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Exploring ChatGPT in education: unveiling learners' experiences through the lens of self-determination theory

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Abstract

The rapid development of Technology-enhanced learning (TEL) has transformed the smart learning environments into higher education, encouraging greater interactivity, personalization, and learner autonomy. This study employed a mixed methods design to investigate the experiences of undergraduate students in utilising ChatGPT in an educational context aligning with the principles of Self-Determination Theory (SDT). A survey was conducted with 83 undergraduate students in the UAE to gather the quantitative data and further to triangulate through interviews with 20 students. The interviews were categorised based on competence, relatedness, and autonomy. The findings demonstrated ChatGPT's potential in addressing advanced queries and breaking down intricate information to enhance comprehension, catering to diverse learners. Positive themes were identified indicating ChatGPT's influence in reducing social anxiety and enhancing learners' preparedness for professional developments. Additionally, the study reported that ChatGPT's role in promoting autonomy during the learning activities, aligning with the broader philosophy of self-directed learning. Nevertheless, participants acknowledge the lack of human interaction. The study highlights ChatGPT's role in promoting autonomy within the learning journey, aligning with the broader philosophy of self-directed learning. The findings contribute valuable pedagogical implications for educators, suggesting supplementary strategies to foster emotional intelligence.

Keywords: ChatGPT, Self-determination theory, Motivation, Higher education, Artificial intelligence

Introduction

In the constantly evolving field of education, incorporating state-of-the-art technologies shows great promise in revolutionising conventional teaching and learning methods (Annamalai, 2025). Information and Communication(ICT) tools hold a significant potential for positive and transformative educational changes as they facilitate various interaction modes, including learner-content, learner-learner, learner-group, and learner-instructor, as well as cloud-based computing, storage and media platforms (Mathew, 2020). Nevertheless, the effectiveness of introducing technology tools is

significantly pertinent and depends on how the technology tools motivate learners to learn (Martin et al., 2023).

One technological advancement that has received considerable attention is the utilisation of Chat Generative pre-trained transformer (ChatGPT). ChatGPT, functioning as a generative AI chatbot, is trained on a wide range of Internet sources and has overcome the limitations of earlier chatbots, significantly impacting how individuals learn (Kasneci et al., 2023).In contrast to the currently available chatbots, which follow predetermined dialogue patterns and employ straightforward question-and-answer structures (see Annamalai et al., 2023), ChatGPT is capable of engaging in a dialogue that closely mimics human-to-human interaction, surpassing the capabilities of earlier chatbot models (Susnjak, 2022).

Existing studies related to ChatGPT have highlighted its potential benefits in the educational context (Chan & Lee, 2023; Tlili et al., 2023). Researchers and practitioners have pointed out the promising use of ChatGPT in various research tasks. For example, generating research ideas (Dowling & Lucey, 2023), offering feedback (Kohnke, 2023), practicing writing skills (Barrot, 2023), formulating Boolean queries for systematic reviews (Wang et al., 2023), and even assisting in writing research papers (Macdonald et al., 2023). Its ability has also prompted administrators to form task groups and organise discussions at institution to discuss its implications (Aydin & Karaarslan, 2022; O'Connor, 2022; Van Dis et al., 2023). ChatGPT demonstrates its ability to innovative resources that enhance teaching and learning activities beyond traditional methods (Jeon et al., 2023). Therefore, ChatGPT is well acknowledged as a credible tool for pedagogical purposes (Jeon et al., 2023).

However, the rise of ChatGPT has also triggered concerns about academic integrity and potential plagiarism (Dehouche, 2021; Malik et al., 2023). A major concern revolves around the negative impact of using generative AI on students' writing and critical thinking skills, with some suggesting that depending on these tools may contribute to a decline in these skills (Kasneci et al., 2023; Sallam, 2023; Warschauer et al., 2023). Critics argue these challenges can harm the overall quality of students' learning outcomes (Chan & Lee, 2023; Zhai, 2022). Such debates further highlight the pressing need for empirical studies to better understand ChatGPT based on an established theory.

Annamalai (2024) outlined ChatGPT effective use in educational context are related to poorly designed interactions and pedagogical practices. Also, thorough investigation of ChatGPT and its real benefits across various educational fields lack in-depth exploration (Cotton et al., 2023; Jeon et al., 2023). The benefits and the challenges associated with the powerful ability of ChatGPT offer ample opportunities for researchers to explore and investigate further.

