Research Journal of Psychology (RJP)

Online ISSN: 3006-7219
Print ISSN: 3006-7200
Volume 3, Number 1, 2025, Pages 11 – 22
Journal Home Page
https://ctr.rjmss.com/index.php/19/about

Impact of AI Dependence on Procrastination among University Students

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ARTICLE INFO

Article History:

Received:	*December*	*05, 2024*
Revised:	*December*	*26, 2024*
Accepted:	*December*	*30, 2024*
Available Online:	*January*	*03, 2025*

Keywords:

AI dependence, Procrastination, University Students

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ABSTRACT

This study investigated the impact of AI dependence on procrastination among university students by contributing to the understanding of over reliance on AI and its outcome as procrastination. The sample of the study was comprised of (N=113) university students, aged between 18 and 35 from various academic disciplines and universities Multan. Cross-sectional, quantitative methods were utilized, along with the convenient sampling technique. Data was collected through google forms. A self-structured demographic sheet along with the two scales was used in this study. Dependence on Artificial Intelligence Scale (DAI) (Morales-García et al., 2024), evaluated the extent of dependence that university students exhibit towards artificial intelligence. The Tuckman Procrastination Scale (TPS) (Tuckman, 1991), measured the level of procrastination among students. Results revealed that AI dependence is positively correlated (r=.241), and predicts (p=.010*) the procrastination. This overreliance on AI results in higher tendency of procrastination among students. However, no significant difference was found in level of education and area of residence regarding AI dependence and procrastination among university students.*

Introduction

Now a day, the world is experiencing rapid advancements in technology, with artificial intelligence becoming an important part of education, enhancing learning experiences and providing personalized support to students. These advancements not only enhance the efficiency of learning tools but also substitute a more engaging and interactive learning environment, allowing students to explore subjects according to their needs. In this world of digital learning, educators are increasingly utilizing AI-driven platforms to adapt instruction and assessments. As a result, the traditional classroom dynamic is evolving, encouraging collaboration between students and AI systems that can adapt to various learning styles and preferences. This advancement not only makes students for a technology-driven future but also empowers them to take ownership of their learning journey.

AI frequently responds to student inquiries in real-time, providing instant feedback and assistance that enhances understanding (Sajja et al., 2024). These tools have also fostered collaboration among students, enabling them to work together on projects and assignments more efficiently through intelligent platforms that facilitate communication and resource sharing. AI tools not only assist students in their academic tasks but also help them communicating and suggesting them new strategies for effective study habits and time management, ultimately empowering them to take greater control of their educational journey. This shift towards AI-driven education is transforming traditional learning environments, making them more adaptive and personalized to meet the diverse needs of every student (Strielkowski et al., 2024).

Delineation of Artificial Intelligence (AI)

Artificial intelligence has many definitions; some people consider it as a computer assisted programs that allows the machines to work efficiently and give better results. AI is basically a human-made technology that work for mankind to help them simplify their work and other processes (Kaplan & Haenlein, 2019). In other word, it is an intelligence that is made by human and verified by machines. There are two types of artificial intelligence; first is weak AI and second is strong AI. Weak AI performs small tasks like voice recognition, face recognition or internet search and is commonly used in daily life (Tai, 2020). Even though weak AI performs effectively and help man-kind in daily life but some thought that it is not that good because it can cause some disruption in electrical network. On the other hand, strong AI also called artificial general intelligence (AGI) is a long-term goal of many investigators. It has the ability to do tasks that human being can and also solve their problems efficiently. We can say that strong AI basically work as human mind, work intelligently and have perceptions and beliefs that are commonly attributed by humans (Tai, 2020).

If we want to do our work more effectively without taking a pause and in short time, AI is very helpful in this way. It is human nature that they are always in search of something that work for them faster, easier and more efficiently (Tai, 2020). So, they make tools that simplify any hardships and complete their work better, faster and efficiently. It is noticed that the use of AI has become more common from the last few years, students are introduced from the open AI chatbots which works as generative AI tool (Dodd, 2023). So, AI brings significant changes in technological world in higher education for both teachers and learners (Cotton et al., 2024). These chatbots helps in performing various roles. AI chatbots helps teachers and students for their academic purposes and also provide them emotional support.

