instructors can also learn of its 'positive' values, highlighting the study's importance. This project investigated the perception of generative AI on students in higher education in Morocco through a comparative study by surveying students and professors at the International University of Rabat (UIR) and Worcester Polytechnic Institute (WPI) and follow-up interviews with UIR participants. After surveying and interviewing students and professors, a policy for utilizing generative AI at the International University of Rabat was developed for consideration and potential implementation.

Goal and Objectives

Our project aimed to investigate the perception of generative AI in higher education in Morocco. To achieve this goal, the following objectives were identified:

1. Investigate the usage of generative AI in higher education institutions
2. Identify views on the current state of generative AI and its future direction in higher education

Methodology

Generative AI's widespread use by students requires a needs assessment that seeks to identify the effects of generative AI on students in higher education and on higher education institutions. A mixed methodology was used by the research team. It consisted of two components based on obtaining quantitative data through surveys and qualitative data through interviews. Quantitative and qualitative data were necessary to draw conclusions about generative AI's impact on higher education. This is a comparative study between WPI and UIR, as surveys were conducted at both universities. Interviews, however, were limited to UIR students. Using selective sampling, our survey participants were undergraduate students and professors from each university, while the interviews only consisted of undergraduate students at UIR. Surveys were distributed at UIR through in-person classroom interactions where QR codes were scanned. For WPI, surveys were emailed and sent through social media sites for students to complete. The survey consisted of 37 questions, some being multiple choice and others based on a 5-point Likert scale. Furthermore, two scales were adopted: the attitudes towards generative AI and the generative AI measurement and usage scales. Interviews comprised five main questions focusing on the current and future states of generative AI at UIR. Probing questions were added to go further in-depth on a topic that the participant mentioned.

Findings

The study's findings, which entailed extensive data preparation and analysis processes, provided perceptions into undergraduate populations at WPI and UIR regarding their attitudes toward and use of generative AI. Data collection procedures included conducting interviews and obtaining survey results from Qualtrics to assure accuracy. Afterward, the data was cleaned, and audio files

were transcribed. The survey responses were carefully examined to exclude erroneous answers and concentrate only on pertinent demographic and attitudinal data.

ANOVA tests and mean computations were the statistical methods used in the analysis of our first objective to evaluate participants' opinions and adoption of generative AI. Regarding application choices and reasons for non-use, both institutions' usage of generative AI showed comparable tendencies, although there were some noticeable variances. Participants from WPI and UIR showed similar distributions in terms of gender, academic year, and subject of study. A qualitative analysis of the interview data for our second objective identified themes related to misinformation, AI use, classroom integration, and future consequences. Participants emphasized the advantages of generative AI in improving learning and productivity while acknowledging its ethical problems and potential for misinformation. Despite their reservations, participants were positive about generative AI's growing influence in academia, anticipating broad integration across numerous fields.

Overall, the study's results emphasize how widely student populations worldwide are adopting generative AI while also presenting complex viewpoints on its application, morality, and potential future ramifications in educational settings.

Discussion

The International University of Rabat and Worcester Polytechnic Institute’s undergraduate student populations were compared in terms of their use and opinions about generative AI. Only one significant association was observed between the institutions in the ANOVA tests and scale score averages, despite similar demographic breakdowns between the two institutions—nearly equal gender distribution and a preponderance of third-year undergraduates majoring in Science,

Technology, Engineering, and/or Mathematical (STEM) fields. Eighty-seven of the 90 UIR participants showed a high utilization rate of ChatGPT, one of the generative AI tools. Conversely, there were more non-users (33 out of 128 participants) at WPI, even though most participants had experience with generative AI. This calls into question presumptions regarding adopting generative AI use in the United States. Participants at UIR and WPI reported shorter assignment completion times when generative AI was used, indicating an efficient tendency. However, worries about the overuse of generative AI and its ethical application were observed, especially among UIR interviewees.

The project faced several limitations as a result of some challenges encountered. One limitation was the lack of data from the small sample size and low response rate. Many students attending classes online during the Islamic holy month of Ramadan resulted in fewer students on campus. Additionally, many students started the survey but did not complete it. The study was also limited to undergraduate students. As for interview data collected at UIR, only four of the 25 interested participants showed up for the interview, with the others not responding when further contacted. Additionally, more existing research was needed to develop our methodology and data analysis as there were limited research studies available to reference.

Recommendations and Deliverable

Based on the data analyzed, we suggested many recommendations, mainly because there are very few generative AI guidelines at UIR. We proposed a generative AI policy that created a structure for properly using generative AI. The policy includes its principles, purpose, data privacy, legal compliance and intellectual property rights, and the enforcement and consequences of breaking the policy. Another recommendation was to create a generative AI training course

and guide that teaches students how to use generative AI correctly and ethically. This recommendation was based on the interviewee's responses. The data from the surveys and interviews also suggested the integration of generative AI into university classrooms would be beneficial, specifically in computer science, as generative AI is becoming an essential component in this field. Finally, recommendations for a more extensive study focused on more universities were made as generative AI's international impacts are becoming more apparent, especially in higher educational institutions.

Conclusion

The future of generative AI is uncertain, with many different potential avenues for its use in society. One realm where this possibility has a vast opportunity to have a significant impact is in the educational system, where there are many international effects that generative AI can have on the educational system to improve the overall quality of education delivered by teachers and received by students. As generative AI's popularity increases, the opportunity for humanity to interact with and potentially benefit from what generative AI offers is immense and growing.

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1.0 Introduction

With the increase in accessibility of generative artificial intelligence (AI) among college students, educators in Morocco are struggling to understand the impact of these technologies on student learning outcomes (Boubker, 2024). Generative AI has recently become popular among students in terms of assisting them with their schoolwork. The most popular generative AI application students use is ChatGPT (Shroer, 2024). It comes in two models, GPT-3.5 and GPT-4.0. ChatGPT-4.0 is the latest release of ChatGPT by OpenAI. It accepts images as inquiries and provides higher accuracy responses with less need for clarification from the user (Vaughan-Nichols & Diaz, 2024). Although GPT-4.0 provides slightly more accurate responses, it comes with a fee most students are unwilling to pay. This results in students choosing to use GPT-3.5, which is perceived just as useful as the newer, paid version of the application (Vaughan-Nichols & Diaz, 2024). GPT-3.5 differs from most generative AI applications because it provides a free option that still works well; most other generative AI applications require a fee (Vaughan-Nichols & Diaz, 2024).

This paper investigates the perception of generative AI on students in higher education in Morocco. Despite similar research being performed in Morocco, neither students from Rabat nor the International University of Rabat (UIR) were included in the study (Boubker, 2024). This research aimed to fill the gap by conducting a comparative study, surveying and interviewing students and professors at the International University of Rabat and Worcester Polytechnic Institute (WPI). By understanding the impact of generative AI on students and professors and their outlooks on it, the research team created a policy for UIR that can guide the ethical use of generative AI in accordance with the university guidelines.

2.0 Background

2.1 Moroccan Higher Education

The Moroccan education system is split into three levels: primary, secondary, and tertiary. This roughly translates to elementary school, middle school, high school, and higher education ("Morocco - education and Training," 2023). Most children in Morocco attend elementary, middle, and high school, but as the children get older, education becomes expensive, and employment overtakes education for many families (Chtatou, 2015). The gross enrollment rate in public and private Moroccan higher education institutions in 2022 was 46% ("UIS Statistics"). The gross graduation rate, 22%, was less than half ("UIS Statistics").

Morocco's determination to improve the higher education system led King Mohammed VI to create the Higher Education Council in 2006. The council was created as an "advisory institution with the mission to provide strategies for improving education in the country, undertake constructive evaluation and advise on future policies and approaches" (Chtatou, 2015). Although Morocco has dedicated its resources to improving its higher education system, it has not been enough. Enrollment in primary and second-level schooling has been much higher than in tertiary-level schooling (Chtatou, 2015). This is caused by the many challenges faced by Moroccan universities. The universities lack scientific research, find difficulties in job opportunities for alumni, and have a limited number of scholarships to provide to students (Ben Haman, 2020). Scientific research in Moroccan universities could provide undergraduate and graduate students opportunities to gain experience in their fields as well as connections with professors or advisors from their university. This may draw students towards working in their educational fields in Morocco instead of going abroad; in 2017, 17% of Moroccans with a higher education left Morocco to work abroad (Middle East Monitor, 2017). Generally, universities play a vital role in

assisting students and alumni in the job searching process, but Moroccan universities have been ineffectual in doing so. This has made it even more difficult for students and alumni to find careers in their field on their own. Lastly, the expense of a university education coupled with limited scholarships is a factor in the lack of attendance.

Over the past 20 years, the Moroccan higher education system has developed significantly ("UIS Statistics"). With the formation of the Higher Education Council, it has only improved by displaying a 33% increase in the enrollment rate in tertiary-level schooling since the council's creation ("UIS Statistics"). Generative AI may be the application students need to aid them with the challenges of university coursework.

2.2 General Information about Artificial Intelligence (AI)

Artificial intelligence is a branch of computer science that revolves around building machines to perform tasks normally requiring human intelligence. It is a type of intelligence that can perform many tasks, including solving problems, coming up with solutions, answering questions, and offering suggestions (Sarker, 2022). Additionally, AI uses processing algorithms and combines them with large sets of data to then learn and analyze the data. It never needs a break, and as a result, it can run millions of tasks quickly and learn from them in a short period of time. Many components and techniques comprise an AI system, including machine learning, deep learning and neural networks, data mining, knowledge discovery, advanced analytics, text mining, and natural language processing (Sarker, 2022).

2.3 Overview of Generative Artificial Intelligence (AI)

Generative AI is a type of AI that has been developing for the last few years, most recently associated with the uprising of ChatGPT and other generative chatbots and AI software that

exists in our society today. Many changes have been brought about and discussed due to this uprising in the use of generative AI within society. As stated by Bozkurt, “The changes implied and/or advocated in the narratives may fall roughly into three categories: (1) educational paradigm shift because the existing, well-established educational system may constrain the facilitating role of AI in education, (2) redefining human and AI roles in education and their respective ownership because AI has advanced to a stage when it can create and generate content like humans, and (3) responsible use of AI so that educational effectiveness can be maximized while educational risks can be minimized and even prevented altogether.” (Bozkurt et al., 2023, p.6). These three different categories of changes that are going to take place, according to Bozkurt, are of vital importance in the integration of generative AI within our constantly advancing society. It is also important to highlight some of the future difficulties that will come with its integration.

