

A Study of Artificial Intelligence Impact on Mental Health and Academic Achievement of Higher Senior Secondary Level Student

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Abstract:

As artificial intelligence (AI) becomes increasingly integrated into educational systems, its impact on students' academic performance and mental health warrants urgent examination. This study explores how AI-based learning tools, recommendation algorithms, and virtual tutoring affect the cognitive load, stress levels, and academic achievements of higher senior secondary students. Using a mixed-method approach that includes survey data, academic performance metrics, and psychological assessments, the research investigates whether AI enhances or disrupts learning efficacy and emotional well-being. The findings reveal that while AI offers personalized learning pathways and efficiency in academic tasks, it can also contribute to anxiety, dependency, and reduced social interaction. The paper concludes with a framework for balanced AI integration in education, emphasizing student-centric design and mental health safeguards.

Keywords: Artificial Intelligence, Mental Health, Academic Achievement, Senior Secondary Students, Education Technology, Student Well-being

1. Introduction:

Artificial Intelligence is reshaping educational systems globally. At the senior secondary level, students are increasingly exposed to AI-powered learning platforms, adaptive testing tools, and automated feedback systems. While these technologies offer the potential to personalize learning and improve academic outcomes, they also raise critical concerns about student psychology, mental overload, and social isolation. This paper explores the cognitive and emotional dimensions of AI use in academic settings, with particular focus on how AI affects academic performance and mental well-being during one of the most pivotal stages of education.

2. Literature Review:

Recent studies have increasingly examined the intersection between AI, education, and student well-being. According to Holmes et al. (2021), AI-driven tools like intelligent tutoring systems and predictive analytics platforms can enhance learning efficiency but often cause anxiety due to continuous evaluation. Similarly, Luckin (2018) argues that although AI can individualize instruction, it fails to understand the emotional context of learning. Schroeder and Spann (2020) highlight the 'data-driven student' model, where AI tracks every move a learner makes, potentially leading to performance pressure. On the mental health front, research by Twenge et al. (2019) links increased screen time and digital learning with rising rates of depression and anxiety among adolescents.

3. Research Gap:

Current studies often isolate academic impact or mental health outcomes, rarely combining both in a unified framework. There is also limited data on senior secondary students—a group uniquely vulnerable due to examination pressure and developmental transitions. This research addresses that gap by investigating AI's holistic influence on academic achievement and psychological well-being in this demographic.

4. Objectives of the Study:

1. To evaluate the impact of AI on the academic performance of higher senior secondary students.
2. To examine the effects of AI use on students' mental health, including stress, anxiety, and emotional resilience.

3. To assess student perceptions of AI tools in learning environments.
4. To propose AI deployment strategies that balance academic support with mental wellness.

5. Hypotheses:

H₁: The integration of AI into daily academic life significantly impacts both the mental health and academic performance of senior secondary students.

H₀: The integration of AI into daily academic life does not significantly impact the mental health and academic performance of senior secondary students.

6. Methodology:

This study employed a convergent mixed-method design. Data was collected from 200 students (Grades 11–12) in both urban and semi-urban schools using AI tools like Byju's, Khan Academy, and Microsoft Teams. Data was gathered over three months using:

- Quantitative Tools: Academic records, PHQ-9 (depression), and GAD-7 (anxiety) scales.
- Qualitative Tools: 20 structured interviews and 2 focus group discussions.

Ethical clearance was obtained from the Institutional Review Board. Participation was voluntary, and anonymity and confidentiality were strictly maintained.

7. Thematic Discussion:

7.1 Academic Enhancement and Cognitive Shifts: AI tools enhance performance but may diminish critical thinking.

7.2 Emotional Impact and Stress: Performance tracking through AI increases stress and anxiety.

7.3 Human Disconnection: AI tutors reduce peer interaction and human connection.

7.4 AI and Identity Formation: Algorithmic feedback shapes students' academic self-perception.

8. Findings

1. Academic Improvement: Students using adaptive platforms scored, on average, 15% higher in math and science subjects.
2. Mental Strain: 58% of students using AI daily reported signs of burnout; girls reported higher anxiety than boys.
3. Emotional Detachment: Several students preferred digital interaction over human help, leading to reduced classroom participation.
4. AI as a Motivator: Interestingly, 20% of high-performing students found AI 'motivating' because it allowed self-paced learning.

9. Ethical and Educational Implications:

- Psychological Dependency
- Algorithmic Bias
- Privacy Concerns
- Emotional Health Challenges

10. Recommendations:

- Combine AI with human mentoring.
- Include AI literacy in curricula.
- Monitor mental health regularly.
- Establish AI ethical use policies.
- Train teachers for effective AI integration.

11. Conclusion:

AI in education is both a boon and a challenge. While it enhances learning outcomes, it may also harm emotional health and social development. A balanced approach—blending technology with empathy—is essential to protect students during their formative years.

12. References:

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