



“TECHNOLOGY, AI AND MENTAL HEALTH”

Artificial Intelligence Dependency and Psychological Well-Being: The Mediating Role of Self-Efficacy Among Students



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Abstract

Artificial intelligence (AI) has become an integral part of modern life, significantly influencing cognitive processes, decision-making, and psychological well-being. While AI enhances efficiency, accessibility, and productivity, its excessive use may lead to dependency, cognitive overload, and reduced self-efficacy. The present study examines the relationship between AI use and mental health among students, with self-efficacy serving as a mediating variable. A quantitative research design was employed, and statistical analyses, including correlation, regression, and mediation analysis, were conducted. The findings revealed that AI use significantly predicts mental health outcomes; however, this relationship becomes non-significant when self-efficacy is introduced, indicating full mediation. The study highlights that balanced AI usage enhances well-being, whereas over-dependence may impair cognitive functioning and increase psychological distress. The findings emphasise the importance of digital self-regulation and strengthening self-efficacy to ensure healthy interaction with AI technologies.

Keywords

Artificial Intelligence, Mental Health, Self-Efficacy, Cognitive Overload, Technology Dependency, Psychological Well-being, Digital Behavior



Research Statement

This study aims to examine the relationship between artificial intelligence use and mental health among students, with self-efficacy serving as a mediating variable.

1. Introduction

Artificial intelligence has become an essential part of human life, influencing how individuals think, learn, and interact. With the increasing integration of AI into academic and personal domains, students rely on AI for problem-solving, decision-making, and even emotional support. While AI simplifies tasks and enhances efficiency, it also raises concerns regarding psychological dependence and reduced cognitive engagement.

Philosophical perspectives emphasise the importance of mental discipline in maintaining psychological well-being. According to the Bhagavad Gita (Chapter 2, Verse 66), mental peace and wisdom are interconnected, suggesting that disciplined use of tools leads to stability, whereas uncontrolled dependence may lead to imbalance. Similarly, Chapter 6, Verse 6 highlights that the human mind can be both a companion and an adversary, depending on how it is controlled.

In the modern context, excessive dependence on AI may lead to reduced independent thinking, cognitive decline, and increased psychological strain. Therefore, it becomes important to understand whether AI acts as a supportive tool or a source of dependency. This study aims to examine the impact of AI use on mental health, with a particular focus on the mediating role of self-efficacy.

2. Historical Background of Artificial Intelligence

Early conceptual roots of AI can be traced back to classical philosophy. Aristotle developed formal logic systems that introduced rule-based reasoning, which later became fundamental to computational logic (Russel & Norving, 2021). In 17th century, René Descartes proposed mechanistic views of human cognition, suggesting that the reasoning process could follow systematic rules.

Later on, the term AI was coined in 1950 by an English mathematician, Alan M. Turing, to determine whether a computer can “think” & “solve” problems as humans do. This is called the Turing test.

“Father of artificial intelligence”, John McCarthy came up with the term “Artificial Intelligence”. During the Dartmouth conference, a computer language called LISP was coded and is still used in AI today.

In Early 1950s and 60s was exciting phase of AI research, with scientists like Allen Newell and Herbert A Simon creating programs that could solve logic problems.

After a decade, Joseph Weizenbaum in 1966 simulated psychotherapeutic conversation, although in simple terms, it demonstrated the psychological impact of machine-mediated interaction. He demonstrated the earliest natural language processing program, ELIZA.

