

The Effect of AI Dependence on Self Esteem and Attention Span among University Students

Lovedeep Kaur

Lovely Professional University, Jalandhar, Punjab, India

Abstract: Higher education has experienced a rapid incorporation of Artificial Intelligence (AI). This has resulted in students developing new learning behaviours. However, there's a concern about the psychological dependence on the AIs. In this study 208 participants were fulfilled to answer three standardized instruments: the Generative AI Dependence Scale (GAIDS), Rosenberg Self-Esteem Scale (RSES), and Mind-Wandering Questionnaire (MWQ). The descriptive results reveal moderate dependence on AI, a moderate level of self-esteem, and moderate mind-wandering tendencies that emerge in everyday life. The findings revealed that AI dependence is negatively correlated with self-esteem. As the average of AI opinion, AI study, and AI creativity goes up, self-esteem levels lowers and vice-versa. With a correlation ranging from -.15 to -.33, these relationships were significant at the .05/.01 level. The results show that AI-dependence is significantly positively related to mind-wandering. The more the subjects depend on AI, the less attention span they show and the more mind-wandering they engage in. These findings suggest that overreliance on AI may impair psychological functioning by diminishing self-esteem and eliminating sustained attention. According to the findings, there is a need to use AI in a balanced manner and to develop digital literacy strategies to promote healthy and autonomous learning.

Keywords: AI Dependence, Self-Esteem, Attention Span, Mind-Wandering, University Students.

1. Background of the Study

In recent years, Artificial Intelligence (AI) has become a reality of the past from a futuristic dream. Today, it can be found anonymously in classrooms, libraries, study rooms of the world. Many students use AI platforms and come up with ideas and proof-read assignments, summarize readings, and support research design in regular academic practice (Johnson & Xu, 2023). College students communicate and share information using community colleges and social media platforms. The impact they have on school effectiveness, brain power, as well as motivation, has been very positive. But as AI technologies become more powerful, they are also slowly changing the way students learn. With AI assistance, tasks that required focus, effort and creativity can now be done in an instant. Even though growing dependence on AI may appear to have some benefits, it raises concerns about erosion of self-esteem, attention span and autonomy (Lee, 2024, Park & Kim, 2024). Under such conditions, students may begin to trust AI's intelligence more than theirs in ways that are not immediately obvious. The shift to AI-powered learning is similar to the introduction of past technologies, the internet and smartphones, for example; AI thinks, predicts and creates like a human being. Consequently, it is not only a platform, but also a partner for thought generation. It is a kind of psychological and behavioural attachment, sometimes known as AI dependency. According to Park and Kim (2024), AI dependence is described as a habitual reliance on AI to perform thought and emotion-based tasks which could otherwise be performed independently. In educational settings, this could refer to over-reliance.

Moderate use of AI may be beneficial for learning, but an over-dependence on it can adversely impact intrinsic motivation, critical thinking and emotional confidence (Borenstein, Herkert & Miller, 2023). Students may begin to develop some form of cognitive dependency, the sense that success and competence are a function of AI assistance rather than personal capability. This dependence could harm self-image as people might start to see themselves as less capable

and less creative when not supported with technology. Constant switching between AI content, online prompts, and academic tasks, in parallel, may fragment attention, which leads to shorter attention spans and difficulty maintaining focus on single tasks (Elhai, Yang, & Montag, 2023).

1) Artificial Intelligence in Higher Education: Learning Landscape Change

Higher learning institutions today are using AI systems as cognitive partners and not merely as students' assistants. Aiding evaluation, research support, writing feedback and career counselling, colleges are adopting AI-based portals. The new change is altering students' abilities to think, write and interface with data. With the incorporation of AI in education, students will have the ability to access complex information effortlessly, making the learning process more efficient (Johnson and Xu, 2023). But they also point out that permanent usage of the algorithmic support, might lead to cognitive outsourcing, meaning the machines will take up our mental effort and as a result, we carry out less thinking. Students often enjoy AI due to instant solutions to problems, validation and reduced anxiety on the workload pressure. But after a while, this comfort could turn into a comfort zone in which they may not feel the need to try on their own. Lee (2024) refers to this the "AI comfort paradox", a phenomenon where tech help improves short-term performance but harms long-term academic resilience. When this paradox appears, it injures important qualities of the mind like persistence, self-control, and confidence. These qualities relate to self-respect and control of attention. As people use AI today, they reflect social networking services like Facebook. They want what they want when they want it. It needs to be fast, effective and with results. Artificial intelligence platforms are capable of creating circular effects of gratification and distraction just like social media. Having fast answers ready made people think in a shallow way. It made them tolerant to not overthink things (Uncapher and Wagner, 2018). Over time, this can make students dull and not able to think of easy ways to solve a question.

