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# Investigating the Factors Influencing Students' Adoption of Generative AIs in Universities: A Case of the Copperbelt University

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***Abstract*—Generative Artificial Intelligence technologies (GenAIs) have increasingly become essential components of students' learning practices in Universities, requiring an examination of the levels of acceptance and factors responsible for acceptance and usage. The study therefore investigated the levels of awareness and adoption and the factors influencing the adoption of Generative-AIs amongst University students, employing the Technology Acceptance Model (TAM) as a theoretical framework. Data from 285 students within the Copperbelt University at different levels of study was analyzed using SPSS. The instrument used in collecting the data was an online questionnaire. Results indicated there are high levels of awareness (88%) and adoption (82%) of GenAIs in learning by students in Universities and there was a relatively high usage frequency (51%). The research also revealed that Expected Benefits, Perceived Usefulness, Attitude Toward Technology, and Behavioral Intention all significantly impacted students' adoption of Generative AI. This study underscores the need to promote a culture of adopting and integrating new promising innovations such ads GenAIs in Universities, and at the same time establish ethical guidelines to promote responsible GenAIs use within education. This research also contributes to the understanding of factors responsible for GenAI adoption in higher educational settings and helps inform strategies for equitable access and responsible innovation.**

***Keywords*—*Artificial Intelligence, Generative Artificial Intelligence, Secondary School, Teachers, Technology Acceptance Model (TAM), Zambia.***

## I. INTRODUCTION

The rapid advancements in Artificial Intelligence technologies (AIs) have had an impact on a number of fields, including education and research. These AI technologies offer a variety of capabilities for both learners and educators, including personalized feedback, increased accessibility, interactive conversations, lesson evaluation, and new ways to teach complex concepts [1]. Another promising application of GenAIs in education are their potential to assist educators in generating course materials, and this can be achieved by simply synthesizing and rephrasing existing content, and thus saving time and effort for educators, allowing them to focus on more complex aspects of course design and pedagogy [1]. Due to these and many more capabilities, GenAI models have become a topic of immense interest and or concern for many educators and learning institutions [2].

In the last two years GenAIs have raised both interest and concerns within the academic sector [3]. Learning Institutions from the onset made it clear that they were not fans of students using generative artificial intelligence (AI) in their learning such as answering assignments, as it could be considered cheating [4]. Some Higher Learning Institutions on the other hand have welcomed or have welcomed the capabilities AI such as ChatGPT have, that can be used to enhance the learning and teaching experience of students and teachers respectively [4]. The integration of GenAIs into classrooms requires a paradigm shift in teaching methodologies, curriculum design, and assessment strategies [5]. The willingness and ability to adopt and effectively utilize these technologies are pivotal for the successful implementation of GenAIs in education. This paper presents the factors responsible for adoption of GenAIs by students using the Technology Acceptance Model (TAM) as the guiding framework. Other models such as UTAUT and TAM2 could be used in future research.

### *A. Problem Statement*

The integration of GenAIs such as ChatGPT into various sectors, including education, present some benefits to the traditional educational systems at higher educational level. Despite these potential benefits of GenAIs, the adoption of GenAIs at the Copperbelt University is still nascent. Various factors influence students' adoption of new technologies, including their attitudes towards technology, perceived ease of use, perceived usefulness, and the availability of support and resources. Understanding these factors is essential for developing strategies to promote the effective integration of GenAIs in educational practices. This research aimed to analyze using the TAM model, the factors responsible for the adoption of GenAIs by students in Universities in Zambia, using Copperbelt University as a case study. By examining the factors responsible for adoption of GenAIs, the study sought to provide a balanced perspective that can inform

policymakers, educators, and technologists in making informed decisions about the future integration of GenAIs in higher education.

### B. Research Objectives

This research aimed to investigate the factors influencing the adoption of GenAIs amongst students in universities using the TAM.

