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# Self-directed Learning Using ChatGPT Positively Affects Student Engagement

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# Self-directed Learning Using ChatGPT Positively Affects Student Engagement

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## Abstract

As artificial intelligence transforms education, ChatGPT has emerged as a tool for learning, reshaping how students engage with academic material. This study investigates ChatGPT's influence on student engagement among Filipino college students, focusing on self-management and intentional learning—two critical dimensions of self-directed learning. Findings indicate that students who actively use ChatGPT in terms of self-directed learning exhibit increased motivation, deeper understanding of course materials, and greater confidence in independent learning. The results further highlight that self-management skills, such as goal-setting and time management, significantly enhance engagement levels, while intentional learning fosters curiosity and persistence. However, while ChatGPT supports autonomy, excessive reliance on it may pose risks to critical thinking and originality. These insights provide valuable implications for educators and policymakers seeking to integrate AI-driven learning while maintaining academic integrity. This study contributes to the evolving discourse on AI-enhanced education.

## Introduction

The productive evolution of artificial intelligence (AI) brings new opportunities in the field of learning. AI introduces advanced tools in education with the capability to transform conventional teaching and learning processes (Adiguzelm et al., 2023). Moreover, in recent years, self-directed learning has gained prominence as a practical approach to education, empowering learners to take ownership of their learning journeys and pursue knowledge according to their interests and needs.

Interest in AI advancements are growing in many fields. This has led to the development of sophisticated AI, such as ChatGPT, which has the potential to support and enhance self-directed learning experiences. Furthermore, self-directed learning can take place both inside and outside of formal educational institutions where learners have the autonomy to take initiative and responsibility for their own learning as they are free to set their personal goals and choose what they are interested to learn (Loeng, 2020). The emergence of AI-based conversational agents, like ChatGPT, may offer a new avenue for supporting self-directed learning by providing learners with an interactive and personalized learning environment.

ChatGPT, a state-of-the-art language model developed by OpenAI, has demonstrated remarkable capabilities in generating human-like responses in conversational settings. It leverages deep learning techniques and vast amounts of pre-trained data to engage in an interactive dialogue with users and has been investigated by many researchers. Also, it has been reported that chatbots, such as ChatGPT, may connect to a broad range of audiences, while being capable of providing the information needed in an operational environment (Adamopoulou & Moussiades, 2020). By leveraging ChatGPT's conversational abilities, learners may engage in dynamic and adaptive interactions, seeking guidance, clarifications, and resources tailored to their specific learning objectives. ChatGPT may become a tool that aids the independence and autonomy of learners, which has the potential to increase motivation and engagement among learners (Firat, 2023). Baidoo-Anu and Owusu Ansah (2023) suggest that ChatGPT possesses the ability to perform complex tasks that are valuable in education. Among Thai students, ChatGPT is regarded as an invaluable asset providing instant feedback, query resolution, and comprehensive academic aid (Limna et al., 2023). Huallpa (2023) emphasizes that Latino-American students use it to supplement human judgment and knowledge, whereas Bonsu and Baffour-Koduah (2023) illuminates its utilization for investigative purposes among Ghanaian college students.

Although ChatGPT may occasionally generate incorrect information and produce harmful instructions or biased content affecting the validity and credibility of the information it gives, ChatGPT is still a powerful tool in education and hence proper cautions and guidelines must still be implemented while using it (Tlili et al., 2023). While ChatGPT has gained popularity in the international research arena, there is a noticeable gap in studies on its application within the context of the Philippines. There remains, in this current setting, a significant opportunity to explore self-directed learning using ChatGPT. Hence, this study seeks to answer the following research questions:

1. What is the level of engagement among Filipino students?
2. What is the level of self-directed learning using ChatGPT among Filipino students?
3. Do the variables of self-directed learning using ChatGPT have significant effects on student engagement?