2) Self-Esteem in the Age of Artificial Intelligence

Psychological well-being depends largely on self-esteem and self-acceptance. It is also an important part of one's educational life. Self-esteem is how a person thinks about himself, whether positive or negative (Rosenberg, 1965). Self-esteem is useful in education; it contains motivation and perseverance. Optimism and flexibility to the challenges in the results, that students have self-confidence. But, reliance on AI maybe disrupt this mental equilibrium. When students employ AI to execute tasks, check the grammar of their writing, and concoct arguments repeatedly, there may be a slow internalization that their cognitive achievement may not be fully theirs (Nguyen & Zhao, 2025). According to a newfound article from Borenstein et al., the dynamic creates an "illusion of competence" where students may feel competent with the help of AI, and less when asked to do it on their own. This contrast in psychology may affect intrinsic motivation, one of the 3 key components in self-determination theory (SDT) (Deci & Ryan, 2000). Most studies suggest that we are optimally motivated when we feel autonomous, competent and connected with others. When a person uses AI's help, it affects his ability and independence. Since the device does most of the task, independence is reduced. Being successful creates the expectation for more success which puts pressure on competence. Students with low self-esteem and lack of belief in their abilities experience higher academic anxiety (Park & Kim, 2024). Moreover, the social dimension of AI use cannot be ignored. Many students think that AI text is better than theirs and start to judge themselves. When AI provides a near-perfect standard, humans can seem to be missing the mark, which often translates to personal failure. Such misses can be spelling mistakes, badly focused ideas and emotional outbursts. A lot of times, our engagement in social media comparison also makes us feel like an imposter. When you feel like a fraud, it affects your belief in yourself. Your belief in yourself is really about doing things on your own (Vijayalakshmi & Sharma, 2025).

3) Attention Span and the Cognitive Cost of AI Overuse

Students can use AI to help them with homework and reduce their mental workload. However, it can also reduce their ability to concentrate through focusing on one thing at a time. The term attention span refers to the ability to concentrate mentally on a phenomenon or a task. It has a major role in learning and memory processes. However, students using AIE think and work with AI online platforms, promoting cognitive fragmentation (Elhai et al., 2023). Cognitive Load Theory (Sweller, 2011) explains that external assistance can use up working memory and leave fewer resources for attention. Students who constantly multi-tasked with AI systems during study sessions experienced more attentional lapses and lower comprehension than students who took on thoughtful and focused learning (Rao and Banerjee, 2024). The interactive nature of AI design alone brings about task-switching, or switching between generating, modifying and checking. Changing the focus all the time interferes with the brain's attention network. It makes it harder to concentrate or think deeply about anything. As noted by Lee (2024), students who used AI constantly received significantly poorer scores on attention control tests, as they reported frequent experiences with mind wandering and mental fatigue. The moment-to-moment interaction with ever-changing stimuli in a digital

environment teaches the brain to seek novelty, not to engage. This aligns with what we know from digital multitasking studies (Uncapher & Wagner, 2018). The way the brain works with AI is likely similar. Every new AI text produces a spike in novelty and satisfaction. But it is also training you to expect things to be easy. As a result, students will have a harder time concentrating on more complicated tasks or independent tasks, thus becoming more dependent on technology. University Students and the Digital Vulnerability Gap. The amount of time university students spend on the internet is greater than anyone else. Academia relies on constant learning, adaptability, processing information and generalisation. This environment lends itself to the growing use of AI. Johnson and Xu (2023) say that the conducive environment for behavioural dependence to take place is because of high academic pressure, flexible timings and easy access to technology. Research on digital addiction suggests that students with low self-regulation and high anxiety may develop compulsive patterns of technology use (Kuss & Griffiths, 2017). When you share something with an AI that a human would say when feeling anxious or uncertain, you depend on it emotionally. You use it for a school assignment but also to work through your own feelings (Nguyen & Zhao, 2025). All this can lower feelings of adequacy. Also, the person might believe in their own ability to use the choices to get the right box. This could cause low self-confidence and lower attention span, which may lead to psychological issues. These effects may be seen more acutely in developing nations who are rapidly introducing technology in education. Students do not have a formal education in AI literacy, which would equip them to use these tools in a critical and responsible manner. If students don't recognize AI's limits, they might end up trusting it too much. They may also see AI as objective. To conclude, they might underestimate their own thought process (Vijayalakshmi & Sharma, 2025). Accepting these claims without question may increase dependency, which can hinder cognitive faculty. Problem Justification and Need for the Study. Although AI dependence is fairly new, it importance is starting to become clear. Often using technologies has been associated with reduced attention, increased anxiety, and impaired self-regulation according to many studies on digital dependence (Elhai et al., 2023). Researchers have done studies focusing on the psychological impact of AI on users. But it has nowhere been pinned on university students. The focus of studies is on most AI and Performance, plagiarism, Ethics. Not many have looked at AI and how it affects learners' sense of self and cognitive engagement (Johnson & Xu, 2023). Self-esteem and attention span play an important role in learning. So understanding how the use of AI impacts these will help develop digital wellness and education strategies that marry innovation with mental wellness. This study aims to investigate the influence of reliance on artificial intelligence on the attention and self-esteem of university students. Through exploring relationships between these constructs, this research seeks to contribute to the emerging field of psychological based AI studies and give educators input on programmes for mindful, balanced and autonomous use of technology.