There is a potential benefit in the educational systems regarding changing the curriculum and structure to better incorporate and prepare for the usage of generative AI (Bozkurt et al., 2023). ChatGPT also allows for a more inclusive and diverse educational structure in regards to how these students can obtain information; they will be able to develop different systems:

- Personalized learning: ChatGPT can be used to create interactive learning experiences that are tailored to individual students' preferences, needs, and abilities.
- Inclusive curriculum: ChatGPT can crawl across global content in many languages to help educators develop more gender and culturally inclusive learning materials and lessons; however, this relies on educators specifically asking it to do so.

- Enhanced collaboration and cooperation: ChatGPT can be used to facilitate collaboration and cooperation between students, teachers, and other educational stakeholders, allowing for more effective communication and knowledge sharing.
- Automated assessment: ChatGPT can be used to automatically grade student assignments, providing immediate feedback and saving teachers' time.
- Improved accessibility: ChatGPT can be used to make education more accessible for students with disabilities, for example, by providing alternative ways to interact with educational content and by automating accessibility features like text-to-speech and captioning.
- Efficiency in time and effort: ChatGPT can assist educators in completing tasks such as writing emails, summarizing educational concepts, and creating test/quiz questions, which can save time and allow educators to spend more time on interpersonal interactions with students.
- Improving language skills: ChatGPT can be used to help students improve their language skills (e.g., writing) by providing instant feedback and suggestions or by adopting the role of a text conversation partner. (Bozkurt et al., 2023, p.8).

These different uses of AI show much promise for improving education for students worldwide.

2.4 Generative Artificial Intelligence (AI) in Higher Education

Many students in the United States have already used generative AI for help in their education despite generative AI such as ChatGPT being a new technology. ChatGPT gained "more than 100 million users in just a few months" and kept these users consistently active since its initial

release (Schroer, 2024). Because of this high influx of users, it is understandable how ChatGPT alone could be changing the educational landscape. Therefore, surveys and other data collection methods can be used to analyze such trends in higher education in order to determine the scope of generative AI's impact.

Of the few research studies that have examined this topic, surveys were utilized to measure the impact of and exposure to generative AI in higher education. An example is the EDUCAUSE QuickPoll study which questioned students in higher education about their opinions on the role that generative AI could play at their institution. The study, which had a combined response rate of 1,277 participants, used two surveys given in February and April of 2023 to answer questions that analyzed generative AI and its relation to students. A question asking about the respondents' attitude towards generative AI showed that 54% of respondents rated their attitude toward generative AI as being optimistic or very optimistic. The second survey revealed that this optimistic or very optimistic attitude in respondents had increased to 67%. The difference in percentages between surveys showed the positive change in attitude as the exposure to new technology had increased generative AI's favorability with respondents. Another survey question that could predict the rapid assimilation of generative AI into higher education was based on the question of generative AI profoundly changing higher education in the next three to five years. Of all respondents, 83% agreed with the statement, suggesting that most students believe that the educational landscape will change in higher education as a result of AI technology (McCormack, 2023). These results, along with the graph below, suggest that ChatGPT has already made a large impact in the educational landscape as most students have interacted with generative AI and viewed it positively. These results show how accountability, ethics, and proper use policies are being brought to attention as most higher education institutions are yet to respond to the use of

generative AI. Based on the vast acceptance of generative AI and the differing attitudes towards its use, a comparative analysis between UIR, a university in Morocco, and WPI, a university in the United States, is necessary to draw conclusions about generative AI usage, attitudes, and concerns.

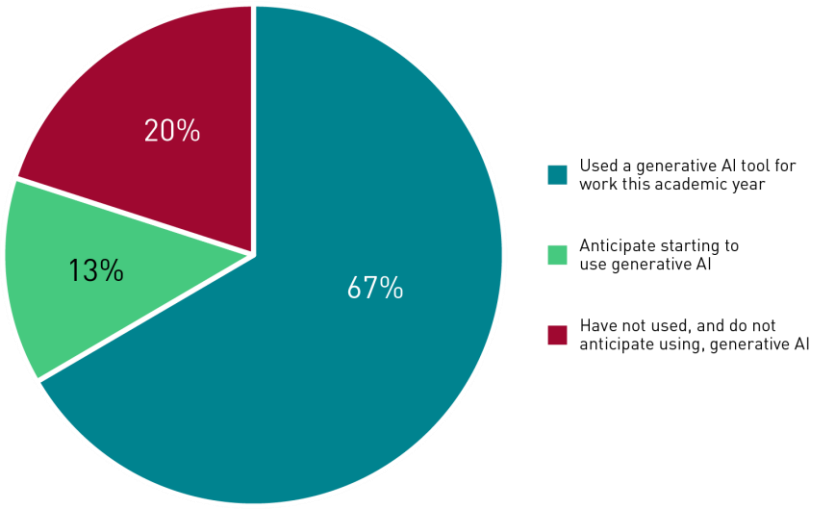

Figure 1: Results for a Survey Question Asking about Respondents use of Generative AI (McCormack, 2023)

2.5 Ethics of Generative Artificial Intelligence (AI)

Ethics plays a large role when discussing generative AI and its applications. There are many factors to consider including misinformation, privacy, and copyright issues. These factors are important to recognize when generative AI is used in higher education. This section will discuss the ethical implications when using generative AI.

2.5.1 Misinformation

Generative AI can be used to create fake content that may seem real, like deep fakes, fake news, and misleading information. Misinformation can lead to harmful actions as deep fakes create

false images, videos, text, or even speech which can be agenda-driven and even fuel hate speech (Chugh, 2023). Artificial intelligence tools have become very sophisticated, making it challenging to differentiate between real and fake.

2.5.2 Security and Privacy Concerns

Security and privacy in AI are important areas to look into. Artificial intelligence can only function based on the data available, as Ahmad stated in an article on the impact of artificial intelligence on human loss in decision making, "Without data it is nothing, and the risk is unavoidable of its misuse and leaks" (Ahmad et al., 2023). ChatGPT collects data such as your email address, conversation history, IP address, location, and any public and private information (Arnott, 2024). This invasion of privacy is what led Italy to become the first country to block ChatGPT due to privacy-related concerns. The Italian Data Protection Authority stated that there was no legal basis for collecting and storing personal data to train ChatGPT (UNESCO, 2023). Security and privacy should be taken seriously in education as universities have a vast amount of student data pertaining to their health, social security numbers, and payment information (Ahmad et al., 2023).

2.5.3 Intellectual Property and Rights

Intellectual property refers to the invention and work created by an artist; the rights to the artist's work is that artist's intellectual property right (Zirpoli, 2023). With the widespread use of generative AI, the question of copyrighting needs to be addressed, as AI can create content that is not original. Artificial intelligence is trained to generate content with the vast amount of data it is exposed to. As a result, this can violate the copyrights and intellectual property of companies, organizations, and artists, which may lead to legal disputes. A song called "Heart on My Sleeve"

was AI-generated but was similar in sound to artists Drake and The Weeknd (Zirpoli, 2023). Artificial intelligence-generated content can be created from copyrighted material. However, the challenge is distinguishing this content from actual artists.

2.5.4 Attitudes and Emotions Towards Generative Artificial Intelligence (AI)

As AI becomes integrated into daily lives, it is important to understand how people view and feel towards generative AI; this includes people's anxieties and trust towards the technology. Artificial intelligence can be associated with many challenges, including job losses, privacy and transparency concerns, and unethical actions, all of which can be manifested as anxiety (Kaya et al., 2024). Research by Frey and Osborn in 2017 concluded that 47% of Americans are at risk of potential job losses caused by AI and robotics. The fear of losing jobs by technology can create anxiety and distrust for the technology. Another study that involved 142 countries and 154,195 participants found that individuals felt anxious about the risks of using AI (Kaya et al., 2024). Many factors contribute to the acceptance and adoption of AI, including inner motivation, self-efficacy, performance expectations, ease of use, user experience, and perceived risks and benefits (Kaya et al., 2024). A study of 6,054 participants from countries including the United States, Australia, Canada, Germany, and the United Kingdom showed that people have low levels of trust towards AI and that trust plays a large part in AI acceptance. Furthermore, in Zhang and Dafoe’s 2019 study, 41% of participants supported the use of AI, while 22% of participants opposed it. The study concluded that participants in higher education levels are associated with more positive attitudes towards AI. People's attitudes and emotions towards AI are based on many important factors and need to be examined to understand the use and adoption of the technology.

2.5.5 Academic Integrity

One of the biggest concerns regarding the ethics of generative AI is in higher education. Generative AI, like ChatGPT, is one of the most used generative AI platforms. ChatGPT has over 180 million users, and in just five days after its release, ChatGPT surpassed one million users (Duarte, 2024). Its ability to provide information based on given input raises concerns regarding plagiarism. Most technological innovations are made with the intent to provide a good service to the world; however, they can also be used for bad. For example, Alfred Noble created dynamite for building and mining purposes; however, his invention was also used to make bombs for warfare and destruction. Alfred Noble wanted to help people with his invention, but it was also used to hurt people (Kravitz, 2021).

Students can use generative AI like ChatGPT to work around assignments, exams, and academics (Asrif, 2024). In a study checking essay originality, ChatGPT-written essays were put into TurnitIn, a plagiarism detection software, and no plagiarism was detected. Fifty additional essays were put to the test, where half were put into TurnitIn and the other half into another software called iThenticate. There was a similarity score of 13.72% on Turnitin and 8.76% on iThenticate. These scores showed that the ChatGPT content was considered highly original (Lo, 2023). Students can use the platform to write essays for them and present the work as their own. This raises concerns regarding the students' actual knowledge of their material. For example, students can use ChatGPT for their assignments and get good grades but still not understand the material. This creates a gap between what they actually know compared to the grades they have received, defeating the purpose of higher education’s goals of challenging and teaching students. This can result in a degree’s loss of value (Asrif, 2024). The ability of AI-assisted cheating has resulted in schools banning access to ChatGPT on campuses (Lo, 2023). The overuse of

generative AI could also impact humans' overall decision-making. In 2023, a study was conducted to examine the effects of AI on decision-making and laziness in students in Pakistan and China. The results showed that 68.9% of laziness and 27.7% of loss of decision-making are due to the impact of AI (Ahmad et al., 2023). In conclusion, academic integrity is crucial when looking at the impact of generative AI on higher education.