## Method

### Research Design

This research used a non-experimental, cross-sectional, and descriptive-correlational design to describe the variables and investigate the relationship of self-directed learning using ChatGPT and student engagement among Filipino college students in the National Capital Region, Philippines. Coe et al. (2017) explain that descriptive research design describes a sample/population, while Wilson and Joye (2016) describe correlational design as a form of research in which the researcher examines the direction and strength of the relationship between two or more variables (Thomas & Zubkov, 2023). It is noteworthy to mention that descriptive-correlational analysis only measures the variables and their relationship, not causation.

### Sampling

The quality of the research depends on the adequacy of the sampling strategy employed (Berndt, 2020). In this

study, convenience sampling was utilized. According to Andrade (2020), convenience sampling involves drawing a sample from a conveniently accessible source. However, it is essential to note that this sample may not accurately represent the larger population. Therefore, the findings based on convenience sampling can only be generalized to the portion of the population from which the sample is drawn, rather than the entire population.

**Data Collection**

We used an online questionnaire via Google Forms to gather data on the topic in the month of April 2023. To prevent redistribution to non-random respondents, we established clear criteria, monitored for inaccuracies and duplicates. Once collected and verified, we organized and tabulated data in Microsoft Excel and SPSS version 26.

**Respondents**

This study included a sample of 107 college students from the Metro Manila area in the Philippines. They all utilized ChatGPT. The sample comprised 57 (53.3%) male participants, 48 (44.9%) female participants, 1 (0.9%) non-binary/non-conforming participant, and 1 (0.9%) participant who preferred not to disclose their gender. The respondents represented various fields of study, with engineering being the most prevalent, accounting for 83 (77.6%) participants. The next was science and technology, with 12 (11.2%) participants. Teacher education, others, and arts programs had lower representation, comprising 6 (5.6%), 4 (3.7%), and 2 (1.9%) respondents, respectively. Furthermore, all respondents surveyed, aged between 18 and 25, stated that they were single.

**Instrumentation**

This study utilized the Likert scale, which is a commonly employed method for measuring attitudes, beliefs, and opinions. In the context of this research, Likert scales were used to assess the extent of students' perceived level of engagement and self-directed learning using ChatGPT. Cronbach's alpha was used to test the reliability of the research instrument. The questionnaire was designed to ensure participant confidentiality, and it took approximately 10 minutes to complete. A letter was provided at the beginning of the survey to provide context for the questions.

The survey consisted of three sections. The first section focused on collecting demographic information. Following that, the second section explored students' level of engagement. The third section inquired about students' self-directed learning using ChatGPT. The questions from the survey were adapted from self-directed learning with technology scale (Timothy et al., 2010) with a total of six items with a subcategory of intentional learning with four items ($\alpha = .85$) and self-management with two items ($\alpha = .63$); and an ultra-short measure for work engagement (Schaufeli et al., 2017) with three items ($\alpha = .95$).

Additionally, Demir and Yurdugül (2013) mentioned the reliability coefficient for the self-management factor of the two-item scale was a little low. According to Gliem and Gliem (2003), a scale's quantity of items can partially affect its Cronbach alpha reliability coefficient. According to George and Malley (2003) (reported in Gliem &

Gliem, 2003), a Cronbach alpha coefficient of.50 to.60 is acceptable. Because of this, when the SDLRS dependability coefficients were examined, they were found to be at a sufficient level.

For uniformity in this paper, adopting the definition by Schaufeli et al. (2017), we define student engagement as a positive emotional and cognitive state, marked by vigor, dedication, and absorption. Meanwhile, following Timothy et al.'s (2010) definition, we term self-directed learning using ChatGPT as the independent use of its features for personalized learning experiences, marked by self-management and intentional learning.

**Reliability**

Reliability is the measure of internal consistency of the constructs in the study. Internal consistency reliability was assessed using Cronbach's Alpha. According to George and Mallery (2003), Cronbach's Alpha value above 0.90 indicates excellent internal consistency, above 0.80 is good, above 0.70 is acceptable, above 0.60 is questionable, above 0.50 is poor, and below 0.50 is unacceptable (Saidi and Siew,2019). However, Cronbach's alpha coefficient between .50 and .60 is acceptable as stated by George and Malley (2023). Table 1 reveals the result of the Directed Learning with Technology Scale with 6 items (α = .91); intentional learning with four items (α = .96) and self-management (α = .61), and the ultra-short measure for work engagement has three items (α = .81) were found reliable.