The specific objectives were:

- To study the Expected Benefit, Perceived Usefulness, Perceived Ease of Use's influence on the attitude and behavioral intention toward Using Generative-AIs and Actual Use of GenAIs amongst students in universities.
- To study the relationship between Expected Benefit, Perceived Usefulness, Perceived Ease of Use, Attitude toward GenAIs, Behavioral Intention, and Actual Use of GenAIs amongst Students in Universities.
- To determine the influences of Expected Benefit, Perceived Usefulness, Perceived Ease of Use, and Behavioral Intention towards GenAIs adoption in universities.

### C. Significance of the Study

This research will contribute to the existing body of knowledge on GenAIs adoption in Higher Education, a relatively rapidly evolving field of study. Secondly, the findings of this study will provide valuable insights for policymakers, educational leaders, teachers and ICT practitioners to design and implement effective interventions and support systems that enhance the adoption of GenAIs by students in universities. Lastly, understanding the factors influencing students' adoption of GenAIs can help in addressing potential challenges and opportunities that would enhance the overall effectiveness of GenAIs in educational settings.

### D. Structure of the Report

This report is organized into six chapters. Following the introduction is Section 2 which reviews the relevant literature on technology adoption theories and models, with a particular focus on the educational context and GenAIs. Section 3 outlines the research methodology, including the research design, data collection methods, and analysis techniques. Section 4 presents the findings of the study, while Section 5 discusses these findings in relation to the existing literature. Finally, Section 6 concludes the report with a summary of the key findings, implications for practice and policy, and recommendations for future research.

## II. Literature Review

The usage of GenAIs in learning Institutions has gained a lot of attention as a solution for enhancing the teaching and learning experiences of students. Studies are showing that a number of educators are aware and to some extent, have adopted the use of these tools in their teaching [6]. Over the past few years, a number of studies have been done on the usage of GenAIs in education. This study in particular focuses on appreciating and understanding the factors influencing the adoption of GenAIs amongst students in Universities in Zambia.

### A. Generative-AI in Education

The incorporation of GenAIs in the education sector has positively influenced a number of activities in education including the learning and teaching support, classroom management, digital skills enhancement, personalized teaching methods, and teacher-student relationships [7]. The authors of [8] argued in their paper that the expected benefits of GenAIs in education include personalized learning, enhanced efficiency, and tailored instruction. Research has also shown that GenAIs can also assist educators in identifying individual student needs and providing targeted support, ultimately fostering a more inclusive and supportive learning environment [9] [10]. Studies have also indicated that students exposed to GenAIs demonstrated increased creativity and critical thinking skills, leading to enhanced problem-solving abilities and a deeper understanding of complex concepts [11]. Furthermore, the integration of GenAIs in education has the potential to revolutionize assessment methods by enabling real-time feedback and adaptive assessments tailored to each student's learning pace and style [12].

Apart from supporting learning and teaching, GenAIs can also be used to streamline administrative processes, enhance student support, and improve administrative efficiency. Overall, the integration of GenAIs in administrative tasks of traditional education systems holds the potential to revolutionize educational processes, improve outcomes, and create a more inclusive and innovative learning environment [13], [14], [15], [16].

Despite all these opportunities promised, the deployment of AI technologies in educational settings also raises significant ethical and privacy concerns. These concerns include issues such as data privacy infringement, algorithmic bias, displacement of human skills by machines, violations of data privacy, lack of transparency, and the potential for biased AI models to perpetuate inequalities, especially for marginalized groups. To address these challenges, it is crucial to prioritize responsible AI development, establish transparent frameworks, and ensure that ethical standards evolve with technological advancements to safeguard student rights and uphold integrity in educational environments [17], [18], [19], [20], [21], [22].