3. Literature Review

Several psychological theories explain the relationship between AI use and mental health:

- **Transactive Memory Theory (Wegner, 1985):** Individuals store information in ex-

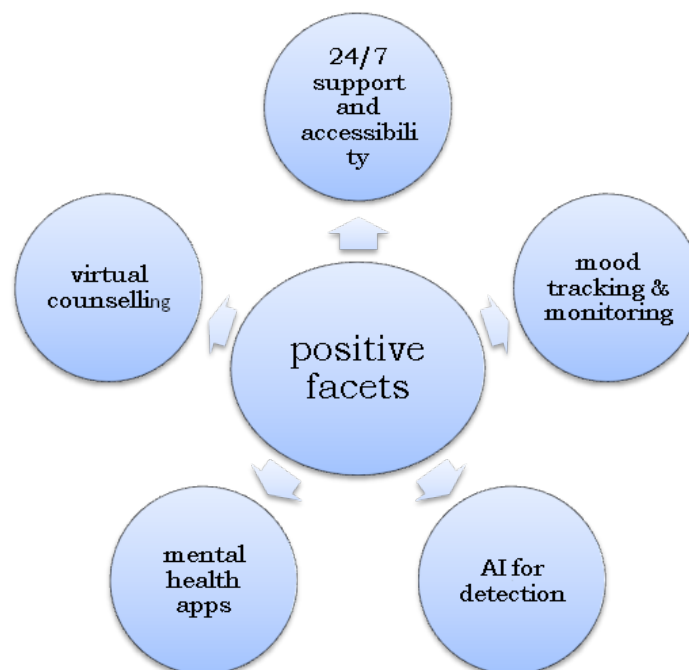
ternal systems such as AI, reducing internal memory usage and cognitive engagement.

- **Learned Helplessness Theory (Seligman, 1975):** Continuous reliance on external assistance may reduce confidence and create a sense of helplessness.
- **Self-Efficacy Theory (Bandura, 1997):** Belief in one's ability decreases when individuals depend excessively on AI for tasks.
- **Attachment Theory (Bowlby):** Emotional reliance on AI may replace human interactions, leading to social withdrawal.
- **Behavioural Addiction Model (Griffiths, 2005):** Excessive AI use may lead to addiction-like symptoms such as withdrawal and dependency.

These theories collectively suggest that while AI can enhance human functioning, over-dependence may negatively impact mental health.

4. Facets of technology, AI on mental health

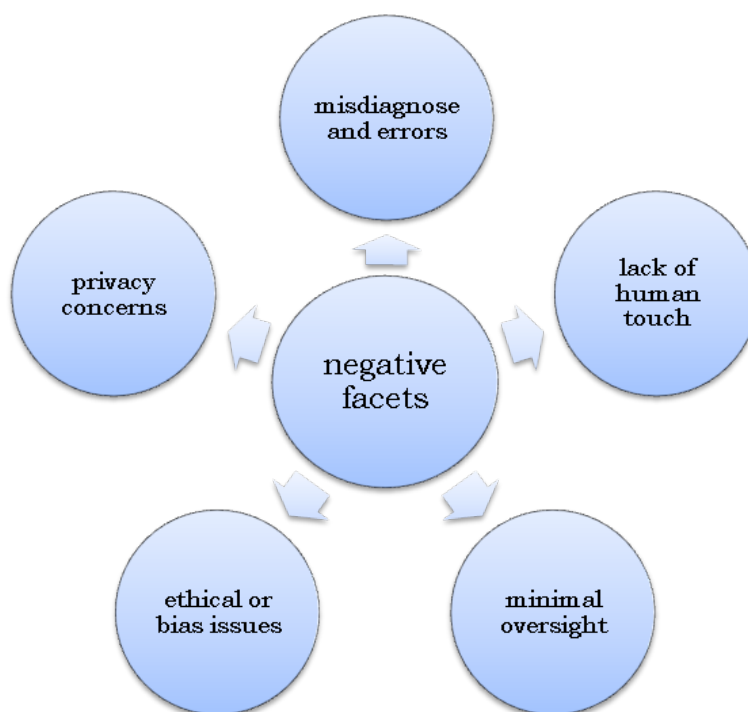
The different facets of technology, AI, are as follows-



- **24/7 support and accessibility-** Artificial intelligence is a new technology for completing daily tasks, with the help of which we can complete any task 24/7, or discover new opportunities in zero time, thereby reducing our over workload. AI can improve the decision making, by giving great choices. Also, the modernisation helps the living beings to use AI in a disciplined manner.
- **Mood tracking & monitoring-** AI can also improve mental stability by refining thoughts, shaping dreams, and giving the accurate path to achieve the goal in a specific period of time. AI can also ease the emotional strains by talking as a virtual companion to an individual. It helps to understand the inner conflicts and resolve them without any interruption in privacy.