2.6 Technology Use and the Studying of Technology in Moroccan Higher Education

Modern technology has been used in higher education institutions internationally for more than a decade. The increase in technology development within society has provided more opportunities for educators to ensure a more holistic and encompassing approach to instruction within the classroom. With that being said, not every country in the world has had an equal chance to develop technological use within classrooms (Ouahbi, 2019). Per Ouahbi in 2019:

> There is a lack of computer discipline at the primary level; there is a lack of continuity and complementarity between the computer program in middle school and the first year of high school. Knowledge and know-how do not follow a precise order both in terms of difficulties and the level of concepts and themes; the teaching of IT in general education remains limited to the level of the 1st year of high school; practically speaking, computer science education in middle schools is limited to the second year only. (Ouahbi, 2019, p.13)

The lack of support to certain regions of the world leads to a disparity in technological development. Ouahbi's study pertains to the Moroccan education system. It emphasizes the lack of computer discipline among younger students. A seamless transition between primary, secondary, and higher education programs is non-existent as students progress through their education.

According to a survey administered to students gauging what they thought about technology being used in their learning environments and how it benefited them, 96% of the students said they believe the technological devices benefited them and their learning within these Moroccan classroom environments (Belmekki et al., 2014). Currently, there is a larger push for the mass inclusion of technology within education, most notably in higher education. This is due to the potential benefit that a current student can apply to their endeavors. They also can ensure future success that correlates directly with these actions of integrating technology. One benefit is the further development of their careers due to the many opportunities that technology and AI specifically can offer them (Talib et al., 2023). In another study Omar Boubker conducted, he "confirmed the positive influence of output quality on perceived usefulness, ChatGPT use, and student satisfaction. Similarly, social influence was recognized as a significant contributor to ChatGPT's perceived usefulness and use." (Boubker, 2022, p.11). There are major factors that currently stand in the way of widespread and unhindered assimilation of AI within higher education in Morocco, involving, "Higher constraints specific to Africa, such as network limits, educational institution readiness, and the availability of digital data, exacerbate the ethical issues." (Oubibi et al., 2022).

In the scope and sequence of the educational system of learning, it is also essential to address AI in higher education curriculum, including AI software and other applications. The research team conducted a comparative study between two universities to investigate the following questions:

RQ1: What are the perceptions of generative AI on university students and professors in Morocco?

RQ2: How must universities be prepared to deal with generative AI in education?

3.0 Methodology

3.1 Introduction

Based on the introduction of ChatGPT and other generative AI to the general public, exploring its uses, popularity, and effect on society is becoming more beneficial to study. To understand these ideas, we recognize the importance of conducting a thorough needs assessment of higher education and how to approach generative AI such that students, professors, and the institution can benefit from its integration. The main research questions guided our investigation into the current landscape and potential future trajectories of generative AI within Moroccan higher education. Furthermore, they assisted us in proposing a policy for the effective adoption and utilization of generative AI in the higher education system.

The research team conducted a mixed methodological study with the student and professor populations while exploring the opinions of both from different departments at UIR and WPI. Quantitative and qualitative data are necessary to deduce a conclusion regarding the importance of generative AI in a Moroccan university. A survey addressed the awareness and knowledge about generative AI. This survey was essential in providing quantifiable data about the usage, benefits, and drawbacks of generative AI at UIR. Furthermore, we collected survey data on WPI students and professors which allowed us to compare higher educational effects of generative AI on an international level. Additionally, one on one interviews with UIR students were conducted, which sought to understand the effects of generative AI and its importance as a new educational technology. The interviews enabled additional qualitative data, allowing students to elaborate on their encounters with generative AI and their views of it as a tool in education. Furthermore, participants from different field types were based on STEM and non-STEM categorization.

These group divisions of the UIR population provided us with a holistic view of the impact of generative AI on an educational institution.

3.1.1 Settings

Our research took place both at UIR, a semi-public university in Rabat, Morocco, founded in 2010 with an enrollment of 6,000 students (UIR, 2023), and at WPI, a private university in Worcester, Massachusetts, United States of America, founded in 1865 with an enrollment of around 7,230 students (DataUSA). The International University of Rabat offers programs from various fields, including engineering, architecture, law and political science, management, medicine, dentistry, and paramedical sciences (UIR, 2023). The university offers three programs: Bachelor's, Master's, and PhD. These programs last four years, two years, and three years respectively. WPI offers over 70 PhD, Master's, Bachelor's, and certificate programs on campus and online (WPI).

3.1.2 Participants

Our participants were undergraduate students and professors from various discipline areas at both UIR and WPI. The survey was sent to students at UIR and WPI through email and other media platforms, including Instagram, Snapchat, and WhatsApp. Additionally, we presented our study to classes and various students at UIR to collect additional survey data. We planned to collect 300 survey responses from each institution but ended with 91 responses from UIR and 128 responses from WPI. The survey administered at UIR contained an additional question asking if the participants were interested in an interview to collect further data regarding their thoughts on generative AI. Twenty-five participants were interested in an interview. Of the twenty-five participants, four participants participated in the interview. The sampling method we

planned on using was stratified random sampling; however, the sampling method we decided on was selective sampling. Selective sampling is when the sample is chosen based on the needs of the study (Barratt & Shantikumar, 2017). Since our study focused on undergraduate students and professors, we chose to send our surveys to undergraduate students and professors. If there were responses from PhD or Master's students, we did not include them in our data analysis.

3.1.3 Goal and Objectives

The goal of our project was to investigate the impact of generative AI on higher education in Morocco. To achieve this goal, the following objectives were identified:

1. Investigate the usage of generative AI in higher education institutions
2. Identify views on the current state of generative AI and its future direction in higher education

The research team's objectives were designed to investigate the uses and perception of generative AI by university students and professors. The methodology and the collection of data of each objective are stated below.

3.2 Objective 1: Investigate the Usage of Generative AI in Higher Education Institutions

An online Qualtrics survey was administered to students as the quantitative method of our study. Participants were asked 37 questions about their use and outlook on generative AI. The survey began by asking the participants whether they used generative AI. If the participants answered "No," they automatically skipped all the questions and were asked why they did not use generative AI. The following questions asked the participants about the effects of generative AI on their grades and schoolwork (see Appendix A). Next, two scales were adopted for the use of

our survey. The first scale was adapted from the article “Attitudes towards AI: measurement and associations with personality” (Stein et al., 2024). The scale (see Appendix B) had been adapted to ask about the participants' attitudes towards generative AI instead of AI in general. Along with a Cronbach alpha value of 0.93, the scale used a 5-point Likert scale.

Next, a scale was derived from the article, “User Acceptance of Information Technology: Toward a Unified View,” to estimate the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). The scale (see Appendix C) was adapted to measure the Unified Theory of Acceptance and use of generative AI, and used a 5-point Likert scale with a Cronbach alpha value above 0.7. Finally, participants were asked questions about their demographics (see Appendix D); this information would later be used for our analysis of the survey data.

3.3 Objective 2: Identify Views on the Current State of Generative AI and its Future Direction in Higher Education

The qualitative method we used to collect data was through in-person interviews. These interviews were conducted one-on-one, with one member from the research team administering the questions and answers for consistency to avoid potential issues that may arise with multiple people conducting one interview. These interviews lasted up to 45 minutes, with the average duration spanning 30 minutes. The interviews encompassed three questions regarding the interviewee’s thoughts on the current state of generative AI and two additional questions regarding their thoughts on generative AI’s future direction in higher education (see Appendix E). Depending on the length and detail of the interviewee’s responses, additional probing questions were asked in order to stimulate the interviewee to provide a more in-depth answer. This allowed for more detailed data for our research.

3.4 Data Storage and Security

All data was stored on a password-protected laptop of one of the researchers to ensure its confidentiality. The survey data was only accessible by the research team, as Qualtrics allows us to administer the surveys digitally and limit access for the participants to the duration of their time taking the surveys, with access ending after submission. This prevented people outside the research team from accessing survey data at a later date.

The interviews were recorded in one of three ways; with a professional camera set-up in a media room at UIR, using a personal cell phone, or a Zoom call recording. We simulated the same environments for all three interviewees in order to maintain uniform data collected from their responses. All the interview recordings were stored on a secure digital card, more commonly known as an SD card, containing 128 Gigabytes of storage space.

3.5 Data Analysis

A quantitative analysis of the survey responses was performed. They were collected anonymously to analyze the usage and acceptance of ChatGPT by students and professors at WPI and UIR. We analyzed the data using Microsoft Excel and the Python packages numpy, pandas, pprint, scipy, and scipy.stats to obtain the average score of the scales and perform one-way ANOVA and correlation tests to analyze the correlation between the scales and participants.

The data collected from our interviews was analyzed qualitatively. The interviews were transcribed using Adobe PremierPro, a software application that is included in the Adobe Creative Cloud licensing program. The interview data was manually analyzed by identifying

common themes between the main questions asked to every participant and the probing questions.

3.6 Limitations

There were limitations to the setting and participants at UIR which lead to specific challenges associated with the methodologies and data collection processes. These limitations hindered the results of both methodologies and our time at UIR. Daily inaccessibility to UIR was a significant limitation as our research team could only go to UIR three days each week for six hours a day. The limited time on campus also prevented us from conducting more in-person interviews. Towards the end of the data collection process, some interviews were done online as in-person options were not available to us. Throughout our data collection period, the Islamic holiday of Ramadan, which is religiously significant in the Muslim-majority country of Morocco, became a limiting factor for the setting and the participants. Professors allowed students to participate in classes virtually, but even online classes showed limited attendance. Time of day was also a limiting factor as attendance levels both online and in-person were much less in the morning sessions as Ramadan shifts followers' schedules to stay up later at night and wake up later in the morning. This prevented the research team from collecting more survey responses, as many students were not present in the classes that we went to administer the survey.