Table 1. Reliability Test: Self-directed Learning using ChatGPT and Student Engagement

| Indicators | Cronbach's Alpha (α) | Mean |
|---|---|---|
| Self-directed learning | .91 | 6 |
| Intentional | .96 | 4 |
| Self-management | .61 | 2 |
| Student engagement | .81 | 3 |

**Ethical Considerations**

This study adhered to the guidelines outlined in the Data Privacy Act of 2012. The researchers strictly ensured that individual information obtained during the study was not and will not be disclosed. observed during the data collection process, with no compensation or coercion involved. Participation was entirely voluntary, and individuals were free to decide whether or not to take part in the study based on their own volition.

**Data Analysis**

In this research, quantitative analysis was conducted using IBM SPSS version 26. The questionnaire responses were obtained from Google Forms and imported into the software for analyzing the responses the participants gave. Descriptive statistics were employed to assess the frequency and percentage distribution of the data, mean, standard deviation and net agreement rating.

The frequency and percentage distribution were used for the demographic profile of the respondents. The mean and standard deviation scores were computed for each aspect of self-directed learning using ChatGPT and student's level of engagement. The mean scores for student's level of engagement were interpreted based on the following scale: "Strongly Disagree (1.00 –1.74)", "Disagree (1.75 – 2.49)", "Agree (2.50 – 3.24)", "Strongly Agree (3.25 – 4.00)".

The student's self-directed learning using ChatGPT was evaluated using a rating scale with the following categories, ranked from lowest to highest: "Strongly Disagree (1.00 – 1.74)", "Disagree (1.75 – 2.49)", "Agree (2.50 – 3.24)", "Strongly Agree (3.25 – 4.00)". The researchers analyzed the mean scores of the responses to identify if self-directed learning using ChatGPT has a significant effect on student engagement. In addition, the net agreement rating with the frequency and percentage distribution will substantiate the mean and standard deviation of the responses. Additionally, because the data used in this study were ordinal and nonparametric, Spearman's rho correlation was a suitable statistical analysis to use to determine whether self-directed ChatGPT learning has a statistically significant positive effect on student engagement (Prion and Haerling, 2014). Based to the "rule of thumb" for interpreting Spearman rho, rs results are as follows: 0 to 0.20 is negligible, 0.21 to 0.40 is weak, 0.41 to 0.60 is moderate, 0.61 to 0.80 is strong, and 0.81 to 1.00 is considered very strong (Prion & Haerling, 2014).

## Results

### The Level of Engagement Among Filipino Students

The primary objective of this study was to assess the level of engagement among students. Table 2 provides insights into the level of student engagement based on the survey results. The mean scores for the three survey items indicate a consistent agreement among students. The scores ranged from $\bar{x}$= 3.13 (agree) to $\bar{X}$= 3.15 (agree), with an overall grand mean score of 3.14 (SD = 0.34), suggesting that, on average, students perceive themselves as actively engaged in their studies.

Table 2. Weighted Mean and Standard Deviation: Student Engagement

| Engagement | Construct | $\bar{X}$ | *SD* | Interpretation | 4 | 3 | 2 | 1 | Total | Net Agreement Rating |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. At my school, I feel bursting with energy. | Vigor | 3.13 | 0.41 | Agree | 16 | 90 | 0 | 1 | 107 | 98.10 |
| 2. I am enthusiastic about my studies. | Dedication | 3.15 | 0.43 | Agree | 18 | 88 | 0 | 1 | 107 | 98.10 |
| 3. I am immersed in my studies. | Absorption | 3.14 | 0.35 | Agree | 15 | 92 | 0 | 0 | 107 | 100.0 |
| **Grand Mean** | | **3.14** | **0.40** | **Agree** | **49** | **270** | **0** | **2** | **321** | **98.77** |

