TWIST

A Double-Edged Sword:
Examining the Link between Students' Dependence on Artificial Intelligence (AI) and their Psychosocial Maturity

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Abstract
This study aims to explore the relationship between students' dependence on artificial intelligence (AI) tools and their psychosocial maturity, focusing on emotional regulation, social responsibility, and independence/self-determination. A descriptive-correlational design was employed, using self-report questionnaires to collect data from 276 undergraduate students at South Cotabato State College. The descriptive part examined how students rely on AI, while the correlational component analyzed the relationship between AI dependence and psychosocial maturity using Pearson's correlation coefficient. The study found a very weak negative correlation between AI dependence and psychosocial maturity, with a Pearson correlation coefficient of -0.045 and a p-value of 0.452, indicating no statistically significant relationship. The primary limitation is the single-institution sample, which may limit the generalizability of the findings. This study contributes to the understanding of AI's role in education, showing that AI dependence does not significantly impact psychosocial maturity. The findings guide educators on integrating AI without compromising critical psychosocial development.

Keywords
AI dependence, Psychosocial maturity, Emotional regulation, Social responsibility, Independence, Descriptive-correlational

INTRODUCTION
The rapid integration of Artificial Intelligence (AI) tools is transforming the educational landscape, offering a plethora of benefits for student learning. These tools personalize learning experiences to cater to individual student needs (Zaman, 2023). Additionally, AI delivers immediate feedback on student performance, facilitating course correction and promoting deeper understanding (Chen et al., 2022). Furthermore, AI democratizes access to information, offering students a vast repository of knowledge readily available (Williams, 2024).

However, concerns have emerged regarding student dependence on these tools and AI's undeniable promise in education. While the benefits of AI are well-documented, a crucial area of exploration remains its long-term impact on the development of crucial psychosocial skills in students, particularly critical thinking and social interaction skills. Psychosocial maturity encompasses a range of competencies essential for healthy development, including emotional regulation, social competence, critical thinking, and responsible decision-making (Alfaro-LeFevre, 2019). While research has explored the benefits of AI in education, a gap exists in our understanding of how student dependence on these tools might influence the development of these psychosocial skills, particularly among college students.

This study investigates the potential double-edged sword of AI in education. The relationship between students' dependence on AI tools and their psychosocial maturity is explored in this endeavor. Examining this link can yield valuable insights into optimizing the use of AI in educational settings. This understanding will allow us to harness the power of AI to enhance learning while fostering well-rounded student development. This encompasses not just academic achievement but also social and emotional well-being. The ultimate goal is to ensure students develop critical thinking and social interaction skills, which are essential for success in today's complex world.

This study investigates the relationship between South Cotabato State College students' dependence on artificial intelligence (AI) tools and its impact on their psychosocial maturity.

RESEARCH OBJECTIVES

This study explores the potential link between students' dependence on artificial intelligence (AI) tools and their psychosocial development. To achieve this, the research aims to:

1. Investigate the extent of students' dependence on AI tools for academic support, learning resources, and productivity and time management.
2. Assess the level of psychosocial maturity among students regarding emotional regulation, social responsibility, and independence and self-determination.
3. Examine the relationship between students' dependence on AI tools and their psychosocial maturity to determine statistical significance.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The educational landscape is undergoing a dramatic transformation fueled by the rapid integration of Artificial Intelligence (AI) tools. While AI offers a multitude of benefits, including personalized learning experiences, readily accessible knowledge, and immediate feedback (Bhutoria, 2022), its potential impact on student development, particularly in the realm of psychosocial skills, remains a pressing concern. This discussion investigates the current state of knowledge surrounding AI in education, explores the potential downsides of student dependence on these tools, and identifies critical areas for future research.

The Rise of AI in Education

The positive impact of AI on student learning has been well-documented. AI-powered tutors provide personalized learning experiences tailored to individual needs and learning styles, leading to improved academic performance (Srinivasa et al., 2022). These intelligent tutors can adjust teaching approaches in real time, offering differentiated instruction and catering to various student abilities (Kinshuk et al., 2016). Additionally, AI-based feedback systems provide students with immediate and detailed analysis of their performance, facilitating course correction and fostering a deeper understanding of the learning material (Chen et al., 2020). This continuous feedback loop allows students to self-regulate their learning and identify areas requiring improvement (Carless, 2019).

Furthermore, AI tools democratize access to information, empowering students with a vast repository of knowledge readily at their fingertips. AI-powered search engines can filter through massive amounts of data, offering relevant learning resources customized to individual student queries (Ammunuel & Rohini, 2023). This readily accessible information fosters self-directed learning, enabling students to pursue areas of personal interest and deepen their understanding of complex concepts.

The Potential Pitfalls of Over-Reliance on AI: Impact on Psychosocial Development

While the benefits of AI in education are undeniable, concerns are mounting regarding its potential to hinder the development of crucial psychosocial skills in students. Psychosocial development encompasses a wide range of competencies essential for healthy growth, including emotional regulation, social competence, critical thinking, and responsible decision-making (Caena & Punie, 2019). Over-reliance on AI tools for academic support might impede the development of these crucial skills, potentially leading to unintended consequences.

One key concern surrounds the potential impact of AI on critical thinking skills. Students who habitually resort to AI-powered writing assistants may not develop the necessary skills for independent research, analysis, and argument construction (Dakakni & Safa, 2023). These AI assistants can generate well-structured essays and summaries without necessarily fostering a true understanding of the underlying concepts (Zhang et al., 2023). As a result, students may struggle with critical thinking tasks that require them to analyze information, synthesize ideas, and develop their unique arguments (Abdel-Karim et al., 2023).

Furthermore, excessive reliance on AI tools for social interaction, such as language learning apps or AI chatbots, could potentially limit opportunities to develop essential social skills like interpersonal communication, empathy, and conflict resolution. While AI tools can play a valuable role in language learning by providing structured environments for practice, they cannot replicate the complexities of real-world social interaction (Kannan & Munday, 2018). AI chatbots cannot understand nonverbal cues, navigate emotional subtleties, or engage in spontaneous conversations, all integral aspects of effective communication.

Research Gap

Despite increased research on artificial intelligence (AI) in education, there is a noticeable gap in understanding how student reliance on AI impacts psychosocial development. Many studies focus on AI's academic benefits but offer limited investigation into how it affects key areas like emotional regulation, social responsibility, and independence, especially in college students. Most research has concentrated on primary and secondary education, leaving higher education relatively unexplored.

Hypothesis

This study posits a null hypothesis (H_0) stating that there is no statistically significant relationship between students' dependence on artificial intelