AI Chatbots and the Study Practices among Learners at Tanzania Public Service College: A Cognitive Load Theory Perspective

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Abstract

The study examined learners' perceptions of AI chatbots' influence on their study practices at the Tanzania Public Service College (TPSC), using Cognitive Load Theory (CLT) as a theoretical framework. AI chatbots offer opportunities to enhance learning efficiency; however, they also pose a risk of reshaping traditional study practices, potentially reducing deep engagement. The study used a quantitative approach. Data were gathered from 163 respondents in the Secretarial and Records Management departments via a structured online survey and analysed using descriptive statistics. The findings reveal that learners use AI chatbots daily; they mostly use them to understand difficult concepts, summarise texts, and translate complex languages. Furthermore, the findings suggest that the majority of learners perceive chatbots as reducing intrinsic and extraneous cognitive load while enhancing germane load. Even though a small number of learners admitted to replacing original readings with AI-generated content, there remains a risk of shallow learning and academic dependence, suggesting a shift away from traditional reading strategies and raising concerns about shallow engagement. The study concludes that AI chatbots are neither inherently beneficial nor harmful; rather, their impact on learning outcomes depends mainly on how students integrate them into their study routines. It is up to institutions to develop guidelines to mitigate overreliance. The study therefore recommends that higher education institutions foster critical engagement with AI tools and establish procedures and training to ensure learners use AI chatbots effectively.

Keywords: *AI chatbots, Cognitive Load Theory, Perceptions, Critical thinking, Cognitive Load.*

1.0 Introduction

Before the internet era, the study habits of higher education learners involved the use of printed books, lecture notes, and other physical learning materials, such as journals and newsletters. Most of these learning materials were accessed from physical libraries. The practice needed learners to take their time and focus to comprehend what they were studying. With the advent of the internet and the increased use of digital technologies, learners progressively transitioned to electronic resources. These resources encompass e-books, academic websites, e-journals, e-theses, e-newspapers, encyclopedias, databases,

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and digital libraries (Jotangia, 2020). E-resources are known to be more convenient to use because they provide wide access and easy retrieval, in addition to saving time (Adenariwo & Sulyman, 2022). Their advent marked a move toward screen-based reading, where information could be quickly searched, skimmed, and bookmarked. Nevertheless, some learners did not diminish the value of printed books and physical materials; instead, they integrated both formats to support their learning needs.

In the current era, the adoption of Artificial Intelligence (AI) into higher education, specifically the application of AI chatbots, has continued to rise globally due to their relevance and practical benefits (Zhang et al., 2023). This has further reshaped the learners' studying practices. Learners are leveraging AI chatbots in three key areas: guidance in completing homework, a personalised learning experience, and skills development (Labadze et al., 2023). Key factors driving their adoption include the demand for personalised learning experiences, the ability to simulate human-like interactions, and the provision of safe and supportive learning environments (Ma et al., 2024). Similarly, in Tanzania, the use of AI chatbots has become increasingly common among higher education learners (Mbembati & Bakiri, 2025; Mambile & Mwogosi, 2025).

Despite the benefits of AI chatbots, there is concern about the unethical use of general AI chatbots in higher education, particularly when learners turn to these tools to complete their assignments, thereby increasing the risk of over-reliance (Williams, 2024; Blahopoulou & Ortiz-Bonnin, 2025). AI chatbots may be influencing how learners approach studies. For example, instead of studying the sources, learners may rely on chatbot-generated summaries or simplified explanations (Zhai et al., 2024). While this may enhance short-term accessibility, the effects on deeper cognitive engagement, studying habits, and the development of independent learning skills remain a concern. For instance, lecturers in higher education have observed a growing trend among students of completing assignments using general AI chatbots such as ChatGPT, Gemini, Co-Pilot, and DeepSeek AI. This results in some learners struggling to comprehend the content written in their submitted assignments. This is exhibited even during their presentations.