AI is more common in young adults mostly the college and university students. They use AI in most forms like voice assistant (Siri, Alexa, chatbots (meta-AI, replica) etc. 55% of adults use these AI tools for their searches and homework assignments (Bleu). In the past era, people use TV, smart phones radio, social media etc. but AI take the place of these by increase interaction of the young adults. It acts as an agent that actively solve the problems of people (Castelfranchi, 1998). The adults are in their development phase in which there are several changes in brain functioning. So now these adults are surrounded by the environment in which the generative AI is used for various purposes like entertainment, researches, learning and other recommendations. As AI is available 24/7, it is more beneficial for students. They can use it in their free hours for their learning purpose as it responds immediately. Mostly, students use AI tools to complete their assignments, but most students thinks that they become more dependent on these AI tools that will affect their critical thinking, their creativity and making them lazy and dependent on these AI tools (Network, 2023).

Artificial Intelligence (AI) Dependence

Dependence on AI is defined as excessive reliance on AI technologies, leading to problematic behaviors such as increased laziness, misinformation, decreased creativity, and reduced critical thinking. It is influenced by academic self-efficacy, academic stress, and performance expectations (Zhang et al., 2024). AI has become commonly used tool among students that enhances their learning experience, providing access to vast resources and personalized assistance in various subjects. AI helps students to work more efficiently by automating repetitive tasks, allowing them to focus on critical thinking and problem-solving skills that are essential for academic success (Pedro et al., 2019). But students become dependent on AI tools, which can lead to a decrease in their ability to think independently and develop essential skills such as research and analysis. By using artificial intelligence, students may unintentionally limit their engagement with the material, relying on technology to provide answers rather than cultivating their own understanding and insights. Thus students lack face to face interaction and may miss out on valuable collaborative learning experiences that come from discussing ideas and concepts with peers and instructors (Park et al., 2020). They are becoming isolated and may struggle to communicate effectively in group settings, which is crucial for both academic and professional environments.

Hence, the dependence on technology can limited the development of skills such as teamwork, communication, and problem-solving, ultimately impacting their readiness for the workforce. This may reduce student’s creativity and ability to think critically, as they become familiar to seeking quick answers instead of engaging deeply with the material. So, there is a need to re-evaluate the balance between technology use and traditional learning methods, developing an environment that encourages active participation, collaboration, and critical thinking among students (Zhang et al., 2024) There is also a problem of ethics and privacy concerns that arise from the extensive use of technology in educational settings, as students' personal data may be collected and misused without their consent. So the need is that students should use AI as an assistant for help not for replacing their own efforts in learning, ensuring that they develop essential skills such as problem-solving and independent thinking while still benefiting from the advantages technology offers.

Procrastination

Procrastination establishes when individuals “voluntarily defer an intended course of action despite anticipating that the delay will result in adverse consequences” (Steel, 2007). Certain individuals manifest a disposition to procrastinate tasks until a subsequent occasion (i.e., chronic

procrastinators), while others might partake in such actions only in particular contexts (Li et al., 2022). “I shall undertake the task tomorrow.” It's a familiar dialogue. It is the essential expression spoken by habitual procrastinators and those who prefer to defer significant endeavors in favor of pursuing brief and immediate satisfaction. Procrastination have two categories; one is personal procrastination and the other is situational procrastination (Vestervelt, 2000). The first one i.e. personal procrastination is that in which individual delay everything or postponed everything like tasks activities and responsibilities constantly. It is the tendency of individual to postponed every activity without any reason and it becomes chronic with the time (Vestervelt, 2000). The second one is situational procrastination. In this type of procrastination, individual postponed tasks or activities in specific situation. So, situational procrastination is situation specific (Kayri & Çokluk, 2016).

Procrastination is common now a day, affecting individuals across various age groups and backgrounds, often leading to increased stress and decreased productivity in both personal and professional spheres (Jayalakshmi & Punithavalli, 2024). It can manifest in various forms, such as delaying tasks, avoiding responsibilities, or getting unfocused by distractions, ultimately delaying one's ability to achieve goals and meet deadlines (Senécal et al., 1995). Procrastinators can be perfectionists who set excessively high standards for themselves, leading to a fear of failure that further worsens their tendency to delay important tasks, but some individuals procrastinate their tasks due to a lack of motivation or interest in the work at hand, making it challenging for them to engage fully and commit to completing their responsibilities. So, individuals sometimes delay tasks unconsciously, which can create a cycle of stress and anxiety as deadlines approach. This is because of their fear of not meeting expectations, which can lead to sense of low motivation that hinders their ability to take action and make progress on their tasks (Ferrari & Pychyl, 2000). On the other hand, the individuals who delay their tasks consciously are often aware of their behavior and may justify it as a way to prioritize other activities or cope with intense feelings. They are aware of their delaying behavior but prioritize unimportant tasks over those that require immediate attention, ultimately leading to excessive responsibilities and increased pressure as deadlines come closer.