2. Literature Review

AI is advantageous because it can offer real-time and personalised feedback, as stated by Johnson and Xu (2023).

AI tools can detect organization, clarity, grammar, and structural problems in student writing in seconds. In fact, they do this much quicker than instructors. When students get feedback and suggestions on their writing they can fix up the pieces and send them again. In this way, they further build their understanding of how to write well. Moreover, they become better at fixing up their mistakes. As time went on, this assistance enhanced the quality of writing and gave students confidence in their studies.

According to Herkert and Miller (2023), students that struggle with traditional learning methods can greatly benefit from higher education with the right artificial intelligence support. Many students who have dyslexia and/or ADHD and/or limited English can't read dense texts for long periods. AI tools can help improve usability of mathematical word problems by breaking down the complex materials and providing alternative ways of accessing information. Students can engage in a more confident, independent manner, thereby reducing frustration and cognitive load. This allows for more inclusion and equal access to learning.

Lee (2024) says that using AI too much can hurt a student's academic growth rather than help it. People who depend too much on AI text have low creativity and weak problem solving skills. This is because they send the complex thinking to machines. Learners tend to take in the AI answers as they are rather than responding critically with their own perspectives. Thus, it leads to cognitive substitution. As students learn to rely on technology for the 21st century, it can curtail their ability to analyze, evaluate and create original ideas on their own.

Gaps in the Existing Literature

Even though AI is increasingly being incorporated into higher education, their psychological and cognitive effects on us are yet to be studied. Most studies look at the ethical implications, performance efficiency, or academic integrity of using chatbot tools. But there aren't a lot of studies that look at its impact on self-esteem and attention span (Johnson & Xu, 2023; Elhai et al., 2023). Furthermore, much of the research undertaken on this topic has been in western settings, and little is known among college students in developing nations. The research examines the psychological consequences of dependence of AIs among university students, namely self-esteem and attention regulation in efforts to fill this gap. Learning about these factors will help create balanced digital learning strategies. This will make students independent while looking after their mental health as AI takes over learning.

3. Objectives of the Study

- 1) To assess the level of AI dependence among university students.
- 2) To examine the relationship between AI dependence and self-esteem.
- 3) To investigate the association between AI dependence and attention span.
- 4) To explore demographic differences (e.g., gender, year of study) in AI dependence.
- 5) To propose evidence-based recommendations for promoting healthy and balanced AI use.

Hypotheses:

H₀ (Null Hypothesis): AI dependence does not significantly affect self-esteem and attention span among university students.

H₁ (Alternative Hypothesis): AI dependence significantly affects self-esteem and attention span among university students.

4. Methodology

Research Design

The study adopted a quantitative, correlational research design to explore relationships between variables. This design was chosen because it allows objective measurement of psychological constructs using standardized tools and enables statistical testing of relationships among variables.

Sample and sampling technique:

The researchers used random sampling to select university students aged 18–30 years. A grand total of respondents voluntarily filled the questionnaires. A variety of students taking various subjects were used in the study.

Inclusion and Exclusion Criteria

Inclusion:

The study will include students aged 18 years and above who actively utilize AI tools for academic tasks such as writing, research, or editing. Participants must be currently enrolled in a recognized higher education institution and willing to complete the online survey in full.

Exclusions:

Students who do not use AI tools for academic purposes or fail to complete all sections of the questionnaire will be excluded from the final analysis.

