GENERATING RESPONSES ON CONVERSATIONAL AI: USAGE PATTERNS AND ADOPTION OF AI CHATBOTS AMONG STUDENTS IN HIGHER EDUCATION

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ABSTRACT: *AI technology specifically the use of AI chatbots among higher education institutions has gained significant traction. A conceptual and practical understanding of these tools brings their maximum benefits and potential to the educational system. Thus, this study delves into the relationship between AI chatbot usage patterns and adoption among higher education students. The data show moderate usage of AI chatbots, specifically for writing aids, personalized learning experiences, problem-solving assistance, and research-based learning. Findings reveal a neutral level of chatbot adoption, by the Unified Theory of Acceptance and Use of Technology (UTAUT) constructs: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). A significant positive relationship between usage patterns and adoption is determined, rejecting the null hypothesis and confirming that increased usage associated with a higher possibility of adoption. This strong relationship accentuates that as students frequently utilize AI chatbots, they are more likely to integrate these tools into their academic and personal tasks and eventually cultivate adoption. Regression analysis further reveals that all subconstructs of AI chatbot usage—writing aid, personalized learning experience, problem-solving assistance, and research-based learning—prompt adoption. This underscores that students who depend on chatbots for problem-solving are remarkably inclined toward adoption, asserting the efficiency of AI chatbots as academic and students' routines support. Consequently, encouraging flexible usage across multiple academic functions and adhering to ethical and responsible usage guidelines are strongly highlighted.*

Keywords: AI chatbots, usage patterns, adoptions, UTAUT

INTRODUCTION

With its ubiquity, integrating technology into higher education has changed the façade and landscape of education. Consequently, various innovative tools have gained traction in the digital era. One of the remarkable advancements in recent years is the emergence of artificial intelligence or chatbot technology. With its inevitable adoption in the educational field, it has emerged as a frontrunner of technology. As of late, the educational sphere is one of the many being revolutionized by the introduction of such technology. In consonance with this notion, [1] emphasized that the Chatbot system has become one of the most popular AI technologies used to support teaching and learning.

AI tools and their utilization in education are exponentially evolving. In fact, of all the numerous and widespread AI technologies used as teaching and learning support, chatbot systems stand out[2] Chatbots are different computer programs that is designed to mimic human conversation that lets their users explore, create and share knowledge [3]. They are tools powered by machine learning algorithms and natural language processing (NLP) that understand and answer user queries via text, voice, or avatars [3]. Chatbot technology simulates human dialogue and provides user-friendly interfaces through its chat functions. From providing details for course contents [4] to creating different assignments [5] and even practicing different questions and answers [6, 7] chatbots serve as virtual assistants that aid educators in different ways. Moreover, with their features of streamlining and personalizing educational components, chatbots provide a promising application in the future of education. [4] cited that FAQ and short response Chatbots could provide a variety of enhancements for student learning, and educator content delivery. The utilization of different chatbots such as ChatGPT provides novel opportunities specifically in the context of transforming higher education. However, despite these promising benefits, using such chatbots does not come without risks [8].

The widespread adoption of chatbots and their increasing accessibility and ubiquity have sparked contrasting reactions among educators and learners. While learners are enthusiastic about chatbot integration, educators' perceptions are particularly critical. In context, although some educational institutions are increasingly capitalizing on AI-powered chatbots, recognizing their relevance, others are more cautious and sceptical about adopting them in modern educational settings. Consequently, this notion has prompted a significant surge in research, aiming to explore the impact of chatbots on education.

Furthermore, despite students showing positive attitudes toward the use of chatbots in education, they exhibit concerns about the future use and repercussions of such. Thus, there is a need to develop local solutions to AI in education that will address the needs of the students and provide a framework for developing policies [9. 10] suggests that further studies on the experience of users in interacting with chatbots which include different factors namely usability, perceived usefulness, and preferences of the students in using such is also warranted. Analyzing the possible benefits and challenges brought by using any chatbot can provide information about different barriers to acceptance and usage of it in education. [11] who investigated the acceptance of chatbots employing the Technology Acceptance Model concluded that teachers are more inclined to accept chatbots if the tool is found to be beneficial and adheres to their needs. In consonance, the benefits and difficulties that may aid in encouraging users and defining appropriate principles that will support the creation

and use of Chatbot technology in education must be considered [2].