Procrastination is notably common within academic environments among both undergraduate and graduate students, exceeding various cultural demographics and gender differences (Ozer & Ferrari, 2011). Research indicates that individuals exhibit a greater tendency to procrastinate when the perceived likelihood of success in performing the task is reduced, when the expected benefit or enjoyment is minimal, or when there exists a prolonged interval between the execution of the task and the reception of the associated cost or benefit. Rorer (Rorer, 1983) has recently give a summary of procrastinator behavior. This behavior is the result of fear of failure (Burka & Yuen, 1983). When students has given some difficult task, they usually show unwillingness that cause procrastinator behavior (Sommers, 1985). In the view of Rorer (Rorer, 1983), it is actually not the fear of failure or success, but it’s actually the fear of possible outcomes of success. He explains that one’s anxiety increases as a result of success that causes procrastination as unpleasant outcomes are associated with enjoyable events (Ellis & Knaus, 1977).

Procrastination, by its nature, lacks any adaptive value within human behavior, as it contributes to unfavorable long-term outcomes, including reduced well-being and low performance in achievement contexts. Procrastination is regarded as a relatively enduring characteristic, commonly described as a “weakness of the will,” which relates to the voluntary delay of a planned course of action, although the expectation of negative consequences arising from the delay (Steel, 2007). Consequently, procrastination is suggested to differ from strategic delays of action and

appears to significantly influence maladaptive behaviors among students in higher education settings (Schneider & Preckel, 2017). It is posited that males show high procrastination when compared to females, while isolated rates of procrastination seem to decrease with aging, as individuals implement more advanced self-regulation techniques to reduce maladaptive behaviors (Steel, 2007; Steel & Ferrari, 2013). In the relative study of different concepts that either promote or delay students' achievement-oriented behaviors and overall well-being within higher education, procrastination emerges as the idea associated with the most harmful consequences for students (Schneider & Preckel, 2017; Steel, 2007).

Literature Review

The impact of AI dependence on procrastination among university students is multidimensional, with AI both contributing to and mitigating procrastination. AI's role in education has been linked to increased procrastination due to factors such as excessive reliance on technology and the flexibility of online learning platforms, which can lead to delays in task completion. However, AI also offers tools for predicting and managing procrastination, suggesting a complex relationship between AI use and procrastination behaviors. A study in chines higher education students confirms that AI dependence can foster procrastination among students (Zhong et al., 2024). The flexibility offered by AI-driven online learning platforms can lead to increased procrastination, as students may delay tasks due to the lack of structured schedules (Adiyansah, 2024). AI can be used to predict academic procrastination by analyzing online learning behaviors, such as task completion times and engagement levels, using classification algorithms. These predictive models can serve as early warnings for students, potentially reducing procrastination by encouraging timely task completion and maintaining learning enthusiasm (Shu & Miao, 2021).

Literature indicated that procrastination is a prevalent phenomenon among students. In this study, Tuckman procrastination scale was used in its translated version and shows significant results. The results of this study showed that the procrastination in academics is correlated with the specific course characteristics. This study also highlights the importance of need satisfaction like autonomy, relatedness and competence (Bäulke & Dresel, 2023). Another study of China held in 2023 postulated that procrastination may be shaped by an array of both environmental and individual factors. The Results of this study indicated that procrastination can be due to negative emotions and it also highlights the gender differences related to procrastination (Liu et al., 2023).

Some studies suggest that the utilization of generative artificial intelligence could significantly affect the tendencies for procrastination within the student population (Shu & Miao, 2021). The employment of shortcuts, which may facilitate students in accomplishing academic assignments with minimal effort, is likely to establish habitual behaviors among them. Consequently, these shortcuts such as the engagement with ChatGPT, might produce procrastination among students. For instance, a student who becomes dependent on AI may perceive that they can finalize an academic task or project in a shorter duration and with reduced effort. Such perceptions of possessing control over their tasks are prone to motivate students to postpone these responsibilities until the eleventh hour, thereby ending in procrastination. Additionally, current evidence further suggests that the engagement with AI tools may raise a sense of laziness among students (Yilmaz & Yilmaz, 2023).