Motivation is an important dimension that needs to be investigated when integrating ChatGPT within educational contexts. Learners who are motivated to learn via ChatGPT are more likely to invest effort, engage in frequent practice, and actively seek opportunities to enhance their learning. ChatGPT's role in promoting ethical learning practices is also important and impacts the level of engagement. Thus, the current state of knowledge lacks a comprehensive exploration of how ChatGPT can be effectively employed to support the fundamental psychological needs of autonomy, competence, and relatedness outlined by Self-Determination Theory (SDT).

Addressing this research gap is important to provide educators and policymakers with valuable insights into the tailored benefits and challenges of integrating ChatGPT into educational context This will enable informed decision-making regarding the incorporation of technology for educational enhancement. There are no studies regarding what motivates students to use ChatGPT. Thus, this study aims to investigate the implications of integrating ChatGPT within the framework of the SDT to narrow the divide between technology and student motivation in educational environments. The following section illustrates the application of the Self-Determination Theory, which serves as a guiding framework for the study. The research question of this study is:

What are the students' experiences of using ChatGPT in educational contexts based on self-determination theory?

Self-determination theory

Self-Determination Theory (SDT) was developed and formulated by Edward L. Deci and Richard M. Ryan (Deci et al., 1991). It is a psychological framework concentrated on human motivation and personality development. It explains individuals' inherent psychological needs for autonomy, competence, and relatedness, and fulfilling these needs results in heightened motivation, well-being, and optimal functioning. The key principles of SDT are:

Autonomy: This pertains to the necessity for individuals to experience a sense of volition and choice in their actions, implying control over one's behaviours and decisions.

Competence: The need for competence involves feeling effective and capable in interactions with the environment, mastering challenges and experiencing a sense of accomplishment.

Relatedness: Humans need social connection and a sense of belonging, to form meaningful interactions with others and feeling understood and valued.

Satisfaction of these psychological needs increases the likelihood of motivation, engagement and persistence in learning efforts. A study on ChatGPT and SDT could explore how the integration of ChatGPT into educational settings impacts students' autonomy, competence and relatedness.

Previous studies on ChatGPT

The following section discusses the key findings of previous studies, providing valuable findings related to ChatGPT's functionalities and implications. Maheshwari (2024) reported the factors influencing learners ' intentions to adopt ChatGPT for academic studies. The study used a Structural equation model (SEM) to analyse data from undergraduate and postgraduate students from public and private universities in Vietnam. The findings reported that learners ' inclination to adopt ChatGPT was influenced by their perceptions of its user-friendliness (PEU). However, the perceived usefulness (PU) of ChatGPT did not directly impact students' adoption intention; instead, it exerted an indirect influence through personalisation (with a positive effect) and interactivity (with a negative effect). Importantly, PU had no significant indirect effect on AI mediated by perceived trust and perceived intelligence. In the same year, Foroughi et al. (2023) involved gathering data from 406 students in Malaysia. The study employed a mixed-methods approach, utilising "partial least squares" (PLS) and "fuzzy-set qualitative

comparative analysis" (fsQCA) for analysis. The PLS analysis reported performance expectations, ease of use, and enjoyment were evident from the use of ChatGPT. The study also found that the perceived value of learning has an impact on the use of ChatGPT.

Jeon et al. (2023) examined the interactions between teachers and ChatGPT, explicitly focusing on understanding the functions of ChatGPT in education. By qualitatively analysing the collected data, four distinct roles for ChatGPT (interlocutor, content provider, teaching assistant, and evaluator) and three roles for teachers (coordinating various resources with pedagogical expertise, encouraging active student inquiry, and fostering awareness of AI ethics) were identified. Another qualitative study by Mohamed (2023) examined the viewpoints of ten English as a Foreign Language (EFL) faculty members at Northern Border University regarding the effectiveness of ChatGPT in supporting their students' English language learning. The educators acknowledged ChatGPT's utility in promptly and accurately addressing a broad spectrum of questions, while others expressed concerns that ChatGPT might impede students' critical thinking and research skills, potentially reinforcing biases or misinformation.