This highlights how AI chatbots are influencing learners' study practices. A considerable body of scholarly literature has examined the educational impact of tailored AI chatbots designed for specific subjects, such as language learning, social studies, and computer science (Zhang et al., 2023; Yetişensoy & Karaduman, 2024; Shahriar, 2025). Similarly, studies conducted in Tanzania have explored the use of AI chatbots in higher education (Sarakikya & Kitula, 2024; Mollel, 2025; Mbembati & Bakiri, 2025). However, there is limited empirical evidence, particularly in the Tanzanian context, on how these general-purpose AI chatbots affect learners' study practices in higher education. Therefore, there is a growing need to examine how general-purpose AI chatbots are shaping learners' study practices in higher education from learners' perspectives. Moreover, the influence of AI chatbots on learners' study practices in professional fields such as records management and secretarial studies remains largely unexplored. Guided by the Cognitive Load Theory, the current study aims to examine learners' perceptions of how AI chatbots are shaping their study practices at the Tanzania Public Service College (TPSC). Specifically, this study aimed to investigate how frequently learners use AI chatbots while studying, the various purposes for which they use these tools, and their perceptions of AI chatbots' influence on their study practices.

2.0 Literature Review

2.1 Overview of AI Chatbots in Studying

AI chatbots are automated systems designed to interact with users in a way that mimics human conversation, using natural language processing and machine learning techniques (Kooli, 2023). The integration of AI chatbots is reshaping higher education (Chukwuere & Handoko, 2024). AI chatbots are applicable across a broad scope of educational contexts, unlike other domain-specific systems. AI chatbots as pedagogical tools exhibit key characteristics, including conversational assistance, multi-modality, multilingual support, scalable and cost-effective deployment, seamless integration with other software systems, and data-driven insights to support teaching and learning (Ilieva et al., 2023).

The use of AI chatbots by learners in higher learning has been well summarised in a study by Ortiz-Bonnin and Blahopoulou (2025), which highlights their application across a wide range of academic activities. These include: generating learning materials, refining ideas, summarising and paraphrasing content, answering questions, completing assignments, producing essays, translating different languages, clarifying complex concepts, preparing for exams, analysing data, and assisting with research. Additionally, AI chatbots are used as personal tutors (buddy system), providing tailored support to meet diverse learner learning needs (Sedrakyan et al., 2024). Jishnu et al. (2023) explored the motivations driving students' use of ChatGPT, aiming to gain a comprehensive understanding of the factors shaping their preferences. The results indicated that students utilise ChatGPT for academic content creation, information seeking, novelty, and convenience.

Previous scholars have reported that AI chatbots can improve learners' cognitive skills (Kouam & Muchowe, 2024). As an example, Pickard-Jones et al. (2024) conducted a study in which two groups of learners participated in a test involving a recorded lecture they had not encountered before. One group used an AI chatbot (ChatGPT), while the other used Google Search. The results suggested that learners who interacted with AI chatbots during the lecture to ask questions and seek clarification experienced less extraneous cognitive load and demonstrated greater germane cognitive load compared to the second group. Moreover, AI chatbot users asked more questions, and when a quiz was offered, results showed that learners using the AI chatbot performed better across different cognitive skill levels. There was also a positive perception of the AI chatbot over Google search. Another study by Lademann et al. (2025) revealed that AI custom chatbots reduce intrinsic and extrinsic cognitive load while significantly enhancing positive-activating emotions, situational interest, and self-efficacy. Similarly, Suriano et al. (2025) revealed that learners' interaction with ChatGPT can significantly enhance their critical thinking skills when learners actively engage with the tool. Positive attitudes toward ChatGPT led to greater engagement, which in turn had a more substantial influence on critical thinking performance than knowledge acquisition alone.

While studies by Ilieva et al. (2023) and Davar et al. (2025) have reported benefits of AI in education, ethical issues concerning its use, particularly the overreliance on technology and academic dishonesty, remain a critical consideration. For example, learners can use AI chatbots to generate responses and copy them directly into their essays. The misuse of AI

chatbots allows them to produce essays effortlessly (King & ChatGPT, 2023). This affects learners' critical thinking and study practices. Recently, Gerlich (2025) reported that learners who relied more on AI chatbots had lower critical thinking skills. Furthermore, Schulz and Knierim (2024) revealed that AI chatbots did not reduce cognitive load compared to standard internet searches.