Student exams were another limiting factor as the research team planned to conduct surveys at a time when many departments were administering midterm or final exams. During the first week, the engineering and science departments had midterm exams for their third-year undergraduate students. During the second week, all other students excluding the business college, had their midterm exams. In the final week we were present on campus, the business college had its final

exams. We were not provided with these exam schedules before we arrived at UIR, limiting both the survey collection process and interview availability for students.

There were limitations to our first objective regarding the distribution of our survey to both WPI and UIR, which ended in a lack of responses. This was due to the following reasons: a significant number of participants did not complete the survey, were not from UIR, were not undergraduate students or professors, or did not consent to taking the survey. Seventy participants from UIR did not complete the survey, 11 did not consent to taking the survey, 12 were not undergraduate students or professors of the university, and 21 were Master's/PhD students. Thirty-four participants from WPI did not complete the survey, three did not consent to taking the survey, four were not undergraduate students or professors of the university, and seven were Master's students.

There were limitations to our second objective resulting in many unprecedented challenges when attempting to conduct the interviews for our project. The first challenge was that many interested participants never responded when contacted for a follow-up interview, which left us with a very small sample size of interviewees. We had 25 interested participants, but only four scheduled for an interview by the end of our data collection. This prevented us from achieving our goal of 60 interviews and forced us to have a different approach during the data analysis process. Another challenge we faced was finding a space that could be used to conduct the interviews. We could not find a suitable workspace for conducting interviews until the final week of data collection, which reduced our availability and potential interviewee count immensely.

4.0 Findings

4.1 Data Preparation

4.1.1 Objective 1: Preparation of Data

The first objective was to investigate the usage of generative AI in higher education institutions. After three weeks of data collection, the raw data was gathered from Qualtrics. It provided all the survey responses in a comma-separated value (CSV) file. In addition to the responses to the questions we provided in the surveys, Qualtrics also provided us with the start and end date of each time a participant took the survey, the progress of each participant survey, the length it took the participant to take the survey, whether the participant completed the study or not, the location, latitude, and longitude of the participant, and the distribution channel with which the survey was distributed. The additional information provided by Qualtrics was disregarded. Although there was a lot of data, many responses were invalid, which required data cleaning. An invalid response contained at least one of the following values: “No” in the column labeled “CONSENT,” “No” in the column labeled “UIR,” Master’s Student in the column labeled “SCHOOL_YEAR,” PhD or Master’s in the column labeled “DEGREE.” Participants who responded with either of those values were marked invalid since they did not align with our sample, who were strictly undergraduates and professors of WPI and UIR. Lastly, we created a new CSV file to analyze each institution’s valid survey responses.

4.1.2 Objective 2: Preparation of Data

In objective two, we identified views on the current state of generative AI and its future direction in higher education. All of the interviews were recorded using one of two recording devices: a

cellphone or microphone. The recordings were transcribed using PremierPro and converted into a text file. We used PremierPro because it provided the best audio transcription and could transcribe large audio files. The transcriptions were then manually corrected for spelling errors, grammatical errors, filler or repeated words, and inaccuracies in the transcription. For the manual correction process, each transcription file was read by one of the researchers and compared with the actual audio.

Some common errors in the transcription files were when someone said “generative AI,” “AI,” or “ChatGPT.” PremierPro had trouble understanding these keywords in the dialogue, so they had to be manually inserted into the text each time. Another common error was the participant or interviewer's repetition or stuttering of words when speaking, causing PremierPro to use an entirely different word or repeat a word or phrase multiple times.

4.2 Analysis Techniques

4.2.1 Objective 1 Analysis

Our first objective, which investigated the usage of generative AI in higher education institutions, was statistically analyzed using Microsoft Excel and various Python packages. The first six questions of the survey, following the question asking the participant for their class year, were analyzed using Microsoft Excel. Participants who used generative AI and those who did not use it categorized the first question using the filter feature in Microsoft Excel. The frequency of the generative AI application categorized the second question. The average for the following four questions was calculated using a standard mean equation in Microsoft Excel.

To analyze the two scales in the survey, the following Python packages were used: numpy, pandas, pprint, scipy, and scipy.stats. The cleaned CSV file of each institution’s survey was

inputted into code that provided the mean of each question. Next, using numpy, pandas, and pprint, we obtained the average value of all the questions in each scale. Numpy was used for calculations while pandas read in the CSV file and pprint printed out the output nicely. The average value from each scale would be the average score, which would determine the participants' attitudes towards and acceptance of generative AI. Next, using scipy and scipy.stats, an ANOVA test was performed on each scale and the following independent variables: gender, school year, and field type. The ANOVA tests were conducted to determine if there was any significance between either of the scales and independent variables. To check our data, MATLAB code was used and also performed the same task by using simple commands that pulled data from the CSV file. The mean function was used with the data to calculate each scale's mean.

4.2.2 Objective 2 Analysis

The analysis of our second objective, where we identified views on the current state of generative AI and its future direction in higher education, was based on understanding each interviewee's responses. Once the transcriptions were manually corrected, each interview was broken down into the main questions mentioned in Appendix E and the probing questions that differed between participants. Most participants answered the questions mentioned in Appendix E, allowing for a quick analysis of responses. Conclusions were drawn from these questions and compared with the other participants. Next, we compared each of the probing questions. Our findings identified four themes related to all of the questions. The four themes included misinformation/ethical dilemmas, AI usage, usage in the classroom, and classroom/future integration. Each participant's opinions for each theme could be clearly analyzed and compared between different participant responses to probing questions.

Each of the main questions mentioned in Appendix E were grouped into the four themes above to identify an overall conclusion about that topic from each participant. The first question was placed under misinformation/ethical dilemmas. The second and third questions were associated with the theme of AI usage. The fourth and fifth questions were placed under the classroom/future integration subcategory. The theme of usage in the classroom did not have any of the five main questions added to it.

The probing questions were distinguished based on the theme most applicable to each. The responses to each probing question could be used to identify a participant's attitude towards that specific theme. If responses from multiple respondents had similar findings that aligned with an overarching theme, a conclusion regarding that theme could be deduced. Specific phrases were quoted in our conclusions, along with main ideas and summarizations of responses. Although we decided to use specific words and phrases from the responses in our statements, the context for these statements was to also understand each participant's opinions correctly.

4.3 Results

4.3.1 International University of Rabat (UIR) Survey Results

The research team collected survey data from both students and professors at UIR. The data was analyzed to determine the following results. The participants were first asked whether they used generative AI or not, 90 of whom responded that they did, while one participant said they did not. Then, participants were asked to select the generative AI applications they use. Eighty-seven participants said they used ChatGPT, 32 used Gemini/Bard, 13 used Dall-E, 30 used Grammarly, and the remaining 17 participants used another generative AI application (Perplexity/Copilot, Adobe Firefly, Snapchat's MyAI, POE, Leonardo AI).

Following this, the participants were asked a series of four questions, each one gauging the different effects of generative AI on their university assignments with the first two questions being on a 5-point Likert scale. The first question asked the participants whether or not their grades had increased since using generative AI. The average response was 3.63 out of five, which correlated to the participants believing their grades were about the same or somewhat better after using generative AI. The second question asked whether their assignments have taken less time to complete because of using generative AI. The average response was 4.31 out of five, which correlated to the participants believing their assignments took less time to complete with generative AI. The third question asked the participants how many hours they spent on their assignments without generative AI. The average number of hours was 3.85 hours. The fourth and final question asked the participants the number of hours they spent on their assignments with the help of generative AI. The average number of hours was 2.77, which signifies an average decrease of one hour with the help of generative AI.

Next, the demographic statistics of the participants were analyzed. As shown in Figure 2, the data resulted in an almost-even gender split with 48 female responses (52.75% of total responses) and 43 male responses (47.25% of total responses) from UIR. The following demographic category focused on the participant's current year of studies. As shown in Figure 2, we determined that there were six first-year undergraduates (6.59% of total responses), 25 second-year undergraduates (27.47% of total responses), 38 third-year undergraduates (41.76% of total responses), 19 fourth-year undergraduates (20.88% of total responses), and three professor responses (3.3% of total responses). The final demographic category analyzed was whether the participants were engaged in STEM or non-STEM-related fields. As shown in

Figure 2, 77 participants were engaged in STEM-related fields (86.52% of total responses), and 12 participants were engaged in non-STEM-related fields (13.48% of total responses).

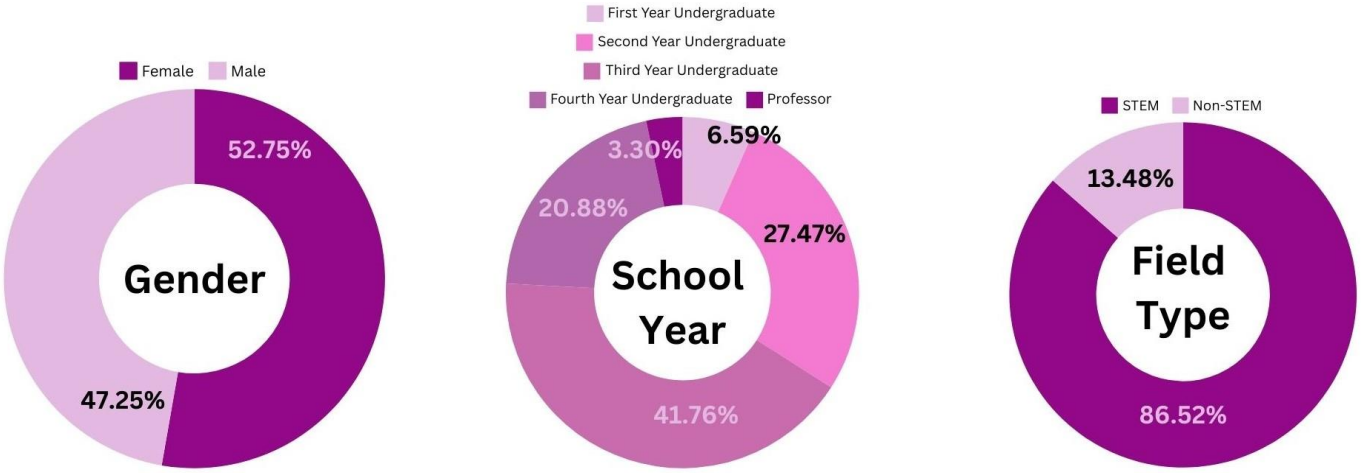

Figure 2 *UIR Demographic Breakdown*

Next, an analysis of each scale was performed. The first scale, which contained 12 questions, measured the participants' attitudes towards generative AI. As shown in Table 1, the mean of the scale was 3.109, representing an overall slightly positive attitude towards generative AI. The second scale gauged the participants' acceptance of generative AI and contained 18 questions. As shown in Table 1, the mean of the scale was 3.979, which indicated an overall acceptance of generative AI and its potential value to assist with the completion of tasks within the participant's daily life.