A closer look at the specific survey items reveals that students expressed agreement with feeling a sense of vigor while at school, as indicated by a mean score of $\bar{X}$= 3.13 (SD = 0.41), net agreement of 98.10 (n = 90 agree, 84%). This suggests that students reported experiencing a burst of energy, which may contribute to their overall engagement. Furthermore, students also expressed enthusiasm about their studies, with a mean score of $\bar{X}$= 3.15 (SD = 0.43), net agreement of 98.10 (n = 88 agree, 82%) indicating dedication about their academic pursuits. Lastly, students reported being immersed in their studies, as evidenced by a mean score of $\bar{X}$= 3.14 (SD = 0.35), net agreement of 100.00 (n = 92 agree, 86%) suggesting absorption and deep involvement on their academic tasks. These findings collectively indicate students' engagement in their studies.

**The Level of Self-directed Learning Using ChatGPT among Filipino Students**

The secondary objective of this study was to assess the level of self-directed learning using ChatGPT among students. According to the data presented in Table 3, the students agreed that self-directed learning using ChatGPT occurs, with scores ranging from $\bar{X}$ = 3.02 (agree) to $\bar{X}$ = 3.13 (agree). The most significant aspect of self-directed learning using ChatGPT ($\bar{X}$ = 3.08, SD = 0.54, net agreement rating = 87.88) reported by students was with intentional learning ($\bar{X}$ = 3.11, SD = 0.61, net agreement rating = 89.70). Students used ChatGPT to engage with information for their learning, including posting information and asking questions, while also critically evaluating the responses ($\bar{X}$ = 3.13, SD = 0.63, net agreement rating = 90.60).

Table 3. Weighted Mean and Standard Deviation: Level of Self-directed Learning using ChatGPT

| **Indicators** | ***X̄*** | ***SD*** | **Interpretation** | **4** | **3** | **2** | **1** | **Total** | **Net Agreement Rating** |
|---|---|---|---|---|---|---|---|---|---|
| **Self-management** | 3.05 | 0.58 | Agree | 41 | 158 | 0 | 15 | 214 | 86.05 |
| 1. I go to ChatGPT to ask questions about our lessons when I am not in school. | 3.02 | 0.77 | Agree | 22 | 75 | 0 | 10 | 107 | 81.40 |
| 2. I use ChatGPT to refine my thoughts and ideas about my work. | 3.08 | 0.60 | Agree | 19 | 83 | 0 | 15 | 107 | 90.70 |
| **Intentional Learning** | 3.11 | 0.61 | Agree | 93 | 313 | 0 | 22 | 428 | 89.70 |
| 1. I find out more information on ChatGPT to help me understand my lessons better. | 3.12 | 0.63 | Agree | 23 | 79 | 0 | 5 | 107 | 90.60 |
| 2. I use ChatGPT to work with information for my learning. | 3.13 | 0.63 | Agree | 24 | 78 | 0 | 5 | 107 | 90.60 |

| Indicators | $\bar{X}$ | *SD* | Interpretation | 4 | 3 | 2 | 1 | Total | Net Agreement Rating |
|---|---|---|---|---|---|---|---|---|---|
| 3. I use ChatGPT to become better at a skill that I am interested in e.g., learn a language. | 3.12 | 0.67 | Agree | 25 | 76 | 0 | 6 | 107 | 88.80 |
| 4. I use ChatGPT to learn more about a topic. | 3.08 | 0.65 | Agree | 21 | 80 | 0 | 6 | 107 | 88.80 |
| **Self-directed Learning using ChatGPT** | **3.08** | **0.54** | **Agree** | **93** | **313** | **0** | **22** | **428** | **87.88** |

Students reached a consensus on the following points: firstly, they acknowledged the importance of accessing additional information through ChatGPT to enhance their understanding of their lessons. Secondly, they recognized the value of utilizing ChatGPT as a tool to process and work with information in their learning endeavors. Thirdly, they acknowledged the potential of ChatGPT to aid in their skill development, citing language learning as a specific area of interest. Lastly, they agreed that ChatGPT serves as a valuable tool to expand their knowledge on different topics.

The study also found that the self-management ($\bar{X}$ = 3.05, SD= 0.58, net agreement rating = 86.05) was a significant factor. The findings revealed that students continued to agree on the existence of self-directed learning using ChatGPT in terms of managing themselves while addressing the following aspects: Firstly, they reported utilizing ChatGPT to ask questions about their lessons when they are not physically present at school ($\bar{X}$ = 3.02, SD= 0.77, net agreement rating = 81.40). They also acknowledged using ChatGPT to share and refine their thoughts and ideas related to their studies ($\bar{X}$ = 3.08, SD= 0.60, net agreement rating = 90.70).

**Significant Positive Effect of the Variables of Self-directed Learning Using ChatGPT on Student Engagement**

The primary aim of this study was to determine if the variables of self-directed learning using ChatGPT have significant positive effect on student engagement. Table 4 presents the analysis of the strength and direction of the relationship between self-directed learning using ChatGPT and student engagement. A bivariate Spearman's rho correlation coefficient (r) was calculated. The bivariate correlation analysis revealed that both self-management ($r = .39$, $p<.001$) and intentional learning ($r = .40$, $p<.001$) positively affects student engagement but weak. Overall, self-directed learning has a moderately positive effect on student engagement ($r = .423$, $p<.001$), two tailed which is statistically significant. Therefore, the null hypothesis that there is no positive effect of self-directed learning using ChatGPT on student engagement is rejected. This suggests that as self-directed learning using ChatGPT increases, student engagement also increases, and vice versa.

Table 3. Weighted Mean and Standard Deviation: Level of Self-directed Learning using ChatGPT

| | Student Engagement | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Spearman's rho** | **Interpretation** | **p-value** | **Decision** | **Remarks** |
| Self-management | .39 | Positively Weak Relationship | 0.001 | Reject $H_o$ | Statistically Significant |
| Intentional Learning | .40 | Positively Weak Relationship | 0.001 | Reject $H_o$ | Statistically Significant |
| **Self-directed Learning** | .42 | Positively Moderate Relationship | 0.001 | Reject $H_o$ | Statistically Significant |

## Discussion

### Level of Engagement among Students

An objective of this study was to assess the level of student engagement. According to the survey results, students perceive themselves as actively engaged in their studies on average. This is similar to what Amora et al. (2016) found that Filipino college students are engaged. This study revealed that the agreement expressed by students regarding feeling a sense of vigor while at school suggests that they experience a high level of energy and enthusiasm in their academic environment.

Meanwhile, the demonstration of enthusiasm by students regarding their studies signifies their strong interest and passion for learning. Plus, the reported immersion of students in their studies suggests that they are deeply involved and engrossed in their academic tasks. All this is analogous to the findings of Schaufeli and Bakker (2004) which imply that when students experience vigor and dedication, they are less likely to feel exhausted or cynical in their academic endeavors.

### Level of Self-directed Learning Using ChatGPT

Our other objective was to examine the level of self-directed learning using ChatGPT. The highest level identified in our study was intentional learning, which refers to a mentality of perceiving every experience as an opportunity to acquire new knowledge or insights, ultimately leading to self-directed learning. Our findings indicate that ChatGPT has become a great tool for self-directed learning. This aligns with the contention of Biswas (2023) that ChatGPT can indeed serve as a tutor or mentor, offering guidance and support throughout the learning journey, and has the ability to create personalized learning objectives and strategies for self-directed learners based on their specific needs and interests. However, Lo (2023) pinpointed that although it has the potential to serve as a virtual tutor to students, it is still associated with challenges such as generating incorrect or fake information.