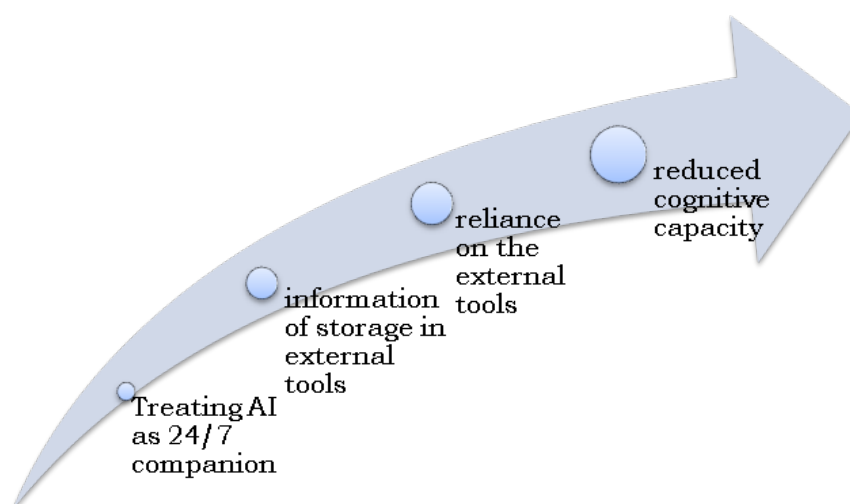
- **AI for detection-** AI is widely used for detection for medication time, for any government jobs, for any new updates, or for health monitoring, and also for any kind of warning signs for health or mental issues.
- **Mental health apps-** mental health apps that provide therapies, stress-relieving techniques, and also help you to focus on warning signs of mental disasters.
- **Virtual counselling-** AI provide virtual counselling, listens to whatever you tell them and often provides counselling according to the conflicts that you have in your mind.



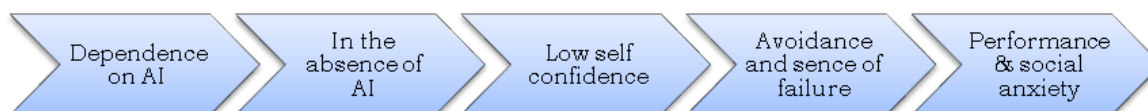
- **Misdiagnosis and error-** AI sometimes creates symptomatic diagnosis causes it has limited information, but human feelings and emotions are beyond AI; that's why AI sometimes shows errors in diagnosis.
- **Lack of human touch-** In the Amrita Bindu Upanishad, it is said that the Mind is alone responsible for the bondage and liberation. Excessive AI use can lead to psychological bondages and loss of human touch, while the wise use of AI can promote well-being.
- **Minimal oversight-** Individuals should have self-control over technology, where the AI can work as a server, not as a boss. It's been a long where the human started to depend on AI completely, and are losing oversight or having very minimal oversight.
- **Ethical or bias issues-** AI can be biased towards the users who are using technology AI differently. It depends on person to person. AI will answer you in the way as you ask the question.
- **Privacy concern-** AI maintains your privacy, but sometimes it interrupts your privacy with or without concern. AI can be hacked, and the remaining private information can