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In recent years, Nugroho et al. (2025) investigated the students' experiences with ChatGPT as a tool for facilitating essay writing. The results illustrated the benefits of ChatGPT in improving the accuracy, efficiency, origination of ideas, and translation of written content. Nevertheless, the investigation also addressed students" apprehensions about the possibility of academic dishonesty and the dissemination of inaccurate information. Similarly, Bucol and Sangkawong (2024) employed an exploratory study to examine the potential of ChatGPT as an Automated Writing Evaluation (AWE) tool in teaching English as a Foreign Language (EFL) in Thailand. The study reported the patterns in the feedback, demonstrating ChatGPT's strengths and its limitations as an AWE. ChatGPT exhibits significant potential as an AWE tool, providing unique features such as scalability, consistency, efficiency, and a human-like interface. However, educators must be aware of its constraints. In the same year, Yigit et al. (2024) conducted a study to examine undergraduate health sciences students' perceptions, experiences, and expectations

regarding the use of ChatGPT. The data was collected through in-depth interviews and analysed thematically, focusing on three primary themes: students' expectations for the future use of ChatGPT, their experiences with ChatGPT, and their perceptions of it. The findings suggest that students regard ChatGPT as a valuable information source and an innovative resource; however, they also express apprehensions regarding its potential to provide inaccurate information.

The studies highlighted above largely examined ChatGPT's functional and technological advances, such as its usability and performance outcomes. While these studies have offered valuable findings about ChatGPT in educational contexts, they mainly used behavioural, cognitive and evaluative approaches. As such, they have not adequately addressed the important psychological and motivational factors that influence students' engagement with ChatGPT among students. There is a notable lack of research that applies robust motivational frameworks such as Self-Determination Theory (SDT) to examine the underlying reasons why students choose to engage with ChatGPT, how they can experience that engagement, and what intrinsic or extrinsic factors that support or hinder them from considering ChatGPT.

SDT is a particularly valuable theory in this context as it prioritises autonomy, competence, and relatedness that are vital for fostering meaningful and self-directed learning. By not exploring these motivational constructs, current studies risk overlooking critical aspects of learner engagement, such as ChatGPT usage's quality (rather than just the quantity or frequency), the emotional drivers of student interaction with AI tools, and the long-term sustainability of such technology in academic settings. Therefore, this study aims to fill this significant theoretical and empirical gap by employing the Self-Determination Theory to investigate how ChatGPT use fits students' basic psychological needs.

Methodology

Participant

This study involved convenience sampling of a total of 83 undergraduate students, aged between 18 and 37 years, from a university in the UAE. This sample size is acceptable for exploratory research and offers useful insights into general trends (Cohen, 1992). Convenience sampling was employed so that the participants were easily accessible to the researchers, making data collection faster and more practical (Etikan et al., 2016).

The participants in this study were students enrolled in Science, Applied Science and Social Science courses in the UAE. Students enrolled in science courses specialised in Engineering, while participants in Applied Science comprised students studying Information Technology. Social science students included those pursuing Education and Management. The participants were from various nationalities, including the UAE (19), Palestine (15), Pakistan (14), Sudan (20), Iraq(7) and India (8).The participants for the interview were 20 and they were purposefully selected based on their active engagement with ChatGPT in their coursework. They represent diverse academic disciplines and nationalities and can speak about their experiences in English. The inclusion criteria required participants to be undergraduate students currently enrolled in Science, Applied Science, or Social Science at the university where the research is carried out. Participants had the experience of using ChatGPT at least once for academic purposes.

Exclusion criteria were participants without experience in using ChatGPT for academic purposes or language courses. All procedures in this study adhered to the guidelines outlined in Ajman University's Institutional Code of Ethics for Research (Ref. No. H-F−H-3−A). Participation in this study was voluntary, and informed consent was obtained from all participants. They were informed of their right to withdraw at any stage during the research. All data collected were kept strictly confidential and used solely for research purposes. Participants were given pseudonyms, and no information was disclosed.

Data collection

Data collection took place from September to December 2023. Participants were briefed about the objective and the nature of the study. They received a document outlining the process and seeking their consent before the study took place. Clear information about the study's goals and potential benefits was provided, with explicit assurance that participation posed no risks. In alignment with the recommendations of Nuby et al. (2019), the study avoided any questions that could induce discomfort or embarrassment or negatively impact participants' emotional well-being.