An investigation clarified that over 70% of university students concede to engaging in procrastination with respect to their academic responsibilities. When students utilize their mobile devices during study time, it requires the delay of their original academic responsibilities, showing

as behaviors symbolic of academic procrastination, such as delays in completing assignments, delay to classes, and delay of competitive events until the final day, among others (Longoni & Cian, 2022). A variety of cross-sectional studies reveals that procrastination is positively correlated with dissatisfaction in study experiences (Balkis & Duru, 2016; Fritzsche et al., 2003) and student's intentions to withdraw from their academic programs (Bäulke et al., 2022). Obtaining a deeper understanding of the interrelations among procrastination, study satisfaction, and dropout intentions could be particularly valuable for individuals, researchers, and academic institutions (Scheunemann et al., 2022).

Significance of Study

The importance of this research is found in which AI technology impacts essential academic behaviors, such as procrastination, among university students. As AI resources are easily available, students may be more dependent on these to seek help in learning, which may cause increase of their confidence and procrastination tendencies. Understanding this relationship is vital due to the correlation between AI dependence and procrastination. Furthermore, in the presence of AI, student may procrastinate in their educational tasks. This study aims to provide essential insights into the most effective strategies for enhancing student's academic performance with a detailed analysis of the connections among AI dependence and procrastination.

Objectives

1. The objective of the study was to examine the impact of AI dependence on procrastination among university students, also analyzing the demographic profile of the students.

Hypothesis

1. There will be a significant difference of AI dependence and procrastination among students regarding their level of education and area of residence.

2. AI dependence would be positively correlated to procrastination among university students.

3. AI dependence will impact procrastination among university students.

Methods

Research Design and Sample

Quantitative, cross-sectional method was used to measure the impact of AI dependence on procrastination among university students. non-probability, convenient sampling technique was employed to collect the sample of (*N=113*) undergraduate and postgraduate students, ages between 18 to 35 years from various public and private sector universities of Multan.

Instruments

Dependence on Artificial Intelligence Scale (DAI)

The Dependence on Artificial Intelligence Scale (DAI) (Morales-García et al., 2024), was used to evaluate the extent of dependence that university students exhibit towards artificial intelligence. The instrument comprised of five items and formatted in a Likert-type manner, offering five

distinct response alternatives that range from "Completely false for me" to "Describes me perfectly.

Tuckman Procrastination Scale (TPS)

The Tuckman Procrastination Scale (TPS) (Tuckman, 1991), 16 items adapted version for college students was used to procrastination among university students. It is a four-point Likert type scale; responses rang from “That’s me for sure” to “That’s not me for sure”. Four items were inverse coded i.e. 7, 12, 14 and 16. High score indicated high procrastination and vice versa.

Procedure

The data was collected from students of different universities, in order to collect the data, a google form containing consent form, demographic sheet and two main questioners was created and sent to the university students on the basis convenience.

Results

Table 1

Independent Samples t-test for Comparing AI Dependence and Procrastination among University Students (N=113).

	Undergraduates *(n=99)*		Postgraduates (n=14)					*95% CI*		
Variables	*M*	*SD*	*M*	*SD*	*df*	*t*	*p*	*LL*	*UL*	*Cohen’s d*
DAI	14.0	4.43	15.2	4.45	111	-.88	.377	-3.63	1.38	0.27
Procrastination	39.0	7.24	40.6	8.88	111	-.76	.448	-5.84	2.59	0.19

*p>.05.

Table 1 showed the non-significant difference of AI dependence and procrastination among undergraduate and post graduate university students.

Table 2

Independent Samples t-test for Comparing DAI and Procrastination among Rural Area and Urban Area University Students (N=1113).

	Rural Area *(n=24)*		*Urban Area (n=89)*					*95% CI*		
Variables	*M*	*SD*	*M*	*SD*	*df*	t	*p*	*LL*	*UL*	*Cohen’s d*
DAI	14.0	4.49	14.2	4.43	111	-.285	.776	-2.32	1.73	0.04
Procrastination	39.5	6.96	39.1	7.60	111	.267	.790	-2.94	3.87	0.05

*p>.05.

Table 2 displayed the non-significant difference of AI dependence and procrastination among urban and rural area university students.

Table 3
Correlation Coefficients for AI Dependence and Procrastination among University Students (N=113)

Variables	*M*	*SD*	DAI	Procrastination
DAI	14.23	4.432	--	
Procrastination	39.22	7.444	.241*	--

*p<.05.

Table 3 revealed that DAI is significantly positively correlated with Procrastination (r = .241*) among university students.