### B. Factors Influencing Students' adoption of GenAIs in education

The adoption of GenAIs by students in education is influenced by a number of factors. Research has shown that factors such as Expected Benefits, Perceived Usefulness, Attitude Toward Technology, and Behavioral Intention significantly impact the adoption of GenAIs by students [23], [24], [25]. Research has shown that students who feel supported in their efforts to integrate AI in their learning are more likely to explore innovative ways to enhance their learning experiences and adapt to the evolving landscape of education [25]. The authors in [26], identified performance expectancy, social influence, self-efficacy, and personal anxiety as factors that positively influences students' adoption of AI-generative models. A study by [27], identified the factors responsible for students' willingness to adopt GenAIs in educational settings as trust levels, confidence, and motivation. The paper by [28] suggested that GenAIs hype, critical discourse analysis, and best practices are key factors

influencing students' adoption of GenAIs like ChatGPT in educational settings. Another research by [29] identified learning Outcomes, Cost-effectiveness, and Accessibility as the primary factors influencing students' willingness to adopt Artificial Intelligence (AI) in educational settings. Fostering a collaborative environment where students can share their experiences and challenges with AI can further enhance their learning journey and promote a deeper understanding of its applications [30]. Research by [31] identified the following as the primary factors influencing students' willingness to adopt AI tools in academic settings: 'Easiness and convenience,' 'Interest Less,' 'Creativity,' 'Feeling Bored,' and 'Course Likeliness.' Additionally, providing training sessions and resources that focus on ethical AI use can empower students to navigate these challenges confidently [32]. Research by [33], identified usefulness, social presence, legitimacy, enjoyment, and motivation as factors influencing students' adoption of Generative AIs such as ChatGPT in education.

### *C. Theoretical framework*

To investigate the factors responsible for students in higher learning institutions in the acceptance and further adoption of GenAIs in the educational settings, this research employed the Technology Acceptance Model (TAM) proposed by Davis (1989) [34]. The Technology Acceptance Model (TAM) elucidates the intention to use GenAIs among students and educators by emphasizing perceived ease of use and perceived usefulness as critical determinants. Research indicates that students are more likely to adopt Generative AIs when they perceive these technologies as enhancing their learning effectiveness and efficiency [35]. Similarly, students show a greater intention to use these tools when they believe that GenAIs can facilitate their learning processes [23]. Moreover, factors such as social influence and facilitating conditions also play a significant role in shaping attitudes towards technology adoption in educational settings [36]. However, some studies highlight potential barriers, including resistance to change and concerns about the reliability of AI-generated content, which may hinder acceptance [37]. Overall, while TAM provides a robust framework for understanding technology adoption, it is essential to consider contextual factors and individual differences that may influence students' and educators' intentions to use Generative AIs in education [38].

### *D. Conceptual Framework and Hypothesis*

The study aimed to investigate the factors responsible for student's adoption and use of GenAIs by students in universities. The conceptualizations of the primary variables within the Technology Acceptance Model (TAM) and the identified external variable (Expected Benefits) with the generated hypothesis are as shown in figure 1 below:

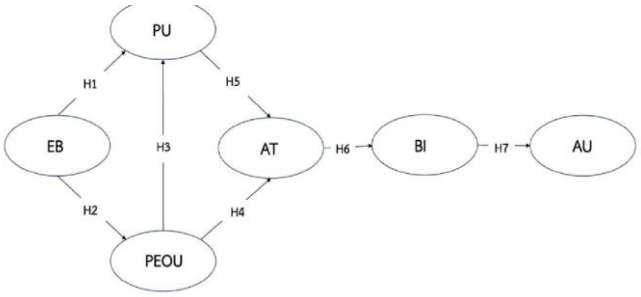


Figure 1: The Conceptual model with hypothesis: Source: Author.

Factor 1. "Expected benefits". Good effects of a new technology in this case GenAIs would positively influence the adoption of the new technology. Hence, the first and second hypothesis.

- *H1: Expected benefits of Generative AIs by students in educational settings positively influences the perceived ease of use and eventual Adoption of Generative AIs by students in universities.*
- *H2: Expected benefits of Generative AIs by students in educational settings positively influences the perceived usefulness and eventual Adoption of Generative AIs by students in universities*

Factor 2 "perceived usefulness": This factor measures the extent to which potential users assume that the use of the technology contributes to an easier performance of work tasks (Davis, 1989). Hence, the third hypothesis is:

- *H3 A more positive perceived usefulness of Generative AIs by students in educational settings positively influences their attitude and eventual acceptance of Adoption of Generative AIs in their learning.*

Factor 3 "perceived ease of use": This factor includes the assessment of the new technology by potential users, and refers to the user-friendliness of the technology which is described as effort expectancy. Hence, the fourth and fifth hypothesis is:

- *H4: A more positive perceived ease of use of generative AIs positively influences the positive attitude and eventual acceptance and adoption of GenAIs in educational settings by students in universities.*
- *H5: A more positive perceived ease of use of generative AIs positively influences the perceived usefulness and eventual acceptance and adoption of GenAIs in educational settings by students in universities.*

Factor 4 "Attitude": This factor captures the degree to which the behavior in question is assessed positively or negatively. In this study, attitude towards a specific behavior is measured as the attitude towards the intention of using generative AIs by students in an educational setting. Hence, the sixth hypothesis is:

- *H6: A positive attitude towards generative AIs influences Behavioral Intention to use Generative-AI amongst students in universities.*

Factor 5 "Behavioral intention": Behavioral intention refers to a person's belief in an action or behavior that is about to happen in the future by predicting the outcome or impact of that action. BI can be measured using three types of questions: expect, want, and intend [39]. In this study it therefore represents the student's belief in his or her own

abilities to use generative AIs in education. Hence, the seventh hypothesis is:

- *H7 A more positive perceived behavioral intention positively influences the acceptance and usage of generative AIs by students in universities.*

## III. METHODOLOGY

The methodology for this study employed a cross-sectional survey design using an online questionnaire to gather data on students' knowledge, frequency of use, expected benefits, perceived usefulness, perceived ease of use, attitude, behavioral intention and actual use of GenAI technologies in learning at the Copperbelt University. The participants' opinions were assessed using five-point Likert scale questions with response options ranging from 1-Strongly Disagree to 5 Strongly Agree. This allowed the participants to express their level of agreement or uncertainty on each statement. The study used random and convenience sampling as its sampling technique, wherein the participants were selected based on their accessibility and willingness to participate. To reach the participants, the questionnaire was distributed through various students' WhatsApp groups. While this approach may not ensure a representative sample of the target population, it allows for the efficient collection of data from a large group of respondents.

A total of 285 undergraduate and postgraduate students, from various disciplines at the Copperbelt University, completed the survey.

### A. Data Analysis Methods

The analyses were conducted in two stages. The first stage focused on descriptive analyses of the responses to reveal participants' perceptions by comparing mean and standard deviation. The second stage involved the validation of each factor as suggested by the TAM model.

### B. Ethical Considerations

All the participants were fully informed about the study's purpose and consent to participate. The confidentiality of all participant data was maintained. Potential biases in data collection and analysis were addressed to ensure the research's validity and reliability.

## IV. RESULTS

### A. Generative AIs awareness and usage

The participants were asked to indicate if they were familiar with GenAIs and 88% of the participants had reported familiarity with GenAIs. The participants were later asked to indicate if they were using GenAIs in their studies and learning and 82% indicated that they were using GenAIs in their studying and learning. Finally the participants were asked to indicate the frequency of GenAIs usage and 51.4% reported using GenAI technologies at least once in a week, 36% reported rarely using them and 12% were not using them all.

### B. Expected benefits of GenAIs

To better understand the expected benefits of generative AIs by students, means were interpreted by referring to the Likert Scale interval recommended by Pimentel [40], where a point mean that falls in the range from 1.00 to 1.80 can be regarded as strongly disagree, 1.81 to 2.60 as disagree, 2.61 to 3.40 as neutral, 3.41 to 4.20 as agree, and 4.21 to 5.00 as strongly agree. Thus, at 3.34, Q3 tended to be neutral, while the rest of the items showed an overall agreed perception. The results are as shown in table I below:

TABLE I. EXPECTED BENEFITS OF GENAIS

| | *n* | *Mean* | *Std. Deviation* |
|---|---|---|---|
| Q1. Generative AIs can help me assess complex tasks and suggest real-time personalized recommendations. | 282 | 3.670 | .803 |
| Q2. Generative AIs will help me plan or perform my tasks as a student with quality. | 279 | 3.437 | .953 |
| Q3. GenAIs will increase my chances of improving my school work as a student. | 280 | 3.342 | .882 |
| Q4. GenAIs can help me in generating projects ideas. | 280 | 3.754 | .803 |
| Q5. Using Generative AIs makes learning activities much easier. | 281 | 3.851 | .774 |
| Q6. Using Generative AIs will make my learning more effective. | 282 | 3.649 | .844 |
| Q7. Using Generative AIs will assist with my other school assignments, e.g. research. | 279 | 3.882 | .807 |
| Q8. Using Generative AIs will make me more knowledgeable in a given course. | 281 | 3.644 | .859 |
| Q9. Using Generative AIs will enhance my learning efficiency. | 276 | 3.594 | .815 |

### C. Perceived ease of use

To better understand the perceived ease of use of generative AIs by students, equally, means were interpreted by referring to the Likert Scale interval recommended by Pimentel [40]. All the items showed an overall agree perception. The results are as shown in table II below:

TABLE II. PERCEIVED EASE OF USE

| | *n* | *Mean* | *Std. Deviation* |
|---|---|---|---|
| Q20 I can quickly learn about using Generative AIs in education | 279 | 3.677 | .807 |
| Q21 using Generative AIs does not require much effort. | 281 | 3.797 | .823 |
| Q22. using Generative AIs is simple and straightforward | 276 | 3.735 | .844 |
| Q23. I can use Generative AIs without asking for help from others | 277 | 3.613 | .999 |

### D. Willingness to use Generative AI Technologies

Overall, the findings suggest that students have a positive attitude toward GenAI technologies. They would like to integrate GenAI technologies in their learning. All the items showed an overall agreed perception. The results are as shown in table III below:

TABLE III. ATTITUDE TOWARDS GENAI ADOPTION

| | *n* | *Mean* | *Std. Deviation* |
|---|---|---|---|
| Q24. It is a good thing to use Generative AIs in education | 275 | 3.512 | .869 |

| | | | |
|---|---|---|---|
| Q25. There are a good number of benefits of using Generative AIs in education | 277 | 3.833 | .762 |
| Q26. Generative AIs add value to my learning and education | 275 | 3.650 | .780 |
| Q27. I feel comfortable incorporating Generative AIs into my learning activities | 279 | 3.562 | .870 |

### E. Behaviural Intention towards GenAI adoption

To better understand the behavioural intention by students towards the use of generative AIs, means were interpreted by referring to the Likert Scale interval recommended by Pimentel [40]. All the items showed an overall neutral response.

### F. Actual use of GenAI adoption

To better understand the actual adoption and use of generative AIs by students, equally, means were interpreted by referring to the Likert Scale interval recommended by Pimentel [40]. All the items showed an overall agree perception.

### G. Hypothesis testing

*1) H1. Perceived expected benefits (EB) of generative AIs will positively influence students perceived usefulness (PU) of generative AIs in educational settings.*

A Linear Regression Analysis was used to test if EB significantly predicted PU.
The fitted regression model was: PU = 5.4 + 0.93EB
The regression was statistically significant ($R^2$ = 0.54), F(1, 253) = 300, p =.000. It was found that BE significantly predicted PU, (β =0.93, t = 17.3, p <0.001)
The H1 hypothesis was accepted.

*a) H2. Perceived expected benefits (EB) of generative AIs will positively influence students perceived ease of use (PEOU) of generative AIs in educational settings.*

A Linear Regression Analysis was used to test if EB significantly predicted PEOU.
The fitted regression model was: PEOU = 8.2 + 0.46EB
The regression was statistically significant ($R^2$ = 0.48), F(1, 77.2) = 255, p =.000. It was found that BE significantly predicated PEOU, (β =0.46, t = 8.8, p < 0.001)
The H2 hypothesis was accepted.