The investigation utilised a survey divided into two sections: Section A focused on gathering demographic information about the participants. Section B employed a five-level Likert scale to investigate to what extent students experience competence, relatedness and autonomy with the use of ChatGPT in their learning activities. These items were constructed by researchers and based on an extensive literature review related to Self-Determination Theory, including key works by Deci and Ryan (1991). The items were developed to represent the three main constructs of the theory: competence, relatedness and autonomy. Content validity was ensured by having three experts in the field of English language and education technology, who assessed the clarity, relevance, and alignment with the theoretical framework. Their input was incorporated to revise the items. Statistical analysis was employed using IBM SPSS Statistics Version 27.0, and the reliability of the construct in the questionnaire was assessed using Cronbach's coefficient alpha, yielding an acceptable internal consistency of 0.81.

The survey was distributed online through an online link and remained accessible to respondents for eight weeks. Following Warmbrod's (2014) suggestion that individual items collectively define the meaning of a construct on a Likert scale, this study computed the mean-item summated score by dividing an individual's summated score by the number of items in the scale. This process generated a mean-item score for each item falling within the range of the values for the response continuum options. All items within a scale were assumed to carry equal weight when calculating summated or mean-item scores. In the data analysis the following mean values were used to determine agreement levels:

1.00−2.33: Low.
2.34−3.66: Medium.
3.67−5.00: High.

Interview

A total of 20 participants were invited to participate in three in-depth interview sessions. Each interview session lasted for approximately 45 to 60 min and was recorded and

transcribed verbatim. The expert panel, which consisted of deans and the head of the Department of Technology Education, validated the research questions. The interview questions are:

Competence

1. Do you think that ChatGPT played a crucial role in enhancing your competence related to your courses?
2. Please share your experience with examples of how ChatGPT has assisted you in acquiring new knowledge or skills.
3. Have you experienced challenges related to competence when using ChatGPT? If so, did you manage to address them?

Relatedness

1. How has ChatGPT influenced your social connection in professional and personal interactions?
2. Give examples of how ChatGPT has guided you to build relationships with others or connect with like-minded individuals?
3. Have you experienced any challenges related to relatedness when incorporating ChatGPT? How have you managed these challenges?

Autonomy

1. How has ChatGPT influenced your autonomy in decision-making and problem-solving, whether work-related or personal?
2. Can you provide examples of how ChatGPT has allowed you to exercise greater autonomy and take ownership of tasks or projects?
3. Have you experienced situations where ChatGPT negatively affected your autonomy, making you feel less in control?

Thematic analysis adhered closely to the six-step procedures proposed by Braun and Clarke (2021) to analyse the interviews. Two lecturers in the field of education and technology were employed to support the researchers in coding and extracting themes. Any disagreements among coders were resolved through collective discussion. Once the data analyses were completed, all the findings were integrated and triangulated to determine the key outcomes of the study.

This study adopted a deductive analysis to systematically analyse the data collected. The deductive analysis was guided by the theoretical framework. This method allowed the exploration or validation of existing theories. By considering deductive analysis, the study seeks to draw conclusions that are logically derived from the chosen theoretical framework, enhancing the rigour and clarity of the research findings.

Braun and Clarke's (2021) five-step process for thematic analysis served as the framework for analysing the interview data. The coding process was completed manually.

Step 1: Familiarisation with the data involved a coder thoroughly reviewing and rereading the transcripts line by line. This stage required complete immersion in the data through a comprehensive review and multiple readings, examining each line meticulously to gain a profound understanding of the material.

Step 2: Initial code creation involved the assistant coding transcripts to highlight important content and annotate them. Similar to the first step, this stage required thorough engagement with the data, including a comprehensive review and multiple readings of transcripts to develop a deep comprehension of the material.

Step 3: Theme identification involved the main author thoroughly examining all annotated transcripts for discrepancies in interpretation. Any disparities were resolved, and the authors examined the codes to generate preliminary themes. During this phase, recurring patterns of significance in the coded information were identified as themes.

Step 4: Reviewing themes included combining certain existing themes or breaking down some themes into subthemes. The team iteratively refined the thematic map until it met their expectations. Researchers assessed the themes, considering whether further refinement, consolidation, or subdivision into subthemes was necessary.

Trustworthiness of qualitative data

After the interviews member checking was conducted to verify that participants agreed to the accuracy of the data as suggested by Doyle (2007). The expert panels were the Deans and the Heads of the Department of Technology Education at the research site. This expert involvement aligns with Sánchez-Guardiola Paredes et al.'s (2021) guidance to ensure content validity of qualitative research. After analysing the coding, Cohen's Kappa value of 0.89 was recorded indicates a substantial inter-coder reliability level, as Lombard et al. (2002) recommended.