Table 1

UIR Scale Mean Values

Scale	Value
Attitudes Towards Generative AI	3.109
Generative AI Measurement and Usage	3.979

Finally, an ANOVA test was conducted on the two scales, Attitudes Towards Generative Artificial Intelligence and Generative AI Measurement and Usage, and three independent variables, gender, school year, and field type. Significance was assigned to relationships with p-values less than 0.005 and f-values above 4.0. The ANOVA test on the Attitudes Towards Generative Artificial Intelligence scale and the independent variable, gender, resulted in an f-value of 0.205 and a p-value of 0.652, signifying an insignificant relationship. The ANOVA test on the Attitudes Towards Generative Artificial Intelligence scale and the independent variable, school year, resulted in an f-value of 0.004 and a p-value of 0.950, signifying an insignificant relationship. The ANOVA test on the Attitudes Towards Generative Artificial Intelligence scale and the independent variable, field type, resulted in an f-value of 1.985 and a p-value of 0.104, signifying an insignificant relationship. The ANOVA test on the Generative AI Measurement and Usage scale and the independent variable, gender, resulted in an f-value of 1.433 and a p-value of 0.235, signifying an insignificant relationship. As shown in Table 2, The ANOVA test on the Generative AI Measurement and Usage scale and the independent variable, school year,

resulted in an f-value of 10.695 and a p-value of 0.002, signifying a significant relationship. The ANOVA test on the Generative AI Measurement and Usage scale and the independent variable, field type, resulted in an f-value of 0.692 and a p-value of 0.599, signifying an insignificant relationship.

Table 2

UIR ANOVA Test Results

Scale	Gender	School Year	Field Type
Attitudes Towards Generative AI	F-value: 0.205 P-value: 0.652	F-value: 0.004 P-value: 0.950	F-value: 1.985 P-value: 0.104
Generative AI Measurement and Usage	F-value: 1.433 P-value: 0.235	F-value: 10.695 P-value: 0.002	F-value: 0.692 P-value: 0.599

4.3.2 Worcester Polytechnic Institute (WPI) Survey Results

The research team also collected survey responses from both students and professors at WPI. The data was analyzed using the same methods to determine the following results. The participants were first asked whether or not they used generative AI. Ninety-five responded that

they did, while 33 said they did not use generative AI. There were four main reasons some participants at WPI did not use generative AI. One reason was because they did not trust generative AI; two people provided this response. The second reason was because they did not need to use generative AI; 21 participants provided this response. The third reason, shared by six participants, was because they did not find it helpful. The final reason was because they did not know how to use it; three participants provided this reason for not using generative AI. Participants were then asked to select the generative AI applications they use. Ninety-two participants said they used ChatGPT, 11 used Gemini/Bard, 23 used Dall-E, 57 used Grammarly, and eight participants used another generative AI application (Canva Logo Creator, Alexa, Microsoft Copilot, Claude, Research Rabbit, Elicit, DeepL Write and Translate). The participants were then asked four questions, each gauging the different effects of generative AI on their university assignments with the first two questions being on a 5-point Likert scale. The first question asked the participants whether their grades had increased since using generative AI. The average response was 3.22 out of five, which correlated to the participants believing their grades were about the same after using generative AI. The second question asked whether their assignments have taken less time to complete after using generative AI. The average response was 3.68 out of five, which correlated to the participants believing generative AI will lessen their time on assignments. The third question asked the participants how many hours they spent on assignments without generative AI. The average time spent on assignments without the help of generative AI was 5.5 hours. The fourth question asked the participants the number of hours they spent on assignments with the help of generative AI. The average number of hours was 4.3, which signified an average decrease of 1.2 hours with the help of generative AI.

Next, the demographic statistics of the participants were analyzed. We collected 51 female responses (41.80 % of total responses) compared to 71 male responses (58.20% of total responses) [see Figure 3] from WPI. The following demographic category analyzed was the school year of the participant. The research team identified nine first-year undergraduates (7.03% of total responses), 21 second-year undergraduates (16.41% of total responses), 65 third-year undergraduates (50.78% of total responses), 25 fourth-year undergraduates (19.53% of total responses), and eight professor responses (6.25% of total responses) [see Figure 3]. The final demographic category analyzed was the field type of the participants, STEM or non-STEM. As shown in Figure 3, 118 participants were involved in STEM-related fields (92.68% of total responses), and nine participants were engaged in non-STEM-related fields (7.32% of total responses).

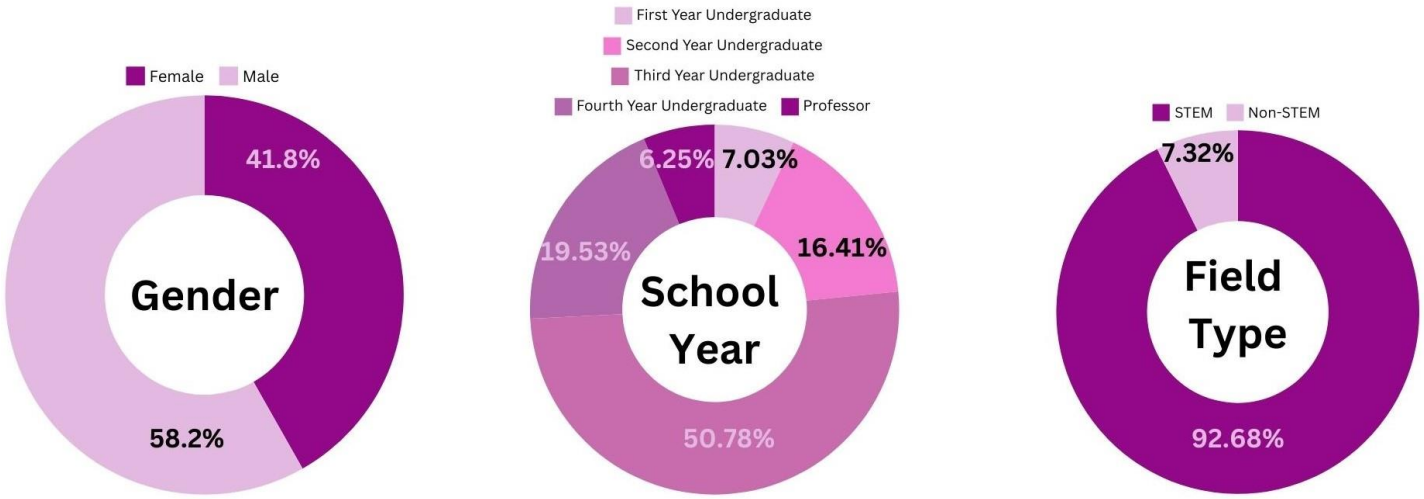

Figure 3 *WPI Demographic Breakdown*

Next, an analysis of each scale was performed. The same scales were administered to UIR and WPI to maintain uniformity and accuracy of the data. The mean of the scale measuring the

participants' attitudes towards generative AI was 3.038 [see Table 2], representing an overall slightly positive attitude towards generative AI. The second scale, which gauged the participants' acceptance of generative AI, had a mean of 3.897 [see Table 2], which indicated an overall acceptance of generative AI and its potential value to assist with the completion of tasks within the participant's daily life.

Table 3

WPI Scale Mean Values

Scale	Value
Attitudes Towards Generative AI	3.038
Generative AI Measurement and Usage	3.897

Finally, ANOVA tests were conducted on the two scales, Attitudes Towards Generative Artificial Intelligence and Generative AI Measurement and Usage, and three independent variables, gender, school year, and field type. Significance was assigned to relationships with p-values less than 0.005 and f-values above 4.0. As shown in Table 4, the ANOVA test on the Attitudes Towards Generative Artificial Intelligence scale and the independent variable, gender, resulted in an f-value of 0.361 and a p-value of 0.549, signifying an insignificant relationship. The ANOVA test on the Attitudes Towards Generative Artificial Intelligence scale and the independent variable, school year, resulted in an f-value of 1.706 and a p-value of 0.195,

signifying an insignificant relationship. The ANOVA test on the Attitudes Towards Generative Artificial Intelligence scale and the independent variable, field type, resulted in an f-value of 0.262 and a p-value of 0.901, signifying an insignificant relationship. The ANOVA test on the Generative AI Measurement and Usage scale and the independent variable, gender, resulted in an f-value of 0.657 and a p-value of 0.420, signifying an insignificant relationship. As seen in Table 3, the ANOVA test performed on the Generative AI Measurement and Usage scale and the independent variable, school year, resulted in an f-value of 3.715 and a p-value of 0.057, signifying an insignificant relationship. The ANOVA test on the Generative AI Measurement and Usage scale and the independent variable, field type, resulted in an f-value of 1.369 and a p-value of 0.251, signifying an insignificant relationship.