According to [12] AI functions as a tool for different purposes namely writing assistance, creating personalized learning materials, and making conversations. [13] which states that teachers perceived AI chatbots such as ChatGPT has moderate impact on mathematics teaching and learning. Although studies focusing on students' intentions to utilize generative AI platforms for learning exist, [13, 14, 15, 16] a noticeable research gap exists regarding students' awareness of ChatGPT, particularly regarding adoption intentions in the education sector. Even though prior research has underscored the significance of factors such as anthropomorphism [17], trust [18] and design novelty [19] in user adoption of new products or chatbots in specific, no prior studies have exploited these variables to explicate students' adoption of chatbots in the higher education context. Numerous studies have explored various aspects of education, including teaching pedagogies [20, 21, 22, 23, 24, 25], student preferences and readiness [26, 27], student motivation and attitudes [28, 29, 30, 31], teachers' skills, competencies, and challenges [32, 33, 34], as well as assessment techniques and tools [35, 36, 37, 38], among other related factors [39, 40, 41, 42, 43, 44, 45], all aimed at improving student learning outcomes. However, limited research exists on the factors that drive the adoption of chatbots among academic professionals as cited by [46]. Notably, no study has yet explored the influence of social and peer networks on the adoption of Generative Pretrained Transformers (GPTs).

In context, several gaps have been identified by the research on the adoption of AI chatbots in higher education using the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Firstly, the lack of comprehensive analysis on the role of facilitating conditions and anxiety in influencing behavioural intentions is apparent since many studies highlight performance expectancy, effort expectancy, and social influence. Additionally, further investigation is suggested because of the inconclusiveness of demographic factors and their moderating effects. The limited exploration of long-term adoption and actual usage behaviour has also been identified as another gap as most studies accentuate initial acceptance. Finally, the scarcity of comparative studies across diverse cultural and educational contexts which could yield deeper insights into the universal applicability of the UTAUT model is evident [47].

As educational institutions aim to enhance learning experiences, this solidifies that studying usage patterns and adoption of chatbots is crucial for understanding user behavior, minimizing potential threats, ensuring effective implementation, and fostering inclusivity in educational technology.

Specifically, it aims to answer the following questions:

1. What is the extent of AI chatbot usage patterns among respondents in terms of:
   a. Writing Aids
   b. Personalized Learning Experience
   c. Problem-solving Assistance
   d. Research-based learning
2. What is the degree of adoption of AI chatbots among respondents in terms of:
   a. Performance Expectancy (PE)
   b. Effort Expectancy (EE)
   c. Social Influence (SI)
   d. Facilitating Conditions (FC)
3. Is there a significant relationship between the extent of usage patterns of AI chatbots and the degree of adoptions?
4. Which among the usage patterns best predicts adoption of AI chatbots?

Research Hypothesis. From the specified question, the researcher formulated the hypothesis and will be tested at 0.05 level of significance.

H_o: There is no significant relationship between the extent of usage pattern of AI chatbots and the degree of adoption.

MATERIALS AND METHODS

This study used the descriptive-correlation method of research since it intends to measure the significant relationship between the extent of usage patterns and adoption of AI chatbots among respondents.

Participants. The respondents of the study were nine hundred seventy-four (974) college students. The respondents were identified using a stratified random sampling to ensure representativeness of each stratum of the population. The researchers sought permission from the administration before conducting the study and provided informed consent to the participants, which included the study's purpose, procedures, risks, and benefits of the study. In addition, the researchers informed the participants that their confidentiality and anonymity will be strictly maintained. In addition, there would be no financial ties to the conduct of the study and an objective evaluation was carried out, there was no conflict of interest involved. The students were also informed of their rights and emphasized that their participation in the research study is voluntary; hence, they can withdraw without facing consequences. Furthermore, the data gathered will be used solely for the study; hence, data manipulation was strictly restricted.

Measures. The researchers utilized two survey questionnaires as instruments for gathering the necessary data needed for this study. Both questionnaires were researcher-made questionnaires.

To ensure the validity of the researcher-made questionnaire, the researchers submitted the questionnaire to experts for the solicitation of suggestions and ideas and the validation of the different indicators included in the questionnaire. With their proficient suggestions, the researchers framed the final content of the questionnaire suitable to answer the desired problems. The responses in the questionnaire were analyzed with quantitative methods by assigning numerical values to Likert-type scales.

A reliability testing was conducted to ensure that the instrument will yield stability over time and across different populations. Cronbach's Alpha Test was used to measure the reliability of the instrument. This is used to measure the internal consistency or inter-item homogeneity of the test scores [48].

Extent of Usage Patterns. A researcher-made questionnaire was used to measure the extent of usage pattern of AI chatbot among students in higher education. The variable was

designed and formulated considering sub-indicators. For illustration, all items pertaining to usage patterns were composed primarily of the sub-indicators, such as (a) writing aids; (b)personalized learning experience; (c) problem-solving assistance; (d) personal skill development; (e)career exploration; and (f) research-based learning. The respondents rated the degree of their assessment of those items in terms of a Likert-type scale.

To measure the range of the responses in terms of the extent of usage patterns the following are indices of interpretation:

Score	Limit	Interpretation
5	4.20-5.00	Very High Extent
4	3.40-4.19	High Extent
3	2.60-3.39	Moderate Extent
2	1.80-2.59	Low Extent
1	1.00-1.79	Very Low Extent

Based on the conducted reliability testing, the following Cronbach's Alpha were obtained:

Scale/Dimension	Cronbach's Alpha
Writing Aids	0.886
Personalized Learning Experiences	0.882
Problem-Solving Assistance	0.891
Research-Based Learning	0.906

Adoption. To measure the degree of adoption of AI chatbots, a researcher-made questionnaire was constructed. The extended Unified Theory of Acceptance and Use of Technology (UTAUT) model was used as a theoretical basis for the construction of the different sub-construct. This is developed by [23] to evaluate the use of a new technology. This UTAUT model is a theoretical advancement that is used to examine the adoption of new technology and the intention to use it.

For the second questionnaire, five items were utilized to operationalize each of the four primary constructs of the UTAUT model namely Performance Expectancy (PE); Effort Expectancy (EE); Social Influence (SI); and Facilitating Conditions(FC). The responses were keyed using a 5-point Likert Scale.

To measure the range of the responses in terms of adoption the following are indices of interpretation:

Score	Limit	Interpretation
5	4.20-5.00	Strongly Agree
4	3.40-4.19	Agree
3	2.60-3.39	Neutral
2	1.80-2.59	Disagree
1	1.00-1.79	Strongly Disagree

Based on the conducted reliability testing, the following Cronbach's Alpha were obtained:

Scale/Dimension	Cronbach's Alpha
Performance Expectancy	0.890
Effort Expectancy	0.858
Social Influence	0.906
Facilitating Condition	0.904

Data Collection Technique.

The researcher administered the questionnaire to the respondents virtually through Google Forms. After the questionnaire was distributed and answered by the respondents, results were carefully consolidated and tabulated and were subjected to the treatment of data and analysis of results.

Data Analysis. After gathering the pertinent data, these were tabulated, analyzed and interpreted using several statistical tools. Descriptive statistics such as frequency distribution and mean were used to assess the extent of usage patterns. The same statistical tool was used to determine the and degree of adoption of AI chatbots terms of several indicators. Finally, the relationships between the variables were analyzed using Pearson Product Moment Correlation.To measure what best predicts adoption of AI chatbot, Multiple Regression was used.

RESULTS AND DISCUSSIONS

Table 1.1 Extent of AI Chatbots Usage in terms of Writing Aids

Statements	Mean	SD	Descriptive Evaluation
I use AI chatbots (such as ChatGPT) in developing written tasks such as essays, reports, and assignments.	2.84	.990	Moderate Extent
I use AI chatbots (such as ChatGPT) to provide me with a convenient and workable prompt for stories, blogs, and poems.	2.58	1.079	Low Extent
I use AI chatbots (such as ChatGPT) to perfect my grammar and improve my writing style.	3.14	1.158	Moderate Extent
I use AI chatbots (such as ChatGPT) in summarizing and paraphrasing different texts easier and more effective	2.95	1.102	Moderate Extent
I use AI chatbots (such as ChatGPT) in composing paragraphs that are free from grammatical lapses and solecisms.	2.70	1.112	Moderate Extent
Overall	**2.84**	**.882**	**Moderate Extent**

Legend:1.00-1.79 (Very Low); 1.80-2.59 (Low); 2.60-3.39 (Moderate); 3.40-4.19 (High); 4:20-5.00 (Very High)

Extent of AI Chatbots Usage in terms of Writing Aids

Table 1.1 shows the extent of usage pattern of AI chatbots among students in higher education in terms of writing aids. As gleaned on the table, students have a "moderate" extent of AI chatbots usage in terms of writing aids with a recorded mean of 2.84 (SD=.882). This suggests that respondents utilize AI chatbots moderatelyas aid for different writing tasks, with the highest dependence on grammar improvement and the least on creative prompts. The standard deviation indicates different usage in each task but suggest that respondents have consistent overall engagement levels with AI chatbots for writing support. According to [49] students were able to develop chatbots for different writing purposes such as idea generation, outlining, and identifying grammatical and spelling errors. Overall, it was found out

that the use of chatbots impacted their motivations to write. A researcher [50] revealed that there is a strong agreement among students on the benefits obtained from the use of AI namely outline preparation, grammar and spelling improvements.

The use of AI in writing is perceived to be an advantage, students are strongly motivated and inclined in using AI in the completion of their task due to its writing assistance specifically on sentence construction and grammatical accuracy [51]. A study [52] reveals that AI chatbots were regarded by the students as a tool that is highly useful in assisting completion of personal task like writing, coding and other related academic tasks.

Table 1.2 Extent of AI Chatbots Usage in terms of Personalized Learning Experience

Statements	Mean	SD	Descriptive Evaluation
I use AI chatbots (such as ChatGPT) to set my learning interests.	2.64	1.174	Moderate Extent
I use AI chatbots (such as ChatGPT) to clarify complex concepts at a pace that suits me	2.86	1.128	Moderate Extent
I use AI chatbots (such as ChatGPT) as a support for my own learning experience	2.94	1.111	Moderate Extent
I use AI chatbots (such as ChatGPT) to make reviewers and other learning materials.	2.68	1.218	Moderate Extent
I use AI chatbots (such as ChatGPT) for creating personal guides in my lectures.	2.66	1.214	Moderate Extent
Overall	**2.75**	**.973**	**Moderate Extent**

Legend:1.00-1.79 (Very Low); 1.80-2.59 (Low); 2.60-3.39 (Moderate); 3.40-4.19 (High); 4:20-5.00 (Very High)

The extent of AI Chatbots Usage in terms of Personalized Learning Experience

The table above shows how extensively respondents use AI to support a personalized learning experience across various functions. It is evident in the table that the respondents have a "moderate" extent of use of AI for personalized learning experiences as reflected in the overall mean score of 2.75 (SD=.973). As depicted in the table, there is a consistent pattern of moderate usage for varied tasks. This implies that while respondents find AI chatbots helpful for personalizing their learning, balanced and selective use is still evident.

There is an increasing interest in the use of chatbots in education especially of personalized tutoring [53]. Most of it was utilized in personalized learning methods that meet the need of student's requirements [54]. Relying on chatbots can significantly enhance students' learning experiences, allowing them to study at their own pace, consume less time, and feel motivated [55].

Table 1.3. Extent of AI Chatbots Usage in terms of Problem-Solving Assistance

Statements	Mean	SD	Descriptive Evaluation
I use AI chatbots (such as ChatGPT) to have variety of tenable answers for my studies.	2.58	1.107	Low Extent
I use AI chatbots (such as ChatGPT) to find solutions for any math problems	2.37	1.160	Low Extent
I use AI chatbots (such as ChatGPT) to assist me whenever I deal with complex technical or logical problems.	2.87	1.113	Moderate Extent
I use AI chatbots (such as ChatGPT) for viable brainstorming tool that share potential perspectives and solutions to challenges I encounter.	2.73	1.085	Moderate Extent
I use AI chatbots (such as ChatGPT) for convenient and accessible solving project and task-related issues.	2.67	1.050	Moderate Extent
Overall	**2.65**	**.929**	**Moderate Extent**

Legend:1.00-1.79 (Very Low); 1.80-2.59 (Low); 2.60-3.39 (Moderate); 3.40-4.19 (High); 4:20-5.00 (Very High)

Extent of AI Chatbots Usage in terms of Problem-Solving Assistance

Table 1.3 shows evaluation of different statement that indicates the extent of AI chatbot use among respondents for different problem-solving task. The respondents show "moderate" extent of AI use which is evident of the computed overall man value of 2.65 (SD=.929). These findings only indicate that AI chatbots were moderately use by the respondents specially for support in general learning task. However, in terms of setting learning interest and clarifying complex concepts in problem-solving, respondents use AI chatbots to a low extent. Instead of pointing to AI chatbots as direct problem-solving guidance, the consistency across responses accentuates a balanced yet selective use of AI for supportive and preparatory tasks only.

A study conducted [56] that AI chatbots, when integrated into educational system, can enhance the problem-solving abilities of the students. Due to its convenience compared to other communication methods, chatbots are used by the students in higher education in resolving their problems [57].

Table 1.4. Extent of AI Chatbots Usage in terms of Research-Based Learning

Statements	Mean	SD	Descriptive Evaluation
I use AI chatbots (such as ChatGPT) to make information searches for my research projects easier and faster.	2.78	1.162	Moderate Extent
I use AI chatbots (such as ChatGPT) to have better research outcomes	2.60	1.150	Moderate Extent
I use AI chatbots (such as ChatGPT) to look for different methodologies that	2.48	1.171	Moderate Extent

can be implemented in my research			
I use AI chatbots (such as ChatGPT) to generate decent summaries and syntheses of my research materials.	2.46	1.150	Moderate Extent
I use AI chatbots (such as ChatGPT) to enhance my ability to conduct research.	2.55	1.183	Moderate Extent
Overall	**2.57**	**1.044**	**Moderate Extent**

Legend:1.00-1.79 (Very Low); 1.80-2.59 (Low); 2.60-3.39 (Moderate); 3.40-4.19 (High); 4:20-5.00 (Very High)

The extent of AI Chatbots Usage in terms of Research-Based Learning

Table 1.4 shows the extent of AI chatbot use in terms of research-based learning. The computed mean value of 2.57 (SD=1.044) indicates that respondents use AI chatbots for research-based learning to a "moderate" extent. Respondents are moderately engaged with AI chatbots in any research-based learning task-making. The overall result indicates a balanced and selective use of AI chatbots, highlighting their support function rather than as a primary research aid.

A researcher [2] concludes that chatbots have different uses not limited to teaching but even to research. AI could create new educational opportunities which also include the application of this technology in research [58].

Table 2.1. Degree of AI adoption Based on the UTAUT Construct in terms of Performance Expectancy

Statements	Mean	SD	Descriptive Evaluation
AI chatbots (such as ChatGPT) lessen the time I spend completing a task	3.22	1.003	Neutral
AI chatbots (such as ChatGPT) contribute to my overall success, productivity, and promptness in meeting the requirements of my tasks.	3.00	1.024	Neutral
AI chatbots (such as ChatGPT) improve my learning outcomes.	3.16	1.026	Neutral
AI chatbots (such as ChatGPT) help me find information more efficiently than traditional methods	3.24	1.076	Neutral
AI chatbots (such as ChatGPT) help me accomplish more tasks.	3.26	.995	Neutral
Overall	**3.17**	**.859**	**Neutral**

Legend:1.00-1.79 (Strongly Disagree); 1.80-2.59 (Disagree); 2.60-3.39 (Neutral); 3.40-4.19 (Agree); 4:20-5.00 (Strongly Agree)

Degree of AI chatbot adoption Based on the UTAUT Construct in terms of Performance Expectancy

Table 2.1 shows the degree of AI adoption based on the Unified Theory of Acceptance and Use of Technology construct in terms of Performance Expectancy. As evident in the table, students in higher education have a "neutral" adoption of AI chatbots based on

the PE construct with a recorded 3.17 as the overall mean value. This suggests that users have a neutral view of the impact of AI chatbots. All the indicators about performance expectancy record a mean score of approximately neutral (around 3) with minor variability in the responses, as indicated by the standard deviation of .859.

PE was found to be a factor that influenced the adoption of chatbots among students of higher education [59].

Research about Performance Expectancy [60] explains the future of adoption intention (AINT) adoption. This is also aligned with the findings which conclude that users adopt a chatbot if they think that it would be a help for them [61]. A strong positive correlation with Adoption Intention (ATAI), actual use (AU) and performance expectancy was observed on the study conducted which indicates that PE of using AI chatbots specifically ChatGPT increases, adoption intention and attitude toward use tends to increase as well [62]. PE is confirmed to influence the intention of the students in higher education to use chatbots [63].

This is in contrary to the result of the study conductedwhich reveals that performance expectancy is not a decisive factor in the early adoption of generative AI [64].

Table 2.2. Degree of AI adoption Based on the UTAUT Construct in terms of Effort Expectancy

Statements	Mean	SD	Descriptive Evaluation
AI chatbots (such as ChatGPT) can enable faster access to information	3.44	1.052	Agree
Manipulating AI chatbots (such as ChatGPT) feels natural and easy for me.	3.01	1.044	Neutral
The features and functionalities of AI chatbots (such as ChatGPT) are not complicated	3.12	1.034	Neutral
AI chatbots (such as ChatGPT) are manipulable and need-oriented.	3.06	.977	Neutral
AI chatbots (such as ChatGPT) cater to a variety of purposes.	3.24	1.004	Neutral
Overall	**3.17**	**.840**	**Neutral**

Legend:1.00-1.79 (Strongly Disagree); 1.80-2.59 (Disagree); 2.60-3.39 (Neutral); 3.40-4.19 (Agree); 4:20-5.00 (Strongly Agree)

Degree of AI chatbot adoption Based on the UTAUT Construct in terms of Effort Expectancy

The table above summarizes the degree of AI chatbot adoption regarding Effort Expectancy in the UTAUT framework which indicates convenience and usability. As gleaned from the table, the overall mean score of EE is 3.17 which indicates a "neutral" stance toward AI chatbot's ease of use. It is evident that respondents tend to agree moderately that AI chatbots provide faster access to different information (M=3.44), yet respondents remain neutral on other indicators about EE such as natural manipulation, simplicity of features, and adaptability to needs. Data suggest that despite users' recognition of the AI chatbots and their potential efficiency in terms of interface and functionality, they do not find them exceptionally intuitive.

A positive correlation between Effort Expectancy and the variables ATAI (Adoption Intention), AU (Attitude Towards

Use), BIU (Behavioral Intention to Use), and T (Trust) was revealed in the study [65]. This stresses how users of AI chatbots, specifically ChatGPT, increase the degree of their adoption and develop a positive attitude toward the technology when they perceive a tool as easy to use. In essence, increasing the perceived ease of use of ChatGPT ushers in greater acceptance, favourable attitudes, sustained usage intentions, and trust, ultimately leading to its wider adoption. EE is found to be impactful on how students from higher education adopt chatbots in the future [66]. Users believe that chatbots are easy to use and understandable because they find it easy to get an answer from it and accomplish things faster [40].

Table 2.3. Degree of AI adoption Based on the UTAUT Construct in terms of Social Influence

Statements	Mean	SD	Descriptive Evaluation
AI chatbots (such as ChatGPT) are recommended by influential people.	2.98	1.039	Neutral
AI chatbots (such as ChatGPT) are used by my family, friends, and classmates.	3.42	1.067	Agree
AI chatbots (such as ChatGPT) have positive reviews and media coverage.	3.09	.946	Neutral
AI chatbots (such as ChatGPT) are emphasized in trainings and seminars.	2.83	1.027	Neutral
AI chatbots (such as ChatGPT) are supported by the school for students to use	2.80	1.108	Neutral
Overall	**3.02**	**.815**	**Neutral**

Legend:1.00-1.79 (Strongly Disagree); 1.80-2.59 (Disagree); 2.60-3.39 (Neutral); 3.40-4.19 (Agree); 4:20-5.00 (Strongly Agree)

Degree of AI chatbot adoption based on the UTAUT Construct in terms of Social Influence

Table 2.3 presents the degree of AI chatbot adoption based on the UTAUT Construct in terms of Social Influence. A "neutral" level (M=3.02, SD=.815) of social influence is observed among the respondents on their AI chatbot adoptions. The results highlight that social influence is moderately considered in AI chatbot adoptions among respondents.

Peer usage and recommendations from family, friends, and classmates are more persuasive than endorsements from experts or institutional support. The neutral responses regarding media coverage, training seminars, and school support indicate that while there is

relative recognition of AI chatbots, they lack heavy promotions in formal settings.

The results of the survey postulate that social influence plays a significant role, though moderately, in the adoption of AI chatbots like ChatGPT. Additionally, there is a relatively strong agreement with the statement that AI chatbots are used by family, friends, and classmates, suggesting that peer influence is seen as more relatable and trustworthy. People are more likely to adopt technology when they observe others in their social circle using it. Barriers to technology adoption are likely overcome by social validation from people within one's immediate environment.

The overall neutral score further suggests that while there is some degree of social influence, it is not a key factor in AI adoption. This accentuates that more targeted, deliberate, and conscious efforts could lead to its increased adoption. Friends, family, colleagues, experts, influencers, and online reviews are primary sources of social influence[67]. Moreover, social influence is significantly associated to adopt and use AI chatbots [68]. Additionally, social influence has a significant effect on behavioural intentions across different areas such as mobile [69] and e-learning systems [70] and[52] conclude is not a significant factor for Google Classroom acceptance. A study confirms that social influence can shape how students adopt AI chatbots [53].

Table 2.4. Degree of AI adoption Based on the UTAUT Construct in terms of Facilitating Conditions

Statements	Mean	SD	Descriptive Evaluation
AI chatbots (such as ChatGPT) are good tools as there are necessary resources such as devices and internet access.	3.16	1.014	Neutral
I have the resources to use AI chatbots (such as ChatGPT).	3.20	1.045	Neutral
I have the knowledge to use AI chatbots (such as ChatGPT).	3.37	1.026	Neutral
AI chatbots (such as ChatGPT) provide a pleasant experience	3.12	.953	Neutral
I can get help from others when I encounter problems with the use of AI chatbots (such as ChatGPT).	3.15	1.039	Neutral
Overall	**3.20**	**.857**	**Neutral**

Legend:1.00-1.79 (Strongly Disagree); 1.80-2.59 (Disagree); 2.60-3.39 (Neutral); 3.40-4.19 (Agree); 4:20-5.00 (Strongly Agree)

Degree of AI chatbot adoption based on the UTAUT Construct in terms of Facilitating Conditions

Table 2.4 shows that the respondents have a neutral stance toward the adoption of AI chatbots based on the Facilitating Conditions within the UTAUT framework with a computed overall mean value of 3.20 (SD=.857).

The aggregate mean of 3.20 supports the neutral evaluation across all indicators. It solidifies that the facilitating conditions for AI adoption are adequate but could be enhanced for user experience, knowledge, and support for broader adoption.

These findings assert that while the basic facilitating conditions for AI adoption are in place, further enhancements in training, user experience, and support systems are necessitated to significantly improve the overall ease and satisfaction of using AI chatbots, potentially prompting greater adoption and use.

A researcher noted how critical the facilitating conditions are in ensuring that chatbot's benefits are maximized and users effectively utilize chatbots [71]. Similarly, facilitating

conditions were found to be significant determinants of intent to use chatbots, especially coaching chatbots [72].

However, the finding opposes the outcome of the study [73], it was found that the impact of facilitating conditions is not statistically significant for the users to continue using chatbots. Furthermore, FC does not significantly influence users' intention for continued use.

Table 3. Significant Relationship Between Extent of Usage Patterns of AI Chatbots And the Degree of Adoptions

Variables	Pearson r	Sig. value	Interpretation	Decision to Ho
Usage pattern* Adoption	0.708	0.000	Significant	Reject

Significant Relationship Between Extent of Usage Patterns of AI Chatbots And the Degree of Adoption

As gleaned from the table, there is a significant relationship between the usage pattern and AI chatbot adoption reflective of the r=0.708; p=0.000<0.05. Hence, the null hypothesis is rejected. Furthermore, the strength of the relationship that exists between these variables is described to be strongly positive. This implies that as AI chatbot usage increases, so does the likelihood of adoption. There is a strong relationship between the two variables examined which indicates that students who are frequently with AI chatbots are more likely to adopt the tool in their daily activities.

The findings coincide with the ideas as per their survey among the students, factors such as facilitating conditions, social influence, utilization behaviour and perceived risk are associated with behavioural intention to use AI chatbots [73]. Moreover, it was found out that EE, PE, and SI were positively correlated with the usage of AI-assisted learning among university students [74]. On the contrary, the impact of facilitating conditions (FC) on users' sustained usage of AI Chatbots is not found to be statistically significant[74].

Usage Patterns as Predictor Adoptions of AI Chatbots

Based on the correlation results and regression analysis, all the subconstructs in the extent of AI chatbot usage patterns and AI chatbot adoption have a significant relationship. Moreover, usage patterns such as writing aids, personalized learning experiences, problem-solving assistance, and research-based learning are all predictors of AI chatbot adoption. Among all the usage patterns, problem-solving assistance yielded the highest R^2=0.451 while the writing aid, personalized learning experience, and research-based learning obtained 0.385, 0.394, and 0.402 respectively.

[42] confirms in their study that intention to use chatbots can be influenced by SI and FC. Furthermore, PE is one of the predictors that is positively related to the intention of continuing to use AI chatbots [75].

In addition, a substantial positive relationship is observed between "Performance Expectancy (PE)" and "Effort Expectancy (EE)" with "Satisfaction (SA)." Specifically, the support offered by AI Chatbots to graduate students in their research and learning endeavours, along with their comprehension of the feedback received, impacts the levels of satisfaction following actual usage [73].

CONCLUSIONS AND RECOMMENDATIONS

In examining the relationship between usage patterns and adoption of AI chatbots among higher education students, data show that students have moderate AI chatbot usage in terms of writing aids; personalized learning experience; problem-solving assistance and research-based learning. Furthermore, findings reveal that there is a neutral adoption of AI chatbots among students in higher education as delineated in the Unified Theory of Acceptance and Use of Technology constructs such as Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC).

Based on the data gathered, a significant positive relationship between AI chatbot usage patterns and their adoptions was determined. This finding rejects the null hypothesis and confirms the association of increased usage of AI chatbots and a higher likelihood of their adoption. The relationship is remarkably strong, implying that as students engage more frequently with AI chatbots, they are more inclined to integrate these tools into their academic and personal tasks. This strong correlation underscores that regular use is salient in fostering AI chatbot adoption. Consequently, students who interact with these tools more often are more likely to see their value and integrate them into their routines.

Regression analysis unveils that all subconstructs related to AI chatbot usage patterns—writing aid, personalized learning experience, problem-solving assistance, and research-based learning—have a significant relationship with AI chatbot adoption. These findings suggest that each of these usage patterns serves as a predictor of chatbot adoption, affirming their influence on students' engagement with the technology. This indicates that students who depend on chatbots for problem-solving are likely to adopt AI chatbots. This asserts that the ability of technology to give efficient solutions to academic tasks is a driving factor for its integration into students' routines.

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