Bai et al. (2023) presented a balanced perspective, citing that AI chatbots offer meaningful benefits, including personalised learning and cognitive offloading. However, they also carry cognitive costs when overused, with diminished critical thinking and memory retention among the adverse effects on learning. Likewise, Schei et al. (2024), Stöhr et al. (2024), and Monib et al. (2025) reported that learners showed positive perceptions of AI chatbots for their usefulness and motivational benefits but also expressed concerns about potential downsides, such as reduced critical thinking and shallow learning.

2.2 Theoretical Framework

The study employed Cognitive Load Theory (CLT) as a theoretical foundation. The theory was developed by John Sweller in 1988 to provide guidelines for presenting information to learners to reduce mental overload and promote effective cognitive processing (Sweller, 1988; Sweller et al., 1998). CLT highlights that working memory is limited in the amount of new information it can process at a time. In contrast, long-term memory can store an essentially unlimited number of schemas (Kirschner, 2002). The model primarily discusses three types of cognitive load: intrinsic, extraneous, and germane. According to Sweller (1998), intrinsic load is the inherent difficulty of the material or activities being learned itself. It is determined by the number of elements (materials or activities) that must be processed simultaneously and by their interactions. Extraneous load is imposed by the way information is presented. Poorly designed instructional methods or design increase the extraneous cognitive load. Germane load is the mental effort required to process, construct, and automate schemas. To optimise learning, CLT recommends reducing extraneous cognitive load, managing intrinsic load, and promoting germane load to support schema construction and automation.

The CLT is considered relevant to this study, as it provides a theoretical foundation for analysing the study's objectives. In examining how frequently learners use AI chatbots while studying, the theory provides insight into whether repeated interaction with AI tools reduces extraneous cognitive load by organising the search and presentation of information. Regarding the second objective, which is the purposes for which learners use AI chatbots, CLT guides understanding of how these tools assist with managing intrinsic load when engaging with complex materials. Finally, in assessing learners' perceptions of AI chatbots' influence on their study practices, the theory highlights the role of germane load, particularly in determining whether chatbot use supports meaningful schema construction and deep learning or primarily encourages surface-level engagement with content.

Recent research has applied the CLT to examine the use of AI chatbots in education to reduce cognitive load. For instance, a study by Lademann et al. (2025) assessed the impact of AI custom chatbots on learning experiences and found that they reduced intrinsic and extraneous cognitive load by enhancing positive activation emotions and self-efficacy.

Similarly, Gkintoni et al. (2025) reviewed 103 studies examining the integration of Cognitive Load Theory with Artificial Intelligence and Machine Learning in education. The findings showed that AI significantly improves learning efficacy by providing personalised instruction and automatically managing cognitive load.

3.0 Methodology

The study adopted a quantitative descriptive survey method to examine learners' perceptions of AI chatbots. This design was considered suitable because it facilitates the collection of measurable data to describe trends, attitudes, and opinions within the target population (Creswell & Creswell, 2017). The participants of the study were the learners at Tanzania Public Service College (TPSC) studying secretarial and records courses. Convenient sampling was used to select respondents because of the availability of learners and their willingness to participate in the study (Etikan et al., 2016). Furthermore, the technique was intended to explore attitudes and opinions, making it appropriate. Data were collected through a structured online survey, which consisted of four parts: the first section included the demographics of the respondents; the second section assessed the frequency of AI use by respondents; the third section explored the purpose of using AI chatbots in studying; and the last section examined learners' perceptions about the use of AI. Respondents who indicated they had never used AI chatbots were automatically directed to the end of the questionnaire via Google Forms' skip logic and therefore did not respond to the remaining items. Data analysis was conducted using descriptive statistics. This helped summarise learner responses on the frequency of chatbot use, purposes, and perceived influence. Data were processed in MS Excel after being exported from Google Forms.

The validity of the questionnaires' content was confirmed using expert review by three specialists in the area, who evaluated clarity, relevance, and comprehensiveness. Reliability analysis using Cronbach's alpha indicated excellent internal consistency for all constructs: perceptions of how AI chatbots reduce intrinsic cognitive load ($\alpha = 0.94465$), perceptions of how chatbots use reduce extraneous cognitive load ($\alpha = 0.92218$), and perceptions of how AI chatbots use increase germane load ($\alpha = 0.94226$), all exceeding the 0.70 benchmark. Before conducting the study, the researcher sought approval from TPSC management. Furthermore, the participation was voluntary, and participants were assured that their responses would remain confidential.