Integration of quantitative and qualitative data

The study employed mixed-methods research design, utilising surveys for quantitative data and interviews for qualitative data. The integration of these data sets took place in the interpretation phase, facilitating a thorough understanding of the research question through the comparison and merging of findings. We used triangulation, a methodological strategy that validates findings by corroborating information from different sources, to enhance the study's overall validity. Despite our intent to ensure a robust analysis through triangulation, it is crucial to acknowledge the emergence of some disparities between quantitative and qualitative data. These variations were primarily attributed to participant responses, divergent perspectives, or unexpected patterns identified during the analysis.

Findings

Table 1 illustrates the participants experiences concerning competence, relatedness, and autonomy in their interactions with ChatGPT. Notably, the findings demonstrate a substantial experience of competence among learners when using ChatGPT in their learning activities, as evidenced by the predominantly upper intermediate level of agreement for competence-related items. The item *"ChatGPT addresses my inquiries and concerns related to my learning"* stands out with the highest score (M 4.13,

Table 1 Items related to competence, relatedness and autonomy

	Items	Strongly disagree	Disagree	Moderately disagree	Agree	Strongly agree	Mean	STD
	Competence							
1	ChatGPT enhances my sense of competence in communicating ideas	2.4	2.41	12	59	24	4.00	826
2	ChatGPT addresses my inquiries and concerns related to my learning	2.4	3.6	6.0	54.2	33.7	4.13	0.866
3	ChatGPT contributes to decision-making related to my learning	4.8	20.5	21.7	38.6	14.5	3.37	1.112
4	ChatGPT contributes to problem-solving related to my learning	6.0	6.0	6.0	45.8	36.1	4.00	1.104
5	ChatGPT provide me with opportunities to acquire new knowledge related to my learning	2.4	7.2	21.7	50.6	18.1	3.75	0.922
6	ChatGPT provides skills that align with my interests	3.6	2.4	4.8	57.8	31.3	4.11	0.884
7	ChatGPT's ability to generate responses that are related to my courses	2.4	3.6	7.2	60.2	26.5	4.05	0.840
8	ChatGPT allows me to complete my tasks related to my learning	2.4	3.6	7.2	60.2	26.5	4.05	0.840

STD 0.866), underscoring ChatGPT's potential to effectively address students' questions and contribute to an environment conducive to active learning, thereby enriching the overall educational experience. Conversely, the item *"ChatGPT contributes to decision-making related to my learning"* received the lowest score (M 3.37, STD 1.112), indicating a comparatively lower perceived impact on decision-making processes related to learning.

For relatedness, the highest response was for the aspect related *to "ChatGPT understands my preferences related to my learning"* (M 3.59, STD 0.911), suggesting a positive connection between students and ChatGPT in understanding individual preferences. On the other hand, the item *"with the help of ChatGPT, I feel others value my work"* received the lowest score (M 3.40, STD 0.962), indicating a limitation in the recognition or validation of students' work by others using ChatGPT. Regarding autonomy, students expressed a high level of perceived autonomy, especially in the item *"I can decide my own pace of learning related to my course/learning"* (M 4.13, STD 0.866). This suggests that students feel empowered to control the speed of their learning experiences with ChatGPT. Conversely, the item *"I am comfortable letting ChatGPT make decisions about my course/learning"* received the lowest score (M 3.07, STD 1.222), indicating a lower comfort level among students in relinquishing decision-making authority to ChatGPT. Overall, the findings provide valuable insights nuanced analysis of competence, relatedness, and autonomy provides valuable insights into how ChatGPT, influence learners experiences and offering effective integration into the learning environment.

Qualitative analysis

The themes of competence, relatedness, and autonomy were derived through a systematic thematic analysis following the coding process. Initially, raw data were coded line-by-line, which leads to a number of codes. These codes are further categorised to a number of subthemes determined similarity and relevance. Table 2 illustrates the subthemes being combined to the broader themes thar reflected based on similarity and relevance, which were then synthesized into broader overarching themes that represented the participants' experiences.

Competence

Participants highlighted the functionality of ChatGPT in providing information and guiding assistance across various dimensions of their courses. The effectiveness of this support is articulated through its proficiency in answering queries, elucidating intricate concepts, and delivering guidance tailored to the course's specific requirements. C8 claimed that it *"helped me correct grammar and spelling errors in my essays."* Similarly, C19 said, *"I ask ChatGPT to help me fix my ideas and I ask it to translate some sentences from English to Arab."*

C7 appreciated ChatGPT and claimed that:

ChatGPT can provide information and assist in various aspects related to my networking security course. It was a great help when it was able to answer questions, explaining concepts, and providing guidance related to the course.