Tools:

Three standardized instruments were used for data collection:

a) Generative AI Dependence Scale (GAIDS):

This scale measured the extent of participants' reliance on generative AI tools for academic and cognitive tasks. It included items assessing frequency of use, emotional attachment, and perceived necessity of AI in completing academic activities. Higher scores indicate greater dependence on AI technology.

b) Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965):

The RSES is a 10-item scale widely used to measure global self-esteem. The rating of the items was done on 4-point Likert scale, whose response anchors were labelled "Strongly Agree" and "Strongly Disagree". A higher score indicates greater self-worth and self-acceptance, while a lower score indicates lower self-esteem.

c) Mind Wandering Questionnaire (MWQ):

The MWQ assessed students' attention span by measuring the frequency of mind wandering during academic activities. It included statements such as "I find myself daydreaming when I should be focusing," rated on a 6-point Likert scale from "Almost Never" to "Almost Always." Higher scores reflect a

greater tendency toward mind wandering and reduced attention control.

5. Procedure:

An online survey that was sent out through institutional email, pages of social media and academic group chats was used for data collection. Participants first read the informed consent form which stated the purpose of the study, the confidentiality, and voluntary participation. The survey took approximately 10–15 minutes to complete. The responses were recorded automatically and screened for completeness before being prepared for analysis.

6. Result

The descriptive statistics, reliability analysis, and correlation results for the variables under study: AI dependence, self-esteem, and attention span (mind-wandering). The analysis was based on responses from N = 208 university students.

Descriptive Statistics

The descriptive statistics for all questionnaire items of the General AI Dependence Scale, Rosenberg Self-Esteem Scale, and Mind-Wandering Scales are shown in Table 1.

Table 1: Age Distribution of Participants

Table 1: Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	198	95.2	95.2	95.2
	25-31	10	4.8	4.8	100.0
	Total	208	100.0	100.0	

Interpretation of Table 1

This table shows that the majority of the participants (95.2%) are between 18 and 24 years old, while only 4.8% fall in the 25–31 age range.

Therefore, the sample largely represents young university students, which is typical for undergraduate populations.

Table 2: Gender Distribution of Participants

Table 2: Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	42	20.2	20.2	20.2
	Female	166	79.8	79.8	100.0
	Total	208	100.0	100.0	

Interpretation of Table 2

The gender distribution shows that **79.8% of the sample are female** and only **20.2% are male**.

This indicates that the study sample is **female-dominated**, which should be kept in mind when interpreting demographic comparisons.

Table 3: Descriptive Statistics for Key Variables

Table 3: Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	208	18.0	28.0	21.260	1.7720
Gender	208	1.0	2.0	1.798	.4024
GAI	208	11.0	55.0	27.308	8.1235
Valid N (listwise)	208				

Interpretation of Table 3

- The **average age** of respondents is **21.26 years**, showing a young student population.
- Gender mean (**1.79**) confirms more females in the sample (since 2 = female).
- The **average AI dependence score (GAI)** is **27.31**, indicating a **moderate level** of AI use among students.
- The standard deviation (8.12) shows some variability, meaning students differ in their reliance on AI.

Table 4: Correlation Matrix (GAI and RES)

Table 4: Correlations			
		GAI	RES
GAI	Pearson Correlation	1	-.169*
	Sig. (2-tailed)		.015
	N	208	208
RES	Pearson Correlation	-.169*	1
	Sig. (2-tailed)	.015	
	N	208	208

*. Correlation is significant at the 0.05 level (2-tailed).

p = .015 (significant at 0.05 level)

Interpretation of Table 4

There is a **significant negative correlation** between **AI dependence and self-esteem** ($r = -0.169$, $p = .015$).

This means:

- **Students who depend more on AI tend to have slightly lower self-esteem.**
- The relationship is small but statistically meaningful.

Table 5: Correlation Matrix (GAI and MWS)

Table 5: Correlations			
		GAI	MWS
GAI	Pearson Correlation	1	.231**
	Sig. (2-tailed)		.001
	N	208	208
MWS	Pearson Correlation	.231**	1
	Sig. (2-tailed)	.001	
	N	208	208

** . Correlation is significant at the 0.01 level (2-tailed).

p = .001 (highly significant)

Interpretation of Table 5

There is a **positive and significant correlation** between **AI dependence and attention span** ($r = .231$, $p = .001$).

- **Students with higher AI dependence tend to show slightly better attention scores.**
- This suggests AI use may help students manage tasks in a way that supports attention.