*b) H3. Perceived ease of use (PEOU) of generative AIs will positively influence students perceived usefulness (PU) of generative AIs in educational settings.*

A Linear Regression Analysis was used to test if PEOU significantly predicted PU. The fitted regression model was: PU = 8.9 + 0.65PEOU. The regression was statistically significant ($R^2$ = 0.24), F(1, 80.6) = 2105, p =.000. It was found that PEOU significantly predicted PU, (β =0.65, t = 8.90, p < 0.001)
The H3 hypothesis was accepted.

*c) H4 and H5. Perceived ease of use (PEOU) and perceived usefulness (PU) respectively of generative AIs will positively influence students Attitude (AT) towards generative AIs in educational settings.*

A Multiple Regression Analysis was used to test if PEOU and PU significantly predicted AT. The analysis showed a good model fit: F(2) =182.5, p <0.001, $R^2$ = 0.602. The analysis showed that PEOU had a positive influence on student's attitudes. (β =0.198, t = 4.3, p < 0.001). Hence the H4 hypothesis was accepted.
The analysis also showed that PU had a positive influence on student's attitude. (β =0.660, t = 14.3, p < 0.001). Hence. The H5 hypothesis was accepted.

*d) H6. Positive attitude (AT) towards generative AIs will positively influence students Behavioral intentions (BI) towards adoption of generative AIs in educational settings.*

A Linear Regression Analysis was used to test if AT significantly predicted BI. The fitted regression model was: BI = 3.18 + 0..37AT. The regression was statistically significant ($R^2$ = 0.173), F(1, 251) = 1104, p =.000. The results are as shown in table X below: It was found that AT significantly predicated BI, (B=0.37, t = 7.2, p < 0.001)
The H6 hypothesis was accepted.

*e) H7. Behavioral intentions (BI) towards generative AIs will positively influence students Actual adoption and use (AU) of generative AIs in educational settings.*

A Linear Regression Analysis was used to test if BI significantly predicted AU. The fitted regression model was: AU = 11.8 + 0..651BI. The regression was statistically significant ($R^2$ = 0.237), F(1, 252) = 1832, p =.000. It was found that BI significantly predicted AU, (β =0.49, t = 8.9, p < 0.001)
The H7 hypothesis was accepted.

## V. DISCUSSIONS

This study of student's adoption and use of GenAIs in higher education reveals a picture of enthusiasm amongst students. The findings of this study provide an understanding of university students' adoption level and perception of GenAIs. It is evident that students are generally familiar with GenAI technologies with 88% of the respondents indicating that they were aware of GenAIs. This finding agrees very well with the findings of [41] which showed high awareness level by students of GenAIs. The findings also showed that students have generally accepted and are using GenAIs in their learning with 82% of the respondents indicating that they were using them. This agrees with a study by [42] which reported a high level (73.5%) of students using generative AIs especially ChatGPT for their learning activities. Using the TAM model, the results also highlighted that the factors such Expected benefits, perceived ease of use, perceived usefulness, Behavioral intentions and attitudes influenced the adoption and use of GenAIs by students in learning. Overall, all the hypotheses supported the general portrayal of the model. The finding also showed that perceived ease of use strongly impacted perceived usefulness (β =0.65, t = 8.90, p < 0.001), confirming the outcome in previous research [43], demonstrating that students whose intention is to use GenAIs tend to value the system's advantages for learning.

## VI. CONCLUSION

In this study, the factors responsible for student's adoption and eventual use of GenAIs were investigated.
Understanding student's willingness to use GenAI tools can help educators to better integrate these tools into their learning process, as a way of complimenting and enhancing traditional teaching methods. The integration can possibly lead to enhanced learning outcomes, for it will allow students to adopt a deep approach to learning when they perceive GenAIs as valuable and supportive tools.

This study has a number of limitations that need to be considered in the interpretation of the results. First and foremost, the sample size was too small and may be used to generalize the finding to the broader population of students at CBU. The study relied completely on data provided by respondents of which they may exhibit some biases on their experiences with GenAI technologies.

Future research should consider these limitations by working with a larger, more diverse sample obtained from a number of Universities. Future research should also use a variety of research methods to avoid biased responses and future research should also examine the relationship between GenAIs use and performance of students.

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