C6 explained:

I ask ChatGPT to explain and provide examples for my course slides that contain points only. I gave the prompt with context, which helped me to understand the whole chapter.

One intriguing aspect emerged during the discussion, shedding light on the effectiveness of simplifying complex ideas. C2 elaborated:

I have asked it to elaborate on some technical concepts and explain them like they were for a 10-year-old, which makes it much easier to get an overview of the idea that is needed for my course. After that, I requested a technical architecture

Table 2 Themes and Sub-themes related to Self- Determination Theory

Codes	Subthemes	Themes
Assist in correcting grammar and spelling; Translate sentences; Answer queries related to language; Explain concepts; Simplify complex ideas; search information	Offers Academic Assistance	Competence
Cross-referencing ChatGPT with reliable sources	Promoting Intellectual rigour	Competence
Lack of emotional engagement and social connection	Lack of Emotional and Social Connection	Relatedness
Preparing for networking; Writing professional emails; Enhancing internship applications	Enhancing Networking and Communication	Relatedness
Generating ideas with confidence. Exploring knowledge at own pace; Self-directed learning	Promoting Confidence and Self-Directed Learning	Autonomy
ChatGPT as a guide in decision-making	Support in Decision-Making	Autonomy

that laid out all the key components and their descriptions.

Participants acknowledge the importance of cross-referencing the ideas obtained from ChatGPT.

P1 said:

I cross-reference the information gathered with trusted sources to make sure the information is correct. For example, in an academic context, you can double-check the information aligns with authoritative sources and scholarly research.

P17 concluded:

ChatGPT seems to be a good resource for expanding my knowledge. It makes me understand complex concepts, find relevant information, and even discover new perspectives on various topics. It's like having a smart study buddy by my side.

Relatedness

Participants found ChatGPT assist in acquiring information and support in various tasks completion. However, they highlighted that it does not inherit the emotional intelligence that is required in social connection.

C13 mentioned:

ChatGPT is helpful in acquiring information or support with various tasks, but it doesn't have the capacity for emotional or social connection that human interactions provide.

C15 added:

ChatGPT seems to have a neutral impact when it comes to social connections since it basically functions as a tool for ideas and information rather than direct social interaction.

Despite these limitations, several participants emphasized how ChatGPT interactions helped them socially in specific ways, particularly in preparation for networking and professional communication.

C16 explained:

As someone with social anxiety, it has helped me to prepare for social interactions, find topics to discuss in networking events that are helpful for my career and find ways to be prepared for a gathering.

P18 highlighted how ChatGPT aided internship applications:

I have used it to help me write short and efficient LinkedIn connection request messages by providing context on my background and the person I want to connect with. I have also written emails using it, especially for requesting internship opportunities with companies or writing professional emails that require talking about myself and my technical background. These have turned out to be very efficient and have always gotten me a positive response.

Some participants characterized their interactions with ChatGPT as having a "virtual companion," contributing positively to a sense of connection.

C10 stated:

> *ChatGPT has fostered a greater sense of connection and engagement in our conversations, and it is a virtual friend to communicate and share ideas. It has a positive impact on my sense of social connection.*

Autonomy

Promoting independence within the learning journey is crucial for nurturing the development of autonomous thinking and decision-making abilities among learners. Participants highlighted that utilizing ChatGPT enables them to generate ideas and explore information at their own pace. ChatGPT empowers individuals to assume control over their educational path, fostering confidence and self-directed learning.

P1 noted:

> *ChatGPT can assist students with brainstorming and generate ideas for projects and assignments. These inputs can encourage independent thinking and decision-making.*

P18 stated:

> *I felt confident with ChatGPT since it can sometimes solve problems and details my questions with examples. It is more helpful than my books or teachers.*

P15 emphasized the autonomy of ideas:

> *I mostly use it to elaborate on my already-established ideas for decision-making and problem-solving, as it can help me find any areas I would have missed, address them, and implement them better. But the overall autonomy of ideas is usually mine.*

Participants observed that including ChatGPT in their learning activities has changed their approach to information and problem-solving. The combination of self-directed exploration, decision-making support, and critical thinking represents a nuanced and pragmatic interaction with AI tools like ChatGPT.