4.0 Results and Discussion

4.1 Background Information of the Respondents

Table 1 summarises respondents' responses on education level, department, and gender.
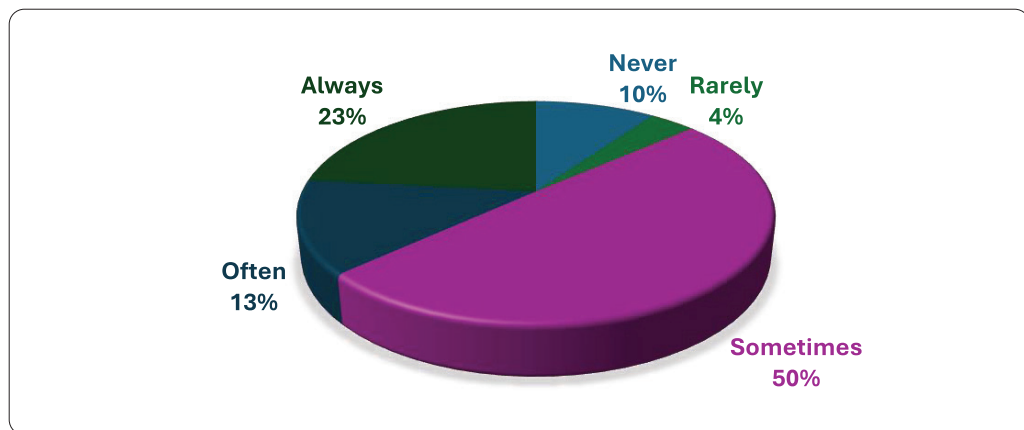
Table 1: Demographic Data of the Respondents

Basis of classification	Category	Frequency	Percentage (%)
Education Level	Bachelor's Degree	33	20.2%
	Diploma	64	39.3%
	Certificate	66	40.5%
Department	Secretarial	57	35%
	Records	106	65%
Gender	Male	56	34.4%
	Female	107	65.6%

Source: Field Data (2025)

The data show that 40.5% of respondents hold a Certificate, followed closely by diploma holders (39.3%), while bachelor's degree holders account for only 20.2%. Among 163 respondents, 34.4% were male, and 65.6% were female, indicating that the majority of the study's participants were female. By department, a larger proportion (65%) of respondents are from Records Management, while 35% are from Secretarial Studies.

4.2 The Frequency of AI Chatbot Use in Studies

The study sought to determine the frequency of AI chatbot use by learners in their studies. Figure 1 illustrates the frequency of AI chatbot use while studying by college learners for academic purposes.

Figure 1: The Frequency of AI Chatbot Use while Studying
Source: Field Data (2025)

The statistical data in Figure 1 indicate that half of the respondents (50%) use AI chatbots sometimes, while 23% use them consistently, and 13% use them often. Very few respondents (4%) reported using them rarely, and 10% never used them. This observation aligns with Chukwuere and Handoko's (2024) findings; therefore, it is evident that AI chatbots are common in higher education and are reshaping how learners approach studies, shifting practices toward technology-assisted engagement with learning materials. This indicates

the growing relevance of AI chatbots in higher education learning environments. For the few learners in this study who never engaged with AI chatbots, there may be fear of potential misuse, limited awareness, or limited access to these tools. Figure 2 also illustrates the type(s) of AI chatbots used often by learners for studying.
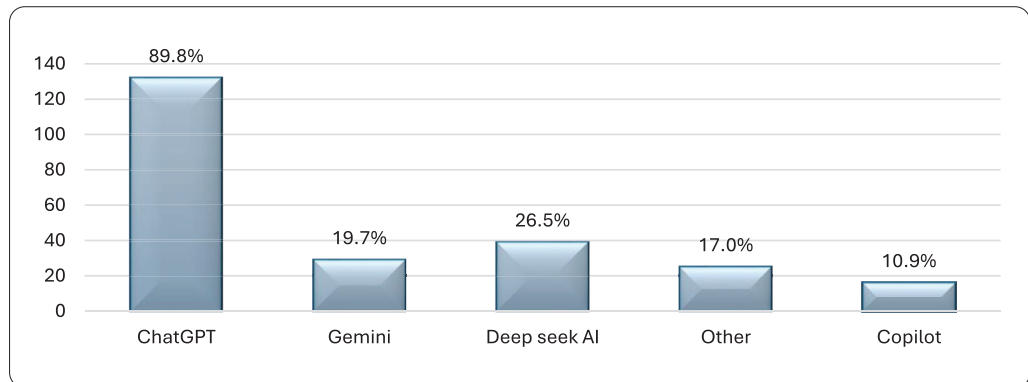