5. Human dependency on AI

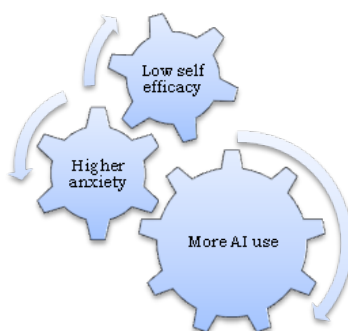
- **Transactive memory systems, Wegner (1985) proposed a theory**, in which he sentenced that individual restores their information in an external resources (for example- friend, phone, diary or etc). This theory shows that nowadays using AI as an official chit chat partner and having safe zone where an individual can restore the information for countless times. It can cause the reduction in cognitive capacity, where the human is completely depending on the AI, it reduces the external connections, and reduced memory encoding, lower the analytical thinking and increased reliance on AI for the decision making. Later on, **Ward et al (2017)** demonstrated that excessive presence of smart phones reduces cognitive capacity, shows reliance on external tools. Over-dependence can reduce the self-efficacy, and increase the performance anxiety and social anxiety when AI is unavailable.



- **Learned helplessness theory, Martin Seligmen illustrated** that when a person comes in repeated exposure of external controlled environment this leads an individual to believe that they lack personal ability. In concern of AI use, this theory explores that the individuals who uses AI continuously for writing, decision making, problem solving & workplace opportunities can face low self-confidence which later on results in low cognitive capabilities and uncertain self-questioning. In the absence of AI, peoples start to feel helpless, disrespected, and avoid work place presentation, which later on creates social anxiety and sense of failure.



- **Self-efficacy theory Albert Bandura**, sentenced that self-worth, is the belief in one's ability to perform tasks successfully. In the context of AI and mental health the excessive AI assistance reduces cognitive performance, experiences, decreased confidence, promotes avoidance of independent work. Which later on work as dependency cycle.

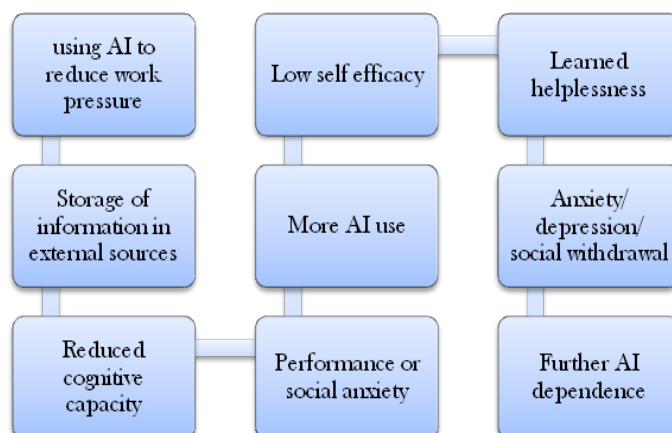


- **Attachment theory John Bowlby**, presented a theory in which he stated that humans' desires for secured emotional bond where they are not judged, not advised logically and constant availability and emotional validation. AI is a virtual friend of individuals which leading individuals towards the emotional reliance on AI, and avoidance of human interaction, this can lead to loss of social touch, loneliness paradox, reduced interpersonal skills.
- **Behavioural addiction model, Mark D. Griffiths (2005)**, presented that continuous over use of anything can lead to some core psychological components (salience, mood modification, tolerance, withdrawal symptoms, conflicts, and relapse).

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6. Integrated model of Human dependence on Technology, AI and mental health

The above-given theories have cleared that humans are completely dependent on AI for their work, for their emotions, their decision making & their emotional bondages or baggage.





Integrated model of Human dependence on Technology, AI and mental health shows that, human started using AI as a virtual partner, which helps out in reducing work pressure, which human felt safe to do. Later on, as human felt safety to use AI, they started using AI as a reminder, and virtual storage tool, which leads them towards reduced cognitive capacity and low self-efficacy. Due to over load of work individuals use more AI, in absence of AI individual start to feel performance or social anxiety, human feels helplessness which end up anxiety, depression and social withdrawal and further AI dependence.