Discussion

The use of ChatGPT in educational context reflects fundamental principles of SDT, particularly competence, relatedness, and autonomy. Its capabilities in natural language processing are reflected through its ability to interpret context, engage in logical content interactions and furnishing informative responses across a wide range of topics. These capabilities contribute to a sense of mastery in communication, aligning with the SDT concept of competence. Participants identified ChatGPT dynamic role as relayed by participants. Participants reported on the efficacy of ChatGPT in responding to inquiries, implying complex ideas and delivering personalized guidance within academic contexts. These findings align with previous studies that have recognized ChatGPT's adeptness in

addressing questions and offering support related to course content (Sallam, 2023). Also, earlier studies indicated that learners showed fewer grammatical errors and greater vocabulary when using technologies (Annamalai et al., 2023; Dizon & Gayed, 2024). ChatGPT has the potential to create a more engaging and efficient learning atmosphere by providing personalized responses tailored to the individual needs and learning preferences of each student and said to offer an "all-in-one" solution for users (Yan, 2023). Moreover, students' experience of using ChatGPT to elaborate on course slides resonates with findings from studies showcasing the adaptability of the model to specific contextual prompts (Chen et al., 2024). Additionally, the study's participants did not face challenges as identified in other studies (Alshater, 2022; Haque et al., 2022), such as the lack of domain expertise and restricted capabilities of ChatGPT in generating original text.

The participants' response strongly suggests that ChatGPT serves as a reliable point of reference for them in their learning journey and not to solely depend on it.

While in line with earlier studies, the current investigation introduces a fresh perspective by highlighting the significance of simplifying complex ideas. Participants revealed that ChatGPT can effectively convey technical concepts "as if explaining to a 10-year-old" adds a new dimension to our understanding of the model's versatility. This innovative aspect underscores ChatGPT's potential not only in addressing advanced queries but also in breaking down intricate information to enhance comprehension, thereby catering to a broader audience with varying levels of expertise.

The ChatGPT interactions, as highlighted by participants, reflect the ongoing tension between the model's functional capabilities and its limitations in emotional and social realms. The consistent viewpoint that ChatGPT lacks the nuances of human connection aligns with prior studies (Kasneci et al., 2023; Ray, 2023). However, the positive themes emerging from participants contending with social anxiety demonstrate a novel and constructive aspect of ChatGPT's influence on users' social interactions and career-related endeavours. Participants highlighted how ChatGPT aids in preparing for social interactions, networking events, and career-related discussions introducing a fresh perspective. The findings of this study suggested that learners could achieve notable improvement in their interactions with others after the idea and knowledge acquired from ChatGPT is used in their communication. While prior research has focused on the limitations of ChatGPT in emotional and social realms, this study reveals a positive and supportive role played by ChatGPT in addressing social anxiety and enhancing users' preparedness for professional engagements. Additionally, students revealed ChatGPT's contribution to networking, internship applications and professional communication adds a novel dimension by highlighting the tangible success achieved through ChatGPT, an aspect not extensively covered in existing literature. The findings are consistent with the study conducted by Celik et al. (2022) who observed that ChatGPT plays multiple roles, particularly as a source of content, a teaching assistant and a conversation partner. This demonstrates ChatGPT's multifaceted ability in diverse instructional contexts. A study by Mohamed (2023) supports that ChatGPT can provide personalized and interactive experiences that allow students to practice beyond the classroom contexts.

The current study's emphasis on promoting autonomy reflects the broader educational philosophy that encourages self-directed learning (Deci et al., 1991). Participants

reported that ChatGPT as a tool that encourages independent thinking and decision-making is consistent with the broader literature on technology-assisted education, where tools are seen as aids in the learning process rather than substitutes for personal exploration. Participants' view of using ChatGPT to generate ideas and support independent thinking is a pattern well documented in technology education, emphasizing the role of technology to enhance students' autonomy (Annamalai et al., 2023; Shadiev & Yang, 2020). While ChatGPT assists in brainstorming and generating ideas, participants stress that the ultimate decision on ideas remains personal. This adds a layer of depth to our understanding of ChatGPT's limitations and balancing the use of any AI wisely. Furthermore, the participants assert that while they may be influenced by the ChatGPT ideas, they are able to discontinue and conduct independent research. This ability to recognize the limitations of ChatGPT and exercise discretion in its use showcases a healthy balance between leveraging technology and maintaining one's autonomy and critical thinking skills.