Figure 2: Types of AI Chatbots Used by Learners for Studying
Source: Field Data (2025)

The results in Figure 2 point out that 89.8% of respondents use ChatGPT, followed by 26.5% who use DeepSeek AI and 19.7% who use Gemini. Fewer respondents (10.9%) use Copilot, or 17.0% who use other AI chatbots. This outcome suggests that ChatGPT was the dominant AI chatbot learners used at TPSC for studying, due to its perceived accessibility and utility. This is similarly supported by Stöhr et al. (2024), who found that more than one-third of learners regularly use ChatGPT for educational purposes. In contrast, use of other AI chatbots remains rare.

3.3 The Purpose(s) of Using AI chatbots while Studying

The study set out to investigate the purpose(s) for which learners use AI chatbots. Figure 3 illustrates the findings.
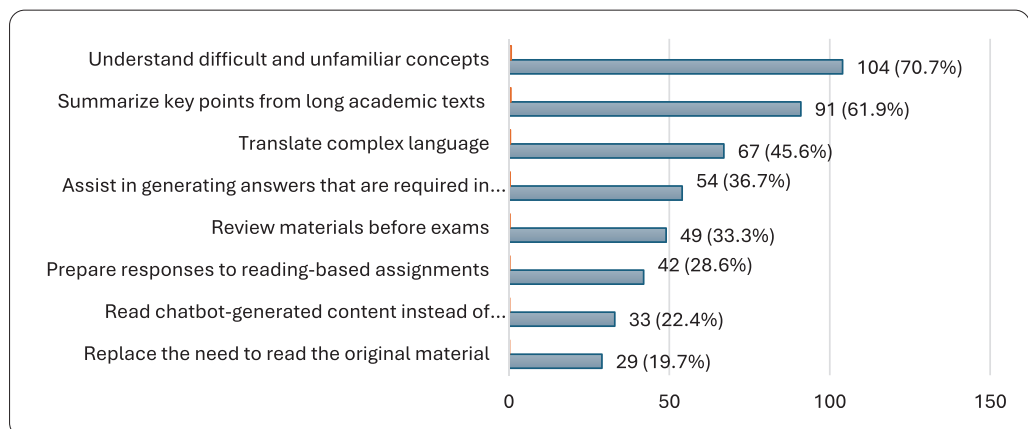

Figure 3: Purpose of Using AI Chatbots while Studying
Source: Field Data (2025)

The statistics in Figure 3 indicate that learners use AI chatbots to understand complex and unfamiliar concepts, summarise key points from long academic texts (e.g., articles, book chapters), and translate complex language by 70.7%, 61.9%, and 45.6%, respectively. The results also indicate that learners moderately use AI to assist in generating answers for assignments and in reviewing materials before exams, by 36.7% and 33.3%, respectively. On the other hand, a small percentage 28.6% use AI chatbots to prepare responses to reading-based assignments; 22.4% read chatbot-generated content instead of original material; and 19.7% replace the need to read original material. The outcome suggests that learners use AI chatbots to simplify learning rather than to skip reading. The results are supported by the study by Jishnu et al. (2023), who noted that learners engage with AI tools for academic creation, information seeking, novelty and convenience. Thus, it can be deduced that learners adopt AI chatbots as complementary tools. This reflects a responsible approach to studying where chatbots enhance efficiency without disregarding engagement with core materials.

3.4 Learners' perceptions on the influence of AI-powered chatbots on study practices

The study set out to examine learners' perceptions of the influence of AI chatbot use on their study practices. Tables 2, 3, and 4 below show the findings.

The respondents were asked to indicate how AI chatbots influence their study practices.