Table 4

WPI ANOVA Test Results

Scale	Gender	School Year	Field Type
Attitudes Towards Generative AI	F-value: 0.361 P-value: 0.549	F-value: 1.706 P-value: 0.195	F-value: 0.262 P-value: 0.901
Generative AI Measurement and Usage	F-value: 0.657 P-value: 0.420	F-value: 3.715 P-value: 0.057	F-value: 1.369 P-value: 0.251

4.3.3 Objective 1: Overall Survey Results

Our first objective was to investigate the usage of generative AI by students in higher education institutions in order to determine how prevalent generative AI is within UIR and WPI. In regards to the survey the research team administered, the anticipated number of survey responses was much lower than predicted, but the research team still collected adequate beneficial data. Between both UIR and WPI, we came across similar results from the data analysis. A surprising number of respondents from WPI stated they do not use generative AI (33 participants), whereas only one participant did not use generative AI from UIR. The generative AI applications participants used outside of the applications explicitly listed on the survey, differed vastly between the two universities. Demographically, the results were also very similar between UIR and WPI. There was a close-to-even split between male and female participants (52.75% Female and 47.25% Male at UIR versus 58.2% Male and 41.8% Female at WPI), the most significant portion of students who used generative AI applications were third year undergraduate students (41.76% at UIR and 50.78% at WPI), and the field of study and work of most participants was overwhelmingly STEM related (86.52% at UIR and 92.68% at WPI). Regarding the scale means for both scales, the values from UIR and WPI were marginally separated. Finally, from the ANOVA tests conducted on the UIR and WPI datasets, only one test conducted on the UIR dataset signified a significant relationship, which was between the Generative AI Measurement and Usage scale and the school year variable.

4.3.4 Objective 2: Interview Results

The purpose of objective two was to identify views on the current state of generative AI and its future direction in higher education by interviewing students. Despite the limited number of interviewees, we received ample information from the four interviews conducted with students at

UIR. From the interviews, four themes were identified: misinformation/ethical dilemmas, AI usage, usage in the classroom, and classroom/future integration. We then manually analyzed the interview responses.

Most participants were aware of the ethical dilemmas and risk of misinformation surrounding generative AI. When using the software, participants felt as if they were cheating. When asked if they had ever experienced ethical dilemmas or concerns related to using generative AI tools in their academic work, one participant stated, “It felt like you were taking a shortcut." Another ethical consideration is data security. One participant heard stories of people's data being used against them. Most participants were aware of the potential misinformation generated. When asked if they knew of potential inaccuracies from generative AI, one participant responded, “Yes, of course. I'm aware of that. Before I started using it, I was aware of the fact that it could sometimes misinform you and that it could sometimes make mistakes.” Despite this, the students knew how to deal with the risk. In one instance, a student knew the types of questions to avoid asking ChatGPT, “Stuff that requires a lot of logic like advanced problem solving tends to result in incorrect answers.”

Regarding AI usage, most participants believed they gained more knowledge when asked if they learned more while using ChatGPT. One participant stated, “For me, it's impossible to learn less when using ChatGPT or Gemini because you are always going to learn something when you read the answers it provides because it provides such valuable answers.” Another student stated, “Yes, I'm definitely learning more. There was never a time where I used ChatGPT or any type of generative AI where it has not helped me out”. When asked whether or not their critical thinking has improved or been harmed due to ChatGPT, all participants believed that ChatGPT benefitted them and sparked their creativity in some way, "You can still better creative thinking with

reading answers from ChatGPT. For example, you can ask a question, read the answer, understand it fully, evaluate it, and then just think critically." However, on the other hand, another participant said that it made them lazy when completing their work, “It just made me very lazy because every time I want to do a task, I determine that it's going to be way easier if I just use AI instead of like taking four hours of my day to do it manually. They rely on ChatGPT and other AI tools to complete their work rather than taking the time to complete it themselves.” We found that all the participants used generative AI in many aspects of their daily lives, not just education. In educational settings, participants use generative AI to complete assignments, teach them new concepts, complete mundane tasks, produce clean code, explain complex terms and concepts, and create logos and posters. In their personal life, they use it to help them with their hobbies or simply look up information of their interest.

Regarding the theme of AI usage in classrooms, participants stated that both students and professors use generative AI. Some professors even encourage students to use the software. One participant said, "I've seen some professors use it. I have had a professor make a presentation on the code, and instead of having to type it himself, he used ChatGPT to provide the snippet of the code." Another student stated, "The instructor tells us to use it. Some of them, but not all. A professor has asked us to use ChatGPT to give us answers about a topic." Utilizing ChatGPT in the classroom can also be seen as a personal instructor. One participant said, "It's kind of like if you're struggling with the code itself, it can help you. It can hold your hand and walk you through it. It explains it to you and tells you what each instruction does for you. It's kind of like having a mentor next to you."

Regarding the theme of classroom integration and future integration, when asked how they foresee generative AI's role in academia in the coming years, all students had similar, positive

responses. All participants agreed that generative AI, such as ChatGPT, will vastly increase its usage in universities across many departments. One participant, who was a computer science major, said, “We're the most likely to end up using generative AI.” He also noted that, “ The business school would definitely [use it] because they also try to keep up with the latest trends every year. It's an important part of that major.” However, he said he would not recommend generative AI for the humanities department, “You are kind of sacrificing the creativity and knowledge you gained by yourself for something that is just considered objectively correct, in most cases.” Another participant said that it would help everyone in the community. A third participant noted that professors will eventually use it. When asked about the advantages and disadvantages of integrating generative AI in classrooms, all four participants agreed that ChatGPT and generative AI benefit learning and allow students to be more productive. One participant mentioned how ChatGPT can act as a personal tutor. The downsides mentioned included laziness, misinformation, misuse of the software, and anxiety towards generative AI. One participant stated, “It's very, very bad for everyone in general because at some point, scientifically speaking, generative AI will learn from what we ask and could have access to our data as students, and as people. It could ruin lives. I've seen many cases of generative AI doing very human stuff and it doesn't make sense, even though it's just ChatGPT. It gives very weird replies. It just does things that are unusual and at some point it will want to rebel.” The participant was concerned about AI being dangerous because of its learning capabilities and how it would move beyond humans and potentially be harmful. Advantages and disadvantages of potentially integrating generative AI into classroom settings are essential to examine as generative AI has a significant impact on the educational system.

5.0 Discussion

The analysis of our data produced a gender split that was relatively even for both institutions, and a sample comprised of mostly STEM majors and third-year undergraduates. Although UIR and WPI had similar demographic splits, the results from the ANOVA tests and calculating the average of the scale scores only produced one significant relationship.

Participants from UIR were avid users of ChatGPT (87 out of 90 participants used it). Around one third of participants used Gemini and/or Grammarly (32 out of 90 used Gemini, 30 out of 90 used Grammarly). When asked whether their assignments have taken less time to complete when using generative AI, participants believed their assignments now take less time to complete. They were, according to our findings, correct; their assignments took, on average, 1.85 fewer hours to complete with the assistance of generative AI. Finally, the results from each scale correlated with the participants from UIR's positive attitude toward AI and acceptance of it.

Of the 128 participants from WPI, 95 participants had used generative AI before, while 33 participants had not. A majority of participants (72%) said they used ChatGPT, a minority used Gemini/Bard (9%) or Dall-E (18%), about one-third of participants used Grammarly (45%), and only 6% of participants used another generative AI applications (Canva Logo Creator, Alexa, Microsoft Copilot, Claude, Research Rabbit, Elicit, DeepL Write and Translate). The 33 participants who did not use generative AI gave different reasons for doing so. Compared to UIR, which only had one participant not use generative AI, this greater number of non-AI users from WPI showed how generative AI is more accepted and used at UIR than WPI. This goes against some initial preconceptions when comparing the two universities. An American university such as WPI can be perceived as being “more technologically advanced and accepting” compared to a Moroccan university such as UIR. The economic differences between

the two nations impacts media literacy and transparency regarding technology within a society. From the four questions asking participants about time spent on assignments, WPI respondents agreed that generative AI could make them more time efficient with their assignments. Time spent on homework went from 5.5 hours to 4.3 hours on average; a decrease of 1.2 hours because of generative AI's help. This showed that students specifically use generative AI to shorten their time spent on homework and increase their free time.

The demographic split for each institution could be explained by how the survey was distributed. The research team consists of third-year students, so colleagues and organizations that received the survey largely consisted of third-year students. Furthermore, the survey was sent to all current WPI students on IQP, which almost entirely consists of third-year students. The mean of the scale, Attitudes Towards Generative Artificial Intelligence, described a slightly positive attitude towards generative AI, which, compared to UIR, is very close. This shows a consistent attitude towards generative AI in which it is slightly seen as a positive rather than a negative. The mean of the scale, Generative AI Measurement and Usage, described the participants' acceptance of generative AI, which was higher, at 3.897. This greater acceptance of generative AI compared to the lower outlook of AI depicted how generative AI, whether students agree with it or not, is here to stay and can be used as a tool by students. The similarities in attitudes between universities suggest an international ideology where students are unsure about AI being beneficial or not while generally agreeing that they accept generative AI as a technological tool.

Interviews conducted to fulfill our second objective provided information confirming the survey results. Interviewees informed us that they and most students at UIR use generative AI in some form. They have also noticed many students use it to cheat during classes and exams. Although interviewees acknowledged the misuse of generative AI, they were concerned with the ethics of

using generative AI and believed that the benefits outweighed the misuse of generative AI. Some interviewees were concerned about the potential detrimental effects generative AI could have on a person if they rely excessively on it. Interviewees also acknowledged the inaccuracies of generative AI and knew how to work around them. The concern and acknowledgment of the interviewees show that even though students at UIR are using generative AI applications for most, if not all, of their tasks and assignments, many of them hold themselves ethically responsible when using it. This is especially in academic settings because they know how easy it is to rely on them entirely.

5.1 Limitations

Our project had a few limitations due to some challenges faced. One limitation was a lack of data as the survey data collected was not enough to make significant findings. Only one significant finding was made from the twelve ANOVA tests. Several factors impacted the sample size. Many students were not on campus for classes and took them online due to the Islamic holy month of Ramadan. The classes that we had the option to present our project in had limited students. Additionally, students would start the survey but not complete it, which further limited our data collection. Furthermore, we only considered looking at data for undergraduate students. For interview data, four participants were interviewed out of the 25 that were interested in a follow-up interview. The other participants, when further contacted via email for an interview, did not respond. Lastly, very few studies have been conducted on generative AI and higher education that could be referred to for the structure of our methodology or analysis of our data.