Table 4
Multiple Regression Analysis for impact of AI Dependence on Procrastination among University Students (N=113)

					95% CI	
Variables	*B*	*SE*	*t*	*p*	*UL*	*LL*
Constant	33.4	2.30	14.51	.000*	28.9	38.0
1. DAI	.66	.07	9.39	.010*	.098	.711

Note. ***p <.010.

Table 4 confirmed that R^2 value of .049 showed that the predictors defined 4.9% variance in the dependent variable, and the results showed that procrastination is positively predicted by AI dependence (β = .241, p = .010*).

Discussion

This study aimed to investigate the impact of AI dependence on procrastination among university students. University students tends to procrastinate when using AI tools. Students usually finds shortcuts for their academic tasks and use AI tools for their assignments. The results of this study showed a significant correlation between dependence on artificial intelligence (AI) and procrastination behaviors among university students, indicating that dependence on AI significantly influenced procrastination tendencies. This observation implied that an increased dependence on AI tools correlates with a high tendency to defer academic responsibilities. These findings provided a critical understandings of the interplay between modern technological advancements, particularly AI, and behavioral tendencies such as procrastination.

The noticeable correlation identified between AI dependence and procrastination highlighted the uncertain characteristics of AI tools within educational environments. Although these tools were made to boost efficiency and assist students in navigating academic challenges, an over dependence on them may precipitate procrastination by delaying the initiation or completion of tasks. For example, learners may defer writing assignments in the hope that AI will alleviate their workload. Such dependence may produce a misleading sense of readiness, resulting in reduced determination and, consequently, procrastination. Furthermore, the influence of AI dependence on procrastination could arise from students' diminished engagement in self-regulatory practices. These findings are similar with previous research that suggested a relationship between AI dependence and procrastination (Bäulke & Dresel, 2023). Prior investigations have indicated that instruments intended to enhance work processes can, unexpectedly, induce delays when excessively or improperly utilized. For instance, studies focusing on digital tools and

procrastination have revealed that students often postpone tasks when they regard technology as a supportive device (Swargiary, 2024).

AI technologies, encompassing writing assistants and content generation systems, are progressively assimilated within academic settings, providing learners with convenient solutions for executing writing assignments. Nevertheless, the findings indicate that excessive dependence on these technologies may unintentionally make worse procrastination. Historically, the phenomenon of procrastination has been related to variables such as dislike of tasks, inadequate time management strategies, and a decline in self-efficacy. The reliance on AI introduces a novel aspect, as students may regard writing assignments as less difficult due to the assistance provided by AI tools. Although this perception may alleviate initial anxiety related to tasks, it could also result in postponed engagement, as the immediacy and convenience afforded by AI tools instill a misleading sense of temporal control.

It is imperative to distinguish between constructive use and excessive reliance on AI tools. When employed judiciously, AI can increase productivity and enhance the quality of writing. However, the findings of this study suggested that students demonstrating significant reliance on AI may encounter challenges with intrinsic motivation and autonomy, both of which are vital for effective time management. In summary, while AI tools present certain advantages within academic frameworks, their unregulated application may contribute to procrastination and related complications. By promoting a measured approach to AI integration, academic institutions can assist students in effectively utilizing technology while safeguarding their self-regulation and productivity.

Conclusion

Conclusively, this research highlights a significant positive correlation between AI dependence and procrastination among university students, indicating that increased reliance on AI tools may lead to a greater tendency to procrastinate. The findings suggest that while AI can serve as a beneficial resource for students, its overuse may inadvertently contribute to delays in academic tasks. Importantly, the study found no significant differences in AI dependence and procrastination based on educational level or area of residence, suggesting that these factors do not influence the observed relationship. Overall, the research underscores the need for awareness regarding the potential negative consequences of excessive AI reliance, encouraging students to find a balance in their use of technology to enhance productivity and minimize procrastination. Future studies could explore interventions aimed at mitigating procrastination linked to AI dependence, further contributing to the academic discourse on technology use in education.

Suggestions and Implications

- This study would help to design policies and guidelines to use AI tools sensibly and ethically.
- Academic institutes and mentors should prioritize raising awareness among students regarding the potential hazards associated with excessive dependence on AI tools.
- Training initiatives could focus on educating time management and self-regulatory competencies, thereby ensuring that students utilize AI as helper rather than a replacement for their academic efforts.

- Developers of AI tools could mix functionalities that promote proactive behaviors, such as reminders, goal-setting options, or mechanisms for tracking progress. These features could serve to decrease procrastination by enhancing responsibility and awareness.

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