Table 2: Perceptions of How AI Chatbots Reduce Intrinsic Cognitive Load

No.	Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard Deviation
1.	AI chatbots help me understand complex concepts more easily	13 (8.8%)	3 (2.0%)	21 (14.3%)	60 (40.8%)	50 (34.0%)	3.89	1.16
2.	AI chatbots reduce confusion when reading difficult materials	12 (8.2%)	3 (2.0%)	28 (19.0%)	62 (42.2%)	42 (28.6%)	3.81	1.12
3.	AI chatbot summaries make lengthy reading materials more manageable and easier to read	12 (8.2%)	7 (4.8%)	31 (21.1%)	52 (35.4%)	45 (30.6%)	3.76	1.18
4.	AI chatbots dezcrease how difficult academic materials feel to comprehend	17 (11.6%)	12 (8.2%)	34 (23.1%)	46 (31.3%)	38 (25.9%)	3.52	1.27
5.	I rely on AI chatbots to make sense of challenging reading materials	14 (9.5%)	14 (9.5%)	38 (25.9%)	48 (32.7%)	33 (22.4%)	3.49	1.21

Source: Field Data (2025)

As shown in Table 2, respondents agreed that AI chatbots help them understand complex concepts more easily, reduce confusion when reading difficult materials, summarise lengthy reading materials, and decrease the perceived difficulty of academic materials by 74.8%, 70.8%, 66%, and 57.2%, respectively. It can also be observed that the mean scores of the first four items in the table are measuring high 3.89, 3.83, 3.76, and 3.52, respectively. On the other hand, only 55.1% of the respondents agreed that they rely on AI chatbots to make sense of challenging reading materials. Generally, these findings indicate a positive perception of AI chatbots for reducing intrinsic cognitive load. Consistent with CLT, these results suggest that AI chatbots reduce intrinsic cognitive load by simplifying complex concepts and allowing learners to allocate cognitive resources toward more profound understanding and meaningful learning. While Lademann et al. (2025) also reported that AI chatbots reduce intrinsic cognitive load and enhance schema construction, this study extends this by showing that learners strategically use chatbots to support and enrich their studying process, rather than replacing traditional study methods. It is noticeable that some respondents remain neutral, particularly when it comes to depending entirely on these tools for studying. This balanced use suggests that when learners engage thoughtfully with AI chatbots, they can improve their understanding and support deeper, independent learning rather than relying on them passively.

Table 3 presents the results for the analysis of learners' perceptions of how AI reduces extraneous cognitive load.

Table 3: Perceptions of How the Use of Chatbots Reduces Extraneous Cognitive Load

No.	Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard Deviation
1.	AI chatbots help me focus on the most relevant information by filtering out unnecessary details	13 (8.8%)	12 (8.2%)	33 (22.4%)	54 (36.7%)	35 (23.8%)	3.59	1.19
2.	AI chatbots help me clarify poorly explained academic materials	14 (9.5%)	26 (17.7%)	30 (20.4%)	42 (28.6%)	35 (23.8%)	3.39	1.28
3.	Chatbot explanations reduce the confusion caused by unclear or complicated writing styles	12 (8.2%)	16 (10.9%)	24 (16.3%)	61 (41.5%)	34 (23.1%)	3.61	1.19
4.	AI Chatbot use helps me focus on the most important ideas in my studies	11 (7.5%)	13 (8.8%)	28 (19.0%)	56 (38.1%)	39 (26.5%)	3.67	1.17
5.	AI chatbots help me quickly locate and extract key information while studying	11 (7.5%)	12 (8.2%)	34 (23.1%)	49 (33.3%)	41 (27.9%)	3.66	1.18

Source: Field Data (2025)