Zhai (2022) mentioned that AI systems, such as ChatGPT, can lack the personal touch and engagement that human teachers provide, which poses a challenge in maintaining learners' interest and motivation. However, our study

yielded different results, indicating that the learning engagement using ChatGPT was relatively high among the students surveyed. They did not express low interest or motivation in using ChatGPT as a tool for self-directed learning. This is supported by a study by Cotton et al. (2023) stating that ChatGPT has the potential to provide various advantages in higher education, such as enhancing student engagement.

Importantly, it should be highlighted that based on the survey results, ChatGPT contributes toward self-directed learning; and possesses the capability to process information with accuracy, efficiency, systematicity, and informativeness (Zhai, 2022). The impact of this phenomenon may raise the benefits of integrating ChatGPT into education.

Additionally, our study shed light on exploring the effects of ChatGPT on student engagement and how it positively contributes towards self-directed learning. In line with our objectives, a study conducted by Firat (2023) supports the notion that ChatGPT, with its functions as a tool for self-directed learning, has the potential to enhance learning outcomes, foster encouragement, and increase motivation for learning. Furthermore, our findings revealed that ChatGPT not only serves as a tool for instructions but also a tool for modernized independent learning, fostering self-directed learning of the learners. As Tsai (2023) mentioned, ChatGPT serves as a valuable tool for students to engage in exploring various solutions, evaluating alternatives, and making informed decisions while it actively encourages self-directed learning by empowering students to take ownership of their educational journey.

**Significant Positive Effect of Self-directed Learning Using ChatGPT on Student Engagement**

Our third goal was the investigation of the effect of self-directed learning using ChatGPT on student engagement. The results show that self-management and intentional learning, which are subcategories of self-directed learning, have a positive relationship on student engagement. These findings suggest that when students adopt self-directed learning practices using ChatGPT, specifically by effectively managing their learning process and approaching it intentionally, they experience higher levels of engagement. This implies that encouraging students to take ownership of their learning, set goals, and be purposeful in their interactions using ChatGPT can foster a more engaged learning experience.

This result is consistent with the research conducted by Ali et al. (2023), highlighting the positive effect of ChatGPT's generation of interest in the students. As ChatGPT has become integral to education, it is important to recognize its influence on student engagement and idea generation. Additionally, Zhai (2022) discovered that ChatGPT offers benefits to researchers, facilitating the writing of logical, accurate, systematic, and informative papers. It is worth noting that learner engagement is significantly influenced by both intrinsic and extrinsic motivation, as highlighted by Liu et al. (2022). It is essential to understand how these types of motivation can affect students' use of ChatGPT. Students may, for instance, be naturally driven to engage using ChatGPT because they have a personal interest in the technology, or the topics being covered. On the other hand, extrinsic motivation, such as receiving immediate feedback or recognition from ChatGPT, can also influence their engagement.

Furthermore, the development of information and communication technologies and the increase in virtual learning opportunities have transformed the way people perceive learning, emphasizing the importance of self-directed learning. ChatGPT may empower and enhance student engagement that promotes learner-centric education. In this globalized and technologically advancing world, individuals who cannot manage their learning processes face challenges in various domains (Karatas & Arpaci, 2021; Taskin, 2019). Self-directed learning entails individuals taking charge of their learning journey by setting goals, organizing access to learning resources, and demonstrating traits such as openness, curiosity, autonomy, and initiative (du Toit-Brits & van Zyl, 2017).

The rapid development of information and communication technologies and the emergence of virtual learning opportunities have highlighted the necessity of self-directed learning in a society that is constantly changing and driven by technology. ChatGPT plays a pivotal role in empowering students and fostering learner-centric education, enabling individuals to take control of their learning journey and thrive in a rapidly changing global landscape.

**Practical Implications**

This study revealed that there is a significant positive effect of self-directed learning using ChatGPT on student engagement. This means that students can benefit from incorporating self-directed learning using ChatGPT into their educational journey.