7. Disadvantages of using AI over social interaction

There are many disadvantages as follows-

- AI is simulated so it cannot understand emotional depth.
- Individuals have a reciprocal relationship with AI. In which they show one-sided emotions.
- Accountability for any kind of action is absent.
- Low chances of high growth because of zero conflicts.
- AI has programmed empathy for individuals. It cannot provide complete feelings for an individual.
- AI cannot understand any kind of feelings.
- Individuals avoid social interactions and discussion which leads them immature social experience.
- Sometimes losing touch with the environment leads them towards the absence of support & help for their mental and social well-being.
- Excessive AI uses can decrease autonomy in an individual.

8. Research Methodology

Objective

To examine the relationship between AI use and mental health among students, with self-efficacy as a mediating variable.

Hypotheses

H₀: No significant relationship exists between AI use and mental health.

H₁: A significant relationship exists, mediated by self-efficacy.

Research Design

Quantitative and correlational design.

Variables

- Independent Variable: AI Use
- Dependent Variable: Mental Health
- Mediator: Self-Efficacy

9-Regression Model

$$Y = \beta_0 + \beta_1 (\text{AI Dependency}) + \beta_2 (\text{Cognitive Overload}) + \beta_3 (\text{Self-Efficacy}) + \beta_4 (\text{Social Interaction}) + \beta_5 (\text{Age}) + \beta_6 (\text{Gender}) + \varepsilon$$



Where:

- Y = Mental health outcome (Stress / Anxiety / Depression)
- β_0 = Intercept
- β_1 – β_4 = Regression coefficients for predictors
- β_5 – β_6 = Control variables
- ϵ = Error term

□ Paired Samples Statistics

Variable	Mean	N	Std. Deviation
Pretest	48.75	20	2.84
Posttest	57.65	20	3.30

10. Results

Paired Sample t-test

A significant difference was observed between pretest and post-test scores: $t(19) = 34.16, p < .001$

Correlation Analysis

- AI Use & Mental Health: $r = 0.42$
- AI Use & Self-Efficacy: $r = 0.51$
- Self-Efficacy & Mental Health: $r = 0.58$

Regression Analysis

AI use significantly predicted mental health and self-efficacy. However, when self-efficacy was included, the direct effect of AI on mental health became non-significant.

Mediation Analysis

The results confirmed **full mediation**, indicating that self-efficacy fully explains the relationship between AI use and mental health.

11. Discussion

The results of this study demonstrate that artificial intelligence has both positive and negative impacts on students' mental health, thus revealing its dual role as a useful tool and a cause of psychological dependence. On the positive side, AI can help in increasing productivity, access, and efficiency by alleviating workload and promptly providing answers to students' problems, be it academic or personal. Features such as prompt, real-time support, virtual counselling, and mood monitoring help improve time management and decrease cognitive load, positively contributing to one's psychological health, if properly used.

However, as the study suggests, artificial intelligence can also lead to negative psychological implications if overused. Over-dependence on artificial intelligence decreases cognitive engagement, independent thought, and problem-solving abilities. This effect can be described



in terms of ‘cognitive offloading’, where an individual chooses to use an external information processor rather than their internal cognitive faculties. Consequently, there may be reduced mental effort, memory, and analysis that eventually leads to cognitive load, emotional burden, increased anxiety and vulnerability to stress.

A significant finding in this study is the mediating role played by self-efficacy. Self-efficacy is defined as an individual’s belief that they are capable of successfully completing a task. As a mediating factor in the relationship between artificial intelligence usage and mental health, self-efficacy affects how individuals use AI in their lives. Those with high self-efficacy will utilise artificial intelligence as a means of assisting their existing efforts and enhancing performance without necessarily replacing their cognitive processes, whereas individuals with low self-efficacy will rely heavily on AI for answers to problems and validation of feelings. This dependency cycle will subsequently decrease students’ self-efficacy and increase reliance on artificial intelligence for cognitive and emotional functions. This could lead to lowered confidence and the development of performance anxiety and social isolation as seen through Bandura’s Self-Efficacy Theory which claims excessive reliance on external aid can diminish an individual’s agency and belief in oneself. Similarly, this also relates to the concept of Learned Helplessness where continuous reliance on an external aid will leave students feeling unable to operate without it.