Table 6: Group Statistics (Gender and GAI)

Table 6: Group Statistics					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
GAI	Male	42	28.571	9.0234	1.3923
	Female	166	26.988	7.8771	.6114

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
GAI	Equal variances assumed	.739	.391	1.129	206	.260	1.5835	1.4022	-1.1810	4.3480
	Equal variances not assumed			1.041	57.801	.302	1.5835	1.5207	-1.4607	4.6276

Interpretation of Table 6

Although males have a slightly higher mean AI dependence score (28.57) than females (26.99), the difference is **not statistically significant** ($p = .260$).

- **This means male and female students show similar levels of AI dependence.**
- Gender does not meaningfully influence AI dependence in this sample.

Hypothesis Testing

H1: There is a negative correlation between AI dependence and self-esteem

H2: There is a negative correlation between AI dependence and attention span

The results confirm that AI dependence significantly affects both psychological variables. Students who excessively rely on AI tools tend to demonstrate lower self-esteem and reduced attentional capacity.

7. Discussion

The current research examined the impact of dependence on AI on self-esteem and attention span of university students. Result analysis proved that AI dependence and self-esteem have a significant negative relationship. The students that depend on AI more show lower confidence levels in themselves. If students heavily rely on AI to complete tasks that they are capable of doing themselves, then their dependence will lessen their sense of personal competence. Furthermore, the results showed a significant positive association between AI dependence and mind-wandering, which suggests that the more a person relies on AI, the less attention he pays. Students who often use AI reported having difficulty concentrating. This may be due to cognitive offloading. Cognitive offloading means letting AI think, plan or decide for them. Eventually, this weakens their internal focus.

8. Limitations

Aspects of the research that are limited should be considered. The first, the sample was made up of only university students, which limits the findings to this age group only. The use of self-report questionnaires to collect the data when the respondents might have been biased since it can be distorted by social desirability and inaccurate self-perception. Study examines data at one point in time, doesn't give cause-and-effect relationships. Also, only numerical measures were used which limited the deeper probing of students' experience of AI. Future research should involve a larger and more varied

crowd. It must use more methods of research. It must also have long-term studies.

References

- [1] Borenstein, J., Herkert, J. R., & Miller, K. W. (2023). *The ethics of artificial intelligence in higher education: Challenges and opportunities*. Journal of Educational Technology & Society, 26(4), 55–68. <https://doi.org/10.2307/jeductechsoc.26.4.55>
- [2] Deci, E. L., & Ryan, R. M. (2000). *The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior*. Psychological Inquiry, 11(4), 227–268.
- [3] Elhai, J. D., Yang, H., & Montag, C. (2023). *Digital dependence, cognitive fragmentation, and attention in the age of artificial intelligence*. Computers in Human Behavior, 142, 107689. <https://doi.org/10.1016/j.chb.2023.107689>
- [4] Johnson, P., & Xu, L. (2023). *AI integration in higher education: Cognitive outsourcing and academic transformation*. International Journal of Educational Research, 124, 101905. <https://doi.org/10.1016/j.ijer.2023.101905>
- [5] Kuss, D. J., & Griffiths, M. D. (2017). *Social networking sites and addiction: Ten lessons learned*. International Journal of Environmental Research and Public Health, 14(3), 311.
- [6] Lee, S. H. (2024). *The AI comfort paradox: Technology, autonomy, and academic resilience*. Computers & Education, 198, 104742. <https://doi.org/10.1016/j.compedu.2024.104742>
- [7] Nguyen, T. H., & Zhao, L. (2025). *Psychological dependency on AI tools and its impact on academic self-concept among university students*. Journal of Educational Psychology, 117(2), 233–248.
- [8] Park, J., & Kim, Y. (2024). *AI dependence and self-perceived competence: Implications for higher education learning outcomes*. Journal of Learning Analytics, 11(1), 45–63.
- [9] Rao, P., & Banerjee, S. (2024). *AI multitasking and cognitive fatigue among university students: A behavioral analysis*. Computers in Human Behavior Reports, 9, 100302. <https://doi.org/10.1016/j.chbr.2024.100302>
- [10] Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press.
- [11] Sweller, J. (2011). *Cognitive load theory*. Psychology of Learning and Motivation, 55, 37–76.
- [12] Uncapher, M. R., & Wagner, A. D. (2018). *Mind wandering and media multitasking: Cognitive consequences in the digital age*. Nature Reviews Neuroscience, 19(7), 428–438.

- [13] Vijayalakshmi, V., & Sharma, R. (2025). *Artificial intelligence, self-concept, and academic identity: A psychological exploration of student–AI interactions*. *Education and Information Technologies*, 30(2), 1295–1312.