First, the results imply that self-directed learning using ChatGPT can enhance student autonomy. By using ChatGPT, students have the opportunity to further learn outside of traditional classroom settings. This increased level of autonomy enables students to delve deeper into subjects that personally resonate with them, fostering a sense of independence and empowerment in their educational pursuits. For instance, students can leverage ChatGPT to access a wide range of resources, ask specific questions, and receive personalized guidance. They have the freedom to establish their own learning objectives, devise study plans, and monitor their progress using ChatGPT's assistance. This cultivates a proactive learning mindset, motivating students to take ownership of their academic journey.

Moreover, the noteworthy positive effect of self-directed learning using ChatGPT on student engagement suggests that this approach encourages students to actively participate in the learning process. ChatGPT's interactive nature and ability to provide instant feedback can foster a dynamic learning experience that captivates students' attention and maintains their interest. ChatGPT, for example, can simulate discussions and conversations, allowing students to engage in thought-provoking dialogues or problem-solving exercises. This interactive experience can boost student motivation and stimulate critical thinking skills. By actively participating in their learning through ChatGPT, students can develop a deeper understanding of the subject matter and cultivate a genuine passion for learning.

Lastly, the insights gleaned from the study hold valuable implications for policymakers, aiding them in informed decision-making and the development of effective measures to enhance student engagement. By recognizing the

pivotal role of self-directed learning using ChatGPT in fostering engagement, policymakers can devise strategies to capitalize on its benefits and address potential challenges.

**Limitations and Directions for Future Research**

The study's positive findings regarding self-directed learning using ChatGPT and student engagement suggest the need for further research. To enhance the validity and generalizability, future studies should consider larger and more diverse samples. Qualitative research methods, such as interviews and focus groups, can also provide deeper insights into this phenomenon. We suggest topics that relate to the exploration of students' experiences regarding the effectiveness of ChatGPT in facilitating self-directed learning, and the investigation of factors that hinder or facilitate student engagement when utilizing ChatGPT for self-directed learning.

The data's inherent limitation lies in its dependence on self-reporting, solely reflecting the perceptions of students. Notably, we did not correlate this data with academic performance, progress, or the quality of work. Moving forward, integrating these aspects could enhance the depth and applicability of future analyses. The study's sample size restricts the generalizability of the findings, as it focused on a small number of participants due to time constraints. Future research should aim to include larger and more diverse samples to enhance the external validity of the findings. We also recommend exploring self-directed learning based on the subject matter studied and the level of study.

The study's findings may have been influenced by the educational setting and/or technological advantages. Therefore, the results may not necessarily apply universally across all educational contexts. Future research should consider examining the effects of self-directed learning using ChatGPT in different contexts (e.g., vocational, technical) to determine the extent to which the findings can be generalized. The study's design may have introduced biases that could impact the results. For instance, self-selection bias may have occurred if participants who chose to engage in self-directed learning using ChatGPT already had a higher intrinsic engagement. Another note to consider is that the use of ChatGPT ultimately hinges on the discretion and ethical choices of each student. While it stands as a learning tool offering vast educational potential, its application can also veer toward unethical practices.

Also, harnessing ChatGPT's potential effectively demands an approach involving modeling, instruction, and demonstrating how to utilize prompts and assess their results. Absent this guidance and framework, there's a risk that ChatGPT might hinder engagement and autonomous learning. Amid the ongoing advancements in artificial intelligence within academic settings, the craft of prompt engineering becomes pivotal in equipping students with the necessary proficiency to wield language models adeptly (Giray, 2023; Giray et al., 2024). This empowerment enables them to boldly venture into enriching their academic pursuits.

## Conclusion

The study results underscore the positive effect of self-directed learning using ChatGPT on student engagement,

highlighting the significance of empowering students to assume control over their educational journey and leverage AI resources. Specifically, the variables of self-management and intentional learning, which form the essential components of self-directed learning, were identified as factors positively influencing student engagement. These outcomes emphasize the transformative potential of enabling students to explore their areas of interest more deeply, establish meaningful learning objectives, and actively interact using ChatGPT to enrich their educational experiences. Thus, these findings contribute significantly to the expanding body of research exploring the advantages of utilizing AI in promoting student engagement and facilitating self-directed learning processes.

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