In this study, the analysis of mediation indicates that self-efficacy acts as a full mediator between AI usage and students’ mental health. This proves that while the use of artificial intelligence itself doesn’t directly impact one’s mental health, its effect on one’s self-efficacy may have a detrimental or helpful influence. When self-efficacy remains high, artificial intelligence tends to aid students, however, it becomes detrimental and may eventually increase anxiety and distress when self-efficacy is low.

Additionally, findings from this study could be examined through the lens of Behavioral Addiction Model which highlights that addiction patterns with artificial intelligence use include compulsion, withdrawal, and reduced self-control. Similarly, Attachment theory could explain the strong relationship and attachment that students form with the use of AI, especially when they get readily available non-judgmental support and validation, reducing social interaction with real people thus resulting in the feeling of loneliness and loss of social skills.

In conclusion, the discussion emphasises that artificial intelligence can have both helpful and harmful effects and that the key factor that mediates these effects is self-efficacy. The use of AI as a supportive tool that enhances rather than replaces human cognition and emotional processes, coupled with high self-efficacy in users, could ensure that AI use is beneficial. It’s crucial to promote strong self-efficacy levels to avoid unhealthy dependence on technology, especially within the student population.

12. Conclusion

This study concludes that there is a significant mediating role of self-efficacy in the relationship between artificial intelligence use and students’ mental health. The results demonstrate that when self-efficacy is entered as a mediating variable into the model, the direct relationship between artificial intelligence use and students’ mental health becomes non-significant, suggesting that there is full mediation. It means that a students’ mental health is affected not only by whether or not they use AI, but also by how they perceive their own abilities in relation



to using it. Using artificial intelligence in a moderate and mindful way can benefit students in terms of increased efficiency, decreased work load, and improved psychological health, while an extreme dependency will result in reduced cognitive engagement, lowered self-efficacy, and increased vulnerability to psychological issues. In the long run, such a situation could contribute to impaired cognitive functioning and diminished decision-making skills. The study thus indicates that artificial intelligence should be a supportive tool and not a replacement for human cognition, emphasising the importance of maintaining high levels of self-efficacy.

13. Implications

Theoretical, practical and policy-related implications arise from the results of this study. Firstly, it can be used to encourage mindful use of artificial intelligence among educators and learners, educating both parties about the pros and cons of over-reliance on AI. Secondly, educational bodies should put an emphasis on cognitive skills, such as problem-solving abilities, analytical thinking and critical engagement, to promote human-centred learning instead of AI-dependence. Thirdly, artificial intelligence-based tools should work hand-in-hand with human-centred mental health care services to ensure the best and safest outcomes for users. Lastly, policies and ethical guidelines regarding AI usage can be drafted by the government focusing on privacy and prevention of over-dependence, especially among young users.

14. Limitations

There are several limitations within the study that need to be addressed. First, the sample size is small ($N = 20$), thus limiting the generalizability of the study's findings to a wider population. Second, the study was confined only to the students' population which means findings may differ for other groups such as working professionals or older people. Third, the study was based on self-report data, which may have introduced potential biases like social desirability, response set or subjective interpretation. Lastly, due to rapid and constant technological changes in AI, results could be out of date by the time they are reported.

15. Future Directions

Future research could build on the current study's findings in several ways. Future studies can analyse the same issues using a larger sample size as well as different user groups, i.e. Other than students. Another way to expand the study is to utilize a longitudinal design. Longitudinal studies could track changes over time in students' use of AI, as well as changes in their mental health, and study of other psychological factors that might contribute to these relationships such as digital literacy, emotional intelligence, resilience or different personality traits. Intervention studies focused on increasing self-efficacy and promoting self-regulated AI usage could also be undertaken to explore cause-and-effect relationships in more detail.



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