Pedagogical implications

The study's findings provide valuable recommendations for educators and practitioners to leverage ChatGPT in educational settings. Some of the strategies are:

Competence

Instructors should offer structured guidance to utilise ChatGPT. This includes examples of tasks that can be accomplished with its assistance and prompts that can be used. Recognizing ChatGPT as an "all-in-one" tool enables educators to integrate it into multiple facets of the curriculum, such as content delivery, concept clarification, and interactive discussions. Course developers are encouraged to develop modules where ChatGPT plays a role as learning assistance, guiding learners to interact with the AI and solve problems collaboratively. It is also important to develop scenarios, tasks, and assignments that align with ChatGPT's strengths in language processing and information synthesis to foster an equitable academic environment.

Relatedness

ChatGPT promotes interactive learning environments by supporting discussion and student participation. Instructors should create activities that engage students with ChatGPT. For example, peer evaluations or debates, supported by ChatGPT's feedback capabilities. The findings have suggested that ChatGPT has a positive impact on users' social interactions, particularly in reducing social anxiety. Educational institutions can organise seminars that instruct students to employ ChatGPT to encourage real life scenarios, thereby allowing them to practice conversations and cultivate social skills in a low-pressure setting.

Autonomy

ChatGPT can be integrated in teaching and learning activities to promote a feeling of autonomy and decision-making skills.

Figure 1 represents a pedagogical framework based on Self-Determination Theory (SDT), which emphasizes three basic psychological needs mainly autonomy, relatedness,
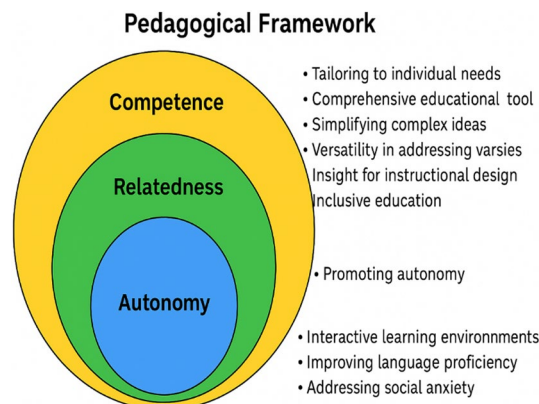
Pedagogical Framework

Competence

Relatedness

Autonomy

- Tailoring to individual needs
- Comprehensive educational tool
- Simplifying complex ideas
- Versatility in addressing varsies
- Insight for instructional design
- Inclusive education

- Promoting autonomy

- Interactive learning environnments
- Improving language proficiency
- Addressing social anxiety

Fig. 1 Pedagogical Framework based on SDT

and competence for effective learning and motivation. Figure 1 also illustrates the inter-relationship and hierarchical interaction among the three psychological needs.

- **Autonomy** forms the base highlighting its foundational role in encouraging motivation and ownership in their learning activities. It supports the notion that when learners feel autonomous, they are more likely to engage meaningfully.
- **Relatedness** encircles autonomy, highlighting that a sense of connection with others is important for learners to feel supported, and motivated. Social interaction and collaborative learning environments enhance autonomy by establishing a community that value students' opinions.
- **Competence** is the outermost layer, demonstrating the larger support system that enables learners to feel effective and successful in their learning activities. Competence is developed through carefully constructed instruction, inclusive methods, and tools such as AI. This tool assists in simplifying difficult content and facilitate diverse learner needs.

Limitations and conclusions

This study contributes significantly into the intersection of ChatGPT use and Self-Determination Theory (SDT) in educational settings. The results indicated that ChatGPT can be applied to students' learning activities in higher education institutions. Furthermore, the study emphasizes practical pedagogical implications, providing educators with practical strategies to integrate AI tools like ChatGPT effectively into learning environments. Although this study was carefully designed certain limitations still do exist. Although convenience sampling may be a practicable method, it is not without its limitations and potential biases. The sample may not accurately represent the broader population, resulting in skewed results. Therefore, other forms of sampling should be taken into account in future studies. Future research might broaden the scope by evaluating educators' perspectives and conducting a longitudinal study. The study recognised the value of ChatGPT as a teaching and learning aid and recommended further experimental research to assess its effectiveness. Also, future studies should include AI-powered language learning tools, such as Duolingo, ELSA Speak, Grammarly, and Speak to assess

the generalisability of the suggested framework and identify new insights in various platforms.

Declarations

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