The results in Table 3 reveal that 60.5% of respondents, with a mean score of 3.59, moderately agreed that AI chatbots help them focus on relevant information by filtering out unnecessary details. 52.4% of respondents had a slightly lower mean score of 3.39. 64.6% of the respondents, with a mean score of 3.61, also agreed that AI chatbots help them clarify poorly explained academic materials. 64.6% of respondents, with the highest mean score of 3.67, reported that using AI chatbots helps them focus on important ideas, and 61.2%, with a high mean score of 3.66, were positive that AI chatbots help them quickly locate and extract key information while studying. According to the CLT, the findings in Table 3 suggest that AI chatbots help manage extraneous cognitive load by presenting information in a more structured and accessible way, allowing learners to direct their mental effort toward understanding core concepts rather than struggling with poorly organised content. While Pickard-Jones et al. (2024) similarly highlighted the role of AI tools in reducing extraneous load, the current study shows that learners actively use chatbots to navigate complex materials efficiently, rather than merely skimming content. This indicates that AI chatbots, when used deliberately, enhance learners' focus and comprehension, supporting more efficient study practices without replacing engagement with the original material. Table 4 presents the analysis results for the perceptions of how AI chatbot use increases Germane load.

Table 4: Perceptions of How AI Chatbots Use Increases Germane Load

No.	Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Standard Deviation
1.	AI Chatbots help me understand academic content more clearly	12 (8.2%)	8 (5.4%)	23 (15.6%)	72 (49.0%)	32 (21.8%)	3.71	1.11
2.	AI chatbots help me remember key concepts when studying	12 (8.2%)	11 (7.5%)	27 (18.4%)	61 (41.5%)	36 (24.5%)	3.67	1.16
3.	AI chatbots encourage me to explore topics more deeply	12 (8.2%)	8 (5.4%)	23 (15.6%)	62 (42.2%)	42 (28.6%)	3.78	1.16
4.	I often prefer studying AI chatbot-generated summaries over traditional learning materials	14 (9.5%)	17 (11.6%)	29 (19.7%)	52 (35.4%)	35 (23.8%)	3.52	1.24
5.	Conversing with AI chatbots stimulates my critical thinking about the subject matter	10 (6.8%)	9 (6.1%)	38 (25.9%)	62 (42.2%)	28 (19.0%)	3.61	1.07

Source: Field Data (2025)

As shown in Table 4, 70.8% of respondents, with a mean score of 3.71, strongly agreed that AI chatbots help them understand academic content more clearly. Additionally, 66% of respondents, with a mean score of 3.67, agreed that AI chatbots help them remember key concepts when studying. Similarly, 70.8% of the respondents with the highest mean score of 3.78 strongly agreed that AI chatbots encourage them to explore topics more deeply. Additionally, 61.2% of the respondents, with a mean score of 3.61, agreed that conversing with AI chatbots stimulates their critical thinking about the subject matter. Interestingly, only 59.2% of respondents reported preferring AI chatbot-generated summaries for studying over traditional learning materials, with the lowest mean of 3.52 and the highest standard deviation of 1.24, suggesting a more divided opinion. However, the statistical data overall reveal a predominantly positive perception. From a CLT perspective, it can be deduced that AI chatbots support germane load by directing learners' mental effort toward meaningful learning, schema construction, and deeper cognitive engagement. This also concurs with the study of Suriano et al. (2025). This suggests that meaningful use of AI chatbots can promote deeper cognitive processing.

5.1 Conclusion and Recommendations

The study examined learners' perceptions of how AI chatbots influence their study practices at TPSC, drawing on Cognitive Load Theory. The findings revealed that learners mostly use AI chatbots to simplify complex materials, summarise content, and facilitate the translation of complex languages. Besides, learners show a positive perception of using AI chatbots to reduce intrinsic and extraneous cognitive load and enhance germane load. This suggests that AI tools can support deeper engagement and more efficient study practices. However, there remains a risk of shallow learning and academic dependence among a notable minority of learners who confessed to replacing original readings with AI-generated content.

The study concludes that AI chatbots are neither inherently beneficial nor harmful; their impact depends on learners' ability to integrate them into their study routines. Thoughtful, reflective use can enhance learning efficiency and cognitive processing, whereas overreliance can undermine critical engagement with learning materials. The study is limited to a single institution. It relies on self-reported survey responses, which may be biased or inaccurate, hence suggesting the use of a mixed-methods approach to provide a balanced perspective on the findings for future studies.

The study recommends that higher education institutions foster critical engagement with AI tools by integrating them into pedagogical frameworks while also establishing guidelines and training programmes to ensure learners use AI chatbots effectively and responsibly, such as evaluating AI-generated content alongside original materials to maintain academic standards.

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