6.0 Deliverable and Recommendations

Our research recommendations for universities are based on the analysis of our data from higher education institutions. Our recommendations include a generative AI policy that guides students and educators on using generative AI in the institution, a generative AI training course that helps students properly use generative AI effectively and correctly, the integration of generative AI into classrooms, and the recreation and expansion of a future research study of generative AI's higher education impacts.

6.1 Deliverable

We proposed a generative AI policy for UIR that outlines the ideas we believe to be important based on the data we collected and analyzed through our methodology (see Appendix F). This policy was created with ChatGPT 4.0 (OpenAI Assistant, 2024) (ChatGPT, 2024) using a combination of the two following inputted prompts written by the research team:

"You are being asked to write a 2-page professional policy for a higher educational institution. Based on the following means, generate a policy for ethically using generative AI in the institution. Include the means in a section of the policy as proof. Be sure to be unbiased in your outlook on generative AI and convincing in your use of generative AI applications.

Attitudes Towards Generative Artificial Intelligence Mean: 3.109

Generative AI Measurement and Usage Mean: 3.979"

"You are being asked to write a professional policy for a higher educational institution on the use of generative AI"

After these responses were generated, the research team combined both policies and kept the sections most applicable for an AI policy.

6.2 Generative Artificial Intelligence (AI) Training Course Recommendation

Additionally, we recommend a training course on generative AI, created and organized by universities, for students and professors to learn how to write generative AI prompts correctly, understand how to identify misinformation, fact-check generative AI, and prevent misuse of generative AI. This way, students can use and integrate generative AI into their work. Generative AI is the newest educational tool much like calculators are used for mathematics or Google for fact-checking information. In a similar way to how students require training to use machinery for mechanical engineering studies, students need to receive training for generative AI to prevent misuse and properly learn through generative AI in a way that works for them. Thus, having a program to enable proper use rather than banning it would benefit the university and its students. From our survey and interview findings, we discovered that most students use generative AI in their higher education studies. Using generative AI properly was a priority of all students interviewed, which showed how the universities must take steps to ensure proper use through education.

6.3 Generative Artificial Intelligence (AI) Integration into the Classroom Recommendation

Another recommendation is based on the integration of generative AI in university courses. Students at UIR informed us during interviews that professors already use generative AI in their classrooms. Some degree programs, specifically in computer science and computer engineering, can be integrated with generative AI as it can help students with programming. Since generative AI use in the classroom is based on the opinions of professors, a universal acceptance and

application of generative AI in university courses is needed, especially in computer science as it is most relevant to these students and their careers. In the future, generative AI integration would benefit other subjects and the different learning styles that students have, but we could not make such conclusions in our findings.

6.4 Future Research Recommendations

Based on the significant limitations we encountered in scope and logistics, we recommend an expanded and replicated study across multiple universities in different countries. We recommend that more survey and interview data is collected from each institution and that different groups of students and professors across degrees, departments, degree years, and genders are properly examined. Our comparative study between WPI and UIR was incomplete, and future studies should examine each institution with an equal methodology, as we were unable to conduct interviews at WPI as we had done at UIR. The goal of this study was to answer a large question of increasing significance in today's academic landscape, thus an equally large study is needed to ensure the question is completely answered.

7.0 Conclusion

The analysis conducted on our data provided helpful information. The mean of each scale from both institutions were very similar, allowing insightful observations and conclusions. One of these observations was how universities in different parts of the world, operating in different societies with vastly different rules and regulations regarding university structure, can have very similar values stemming from their undergraduate populations. This also alludes to the vast and rapid grasp that generative AI has on the technological sphere globally, going against some common misconceptions that only economically wealthy societies will be able to adopt and

adjust to the developments of generative AI currently taking place in the world. Although the students are operating in different environments, they can still have objectively similar outlooks and usage of the generative AI technology, irrespective of the different challenges they may face in their unique curriculums. With the rapid pace our society is accepting and continuing to integrate generative AI into daily human life, there could potentially come a time when it will become second nature to have significant decisions and policies created using the help of generative AI. This concept could be present within all disciplines of society, especially education, where there are many potential benefits to the average student's experience at any level of education, including the higher education system in Morocco.

8.0 References

Arnott, B. (2024, January 2). *Yes, CHATGPT saves your data. here's how to keep it secure.* Forcepoint. https://www.forcepoint.com/blog/insights/does-chatgpt-save-data#:~:text=ChatGPT%20collects%20both%20your%20account,use%20in%20your%20ChatGPT%20prompts.

Ahmad et al. (2023, June 9). Impact of artificial intelligence on human loss in decision making, Laziness and Safety in Education. Nature News.

Assistant from OpenAI. (2024, April 19). *Generative Artificial Intelligence Usage Policy*. International University of Rabat.

Barratt, H., & Shantikumar, S. (2017). *Methods of sampling from a population*. Methods of sampling from a population | Health Knowledge. https://www.healthknowledge.org.uk/public-health-textbook/research-methods/1a-epidemiology/methods-of-sampling-population

Belmekki, Nabil and Ouazzani Ibrahimi. (2014). The Integration of the New Technology at the Moroccan Universities. Arab World English Journal. P. 427-442. https://www.awej.org/images/AllIssues/Volume5/Volume5number4Decmber/28.pdf.

Ben Haman, O. (2021). The Moroccan education system, dilemma of language and think-tanks: The challenges of social development for the North African country. The Journal of North African Studies, 26(4), 709-732. https://doi.org/10.1080/13629387.2019.1711061

Boubker, O. (2024). From chatting to self-educating: Can AI tools boost student learning outcomes?. Expert Systems with Applications, 238, 121820.

Bozkurt et al. (2023). Speculative Futures of ChatGPT and Generative Artificial Intelligence (AI): A Collective Reflection from the Educational Landscape. Asian Journal of Distance Education. https://zenodo.org/records/7636568.

ChatGPT. (2024, April 19). Generative AI usage policy for higher educational institutions. Unpublished document.

Chtatou, Mohamed. 2015. “A Moroccan Success Story Tainted With Some Shortcomings”. Paper Commissioned For The EFA Global Monitoring Report 2015, Education For All 2000–2015: Achievements And Challenges. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000232463.

Chugh, V. (2023, July 20). *Understanding the ethics of Generative AI: Risks, concerns, and best practices*. DataCamp. https://www.datacamp.com/tutorial/ethics-in-generative-ai

Duarte, F. (2024, February 2). *Number of ChatGPT users (Feb 2024)*. Exploding Topics. https://explodingtopics.com/blog/ChatGPT-users

International Trade Administration. (2023, March 23). *Morocco - education and Training Services Industry Snapshot*. International Trade Administration | Trade.gov. https://www.trade.gov/country-commercial-guides/morocco-education-and-training-services-industry-snapshot

Kaya et al. (2024). The roles of personality traits, AI anxiety, and demographic factors in attitudes toward artificial intelligence. *International Journal of Human–Computer Interaction, 40*(2), 497-514.

Kravitz, F. (2021). *Dynamite and the ethics of its many uses*. American Chemical Society. https://www.acs.org/education/outreach/celebrating-chemistry-editions/2021-ncw/dynamite-ethics.html#:~:text=Nobel%20created%20dynamite%20to%20help,and%20rockets%20used%20in%20wars.

Lo, C. K. (2023, April 18). *What is the impact of chatgpt on education? A Rapid Review of the literature*. MDPI. https://www.mdpi.com/2227-7102/13/4/410#B12-education-13-00410

McCormack, Mark. (2023). *Adopting and Adapting to Generative AI in Higher Ed Tech*. EDUCAUSE Research Notes. https://er.educause.edu/articles/2023/4/educause-quickpoll-results-adopting-and-adapting-to-generative-ai-in-higher-ed-tech.

Middle East Monitor. (2017, September 12). *Millions lost as one fifth of educated Moroccans leave country*. https://www.middleeastmonitor.com/20170912-millions-lost-as-one-fifth-of-educated-moroccans-leave-country/

Ouahbi, Ibrahim et al. (2019). Computer Science Program in Moroccan Secondary Schools: Curricula Analysis. International Journal of Modern Education and Computer Science. 11. 10-15. https://www.researchgate.net/publication/331501578_Computer_Science_Program_in_Moroccan_Secondary_Schools_Curricula_Analysis/citations

Oubibi et al. (2022, January). The challenges and opportunities for developing the use of data and artificial intelligence (AI) in North Africa: case of Morocco. In International Conference on Digital Technologies and Applications (pp. 80-90). Cham: Springer International Publishing.

Sarker, I. H. (2022). *AI-based modeling: Techniques, applications and research issues towards automation, intelligent and Smart Systems*. SN computer science. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8830986/

Schroer, Alyssa. (2024). *What is Artificial Intelligence?* builtin. https://builtin.com/artificial-intelligence.

Stein et al. (2024). Attitudes towards AI: measurement and associations with personality. *Scientific Reports*, *14*(1), 2909.

Talib et al. (2023). Utilizing M-Technologies for AI-Driven Career Guidance in Morocco: An Innovative Mobile Approach. International Journal of Interactive Mobile Technologies (iJIM), 17(24), pp. 173–188. https://doi.org/10.3991/ijim.v17i24.44263

Uis. (n.d.). *Uis statistics*. UIS Statistics. http://data.uis.unesco.org/index.aspx?queryid=3812

UNESCO. (2023). *Chat GPT-and-artificial-intelligence-in-higher-education-quick-start-guide en final - working papers*. Studocu. https://www.studocu.com/row/document/international-institute-for-higher-education-in-morocco/artificial-intelligence/chat-gpt-and-artificial-intelligence-in-higher-education-quick-start-guide-en-final/65648857

Vaughan-Nichols, S., & Diaz, M. (2024, January 24). *ChatGPT vs ChatGPT plus: Is it worth the subscription fee?*. ZDNET. https://www.zdnet.com/article/ChatGPT-vs-ChatGPT-plus-is-it-worth-the-subscription-fee/

Venkatesh et al. (2003). "User Acceptance of Information Technology: Toward a Unified View," MIS Quarterly (27:3), pp. 425-478.

Zirpoli, C. (2023). *Generative Artificial Intelligence and Copyright Law*. Congressional Research Service. https://crsreports.congress.gov/product/pdf/LSB/LSB10922

WPI. (n.d.). *Worcester Polytechnic Institute*. Worcester Polytechnic Institute (WPI). https://www.wpi.edu/

9.0 Appendices

Appendix A: Survey Questions Created by Group

1. Do you use generative AI?

    a. Yes

    b. No

2. What generative AI applications have you used?

    c. ChatGPT

    d. Grammarly

    e. Bard

    f. Dall-E

    g. Other

3. On a scale of 1 to 5, have your grades increased since using ChatGPT? (1=Not at All, 5=A lot)

4. On a scale of 1 to 5, have assignments taken less time to complete because of using ChatGPT? (1=Not at All, 5=A lot)

5. On average, how much time did you spend on your assignments without the help of ChatGPT?

6. On average, how much time do you spend on your assignments now with the help of ChatGPT?

Appendix B: Attitudes Towards Generative Artificial Intelligence Scale

In the following, we are interested in your attitudes towards generative artificial intelligence (AI).

a. Generative AI will make this world a better place
b. I have strong negative emotions about generative AI.
c. I want to use technologies that rely on generative AI.
d. Generative AI has more disadvantages than advantages.
e. I look forward to future generative AI developments.
f. Generative AI offers solutions to many world problems.
g. I prefer technologies that do not feature generative AI.
h. I am afraid of generative AI.
i. I would rather choose a technology with generative AI than one without it.
j. Generative AI creates problems rather than solving them.
k. When I think about generative AI, I have mostly positive feelings.
l. I would rather avoid technologies that are based on generative AI.

*Stein, J. P., Messingschlager, T., Gnambs, T., Hutmacher, F., & Appel, M. (2024). Attitudes towards AI: measurement and associations with personality. *Scientific Reports*, *14*(1), 2909.

Appendix C: Generative AI Measurement and Usage Scales

Please read each statement and choose the response, ranging from strongly disagree (1) to strongly agree (5), that best applies to you.

1. Performance expectancy
    a. I believe that generative AI is useful in my studies
    b. Using generative AI increases your chances of achieving important things in your studies
    c. Using generative AI helps you get tasks and projects done faster in your studies
    d. Using generative AI increases your productivity in your studies

Please read each statement and choose the response, ranging from strongly disagree (1) to strongly agree (5), that best applies to you.

9. Effort expectancy

    a. Learning how to use generative AI is easy for me
    b. My interaction with generative AI is clear and understandable
    c. I find generative AI easy to use
    d. It is easy for me to become skillful at using generative AI

Please read each statement and choose the response, ranging from strongly disagree (1) to strongly agree (5), that best applies to you.

10. Social influence

a. People who are important to me think I should use generative AI
b. People who influence my behavior believe that I should use generative AI
c. People whose opinions I value prefer me to use generative AI

Please read each statement and choose the response, ranging from strongly disagree (1) to strongly agree (5), that best applies to you.

11. Facilitating conditions

a. I have the resources necessary to use generative AI
b. I have the knowledge necessary to use generative AI
c. Generative AI is compatible with technologies I use
d. I can get help from others when I have difficulties using generative AI

Please read each statement and choose the response, ranging from strongly disagree (1) to strongly agree (5), that best applies to you.

12. Behavioral intention

a. I intend to continue using generative AI in the future
b. I will always try to use generative AI in my studies
c. I plan to continue to use generative AI frequently

13. Use Behavior

Please choose your usage frequency for generative AI:

a. Never
b. Once a month
c. Several times a month
d. Once a week
e. Several times a week
f. Once a day
g. Several times a day

*Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. 2003. "User Acceptance of Information Technology: Toward a Unified View," MIS Quarterly (27:3), pp. 425-478.

Appendix D: Demographic Questions

14. What year were you born in?

15. What is your gender?

    a. Male
    b. Female
    c. Other

16. What is your race?

    a. White
    b. Hispanic/Latino/Spanish Origin
    c. Black/African American
    d. Asian
    e. American Indian/Alaska Native
    f. Middle Eastern/North African
    g. Native Hawaiian/Other Pacific Islander
    h. Some Other Race of Origin
    i. Multiracial

17. What languages do you speak?

    a. Arabic
    b. French
    c. English

d. Tamazight

e. Spanish

f. Other

19. Are you pursuing a STEM or non-STEM related degree?

a. STEM

b. non-STEM

20. What degree are you pursuing? _____

Appendix E: Interview Questions

1. Have you ever experienced ethical dilemmas or concerns related to the use of generative AI tools in your academic work?
2. Do you feel that with the use of ChatGPT, you are learning more or less as you are more reliant on it?
3. Do you feel that your critical thinking has benefited or been harmed due to the use of ChatGPT or other generative AI tools?
4. How do you foresee the role of generative AI tools evolving in the academic landscape in the coming years?
5. In your opinion, what are the potential advantages and disadvantages of integrating generative AI tools into university education in the long term?

Appendix F: Deliverable

Generative Artificial Intelligence Usage Policy

I. Purpose and Scope

This policy provides guidelines for the ethical and responsible use of generative artificial intelligence (AI) technologies within the International University of Rabat (UIR). It applies to all students, faculty, staff, and affiliated partners who utilize generative AI tools for academic, research, and administrative purposes.

II. Policy Statement

UIR recognizes the transformative potential of generative AI in enhancing educational practices, fostering innovative research, and improving operational efficiencies. This policy aims to promote the use of generative AI within an ethical framework that upholds the UIR's integrity, respects intellectual property rights, and protects the privacy of all individuals.

III. Definitions

- Generative AI: Technology that uses machine learning models to generate text, images, audio, and other data types, typically designed to perform specific tasks based on training data.
- Ethical Use: Adherence to moral principles that include fairness, accountability, transparency, and respect for human rights.
- Intellectual Property (IP): Creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names, and images used in commerce.

IV. General Principles

1. Responsibility: Users must operate generative AI tools responsibly, ensuring that their use aligns with UIR's standards for academic honesty and professional conduct.
2. Transparency: Adequate disclosure about the use of generative AI-generated content is required in all academic and research outputs to maintain the integrity of the scholarly record.
3. Accountability: Users should be accountable for the outcomes of generative AI applications, including the readiness to address any unintended consequences and the obligation to correct errors proactively.
4. Fairness: The deployment of generative AI should be free from biases that may disadvantage any individual or group based on race, gender, ethnicity, disability, or any other identity marker.

V. Guidelines for Use

1. Academic Integrity:
    - Students and faculty must clearly cite the use of generative AI in the creation of any work submitted within the academic setting.
    - Generative AI should not be used to complete assignments, exams, or any tasks intended to assess human learning and comprehension unless explicitly allowed by the instructor.
2. Research:

- Researchers must disclose the use of generative AI in publications or any form of dissemination of their work.
- Generative AI should be used to augment research capabilities and must not replace human judgment where ethical considerations or critical decision-making are required.

3. Administrative Use:
    - Generative AI may be used to improve efficiency and accuracy in administrative tasks, provided that it does not infringe upon personal privacy or data protection standards.
    - All use of generative AI must comply with local, state, and federal regulations concerning data security and privacy.

VI. Intellectual Property

- Ownership and Rights: Work generated partially or entirely by AI tools is subject to the same intellectual property policies as other institutional works. Users should be aware of the licensing terms of the AI platforms they utilize.
- Use of Copyrighted Material: Generative AI must not be used to infringe on the copyright of others. This includes feeding copyrighted materials into AI tools without appropriate rights or licenses.

VII. Data Security and Privacy

1. Data Protection:

- Ensure that all generative AI applications comply with UIR's data protection policies.
- Sensitive information, including personal data, should not be used as input for generative AI without proper authorization and safeguards.

2. Confidentiality:
    - Maintain confidentiality and security in the deployment of generative AI tools, especially those that handle or generate sensitive or proprietary information.

VIII. Compliance with Laws and Regulations

- Legal Compliance: All use of generative AI tools must comply with applicable laws and regulations, including those concerning copyright and data protection.
- Sanctions for Misuse: Violations of this policy may result in disciplinary action, up to and including termination of employment or academic penalties.

IX. Monitoring and Evaluation

1. Usage Assessment:
    - Regularly assess the use of generative AI technologies to ensure they meet ethical standards and policy objectives. The Generative AI Measurement and Usage Mean of 3.979 indicates a robust integration of these technologies, necessitating continuous oversight.
2. Impact Review:
    - Conduct periodic reviews to evaluate the impact of generative AI on the academic community and revise policies as technology and societal norms evolve.

X. Enforcement

1. Training and Awareness
    - Training Programs: UIR will provide training sessions on the ethical use of AI technologies.
    - Resources: Continuous access to up-to-date resources and guidelines on generative AI will be available to all users.
2. Violations of this policy may result in disciplinary action, up to and including suspension or termination of access to generative AI resources, and must be handled through the appropriate administrative channels of UIR.

XI. Policy Review and Adaptation

This policy will be reviewed bi-annually to adapt to technological advancements and emerging ethical standards in the use of generative AI. The review process will consider feedback from the institutional community and developments in the broader generative AI landscape.

As part of the policy formulation process, a research team collaborated with UIR and conducted a survey to gauge attitudes toward generative AI. The survey resulted in an Attitudes Towards Generative AI Mean of 3.109. This score reflects a cautiously optimistic outlook among stakeholders, underscoring the need for clear guidelines and ethical standards in deploying generative AI technologies (see Appendix A).

XII. Implementation

This policy is effective immediately and will be revisited as technology and use cases evolve. All members of UIR are encouraged to engage with generative AI responsibly, adhering to the outlined ethical guidelines and contributing positively to UIR's mission.

Conclusion

Through the responsible use of generative AI, UIR aims to harness these technologies to enhance educational opportunities, empower scholarly research, and improve operational effectiveness while ensuring ethical practices that respect the rights and dignity of all individuals.

References

Assistant from OpenAI. (2024, April 19). *Generative Artificial Intelligence Usage Policy*. International University of Rabat.

ChatGPT. (2024, April 19). Generative AI usage policy for higher educational institutions. Unpublished document.

Appendix

Appendix A: Evidence of Community Attitudes

Scale	Value
Attitudes Towards Generative Artificial Intelligence	3.109
Generative Artificial Intelligence Measurement and Usage	3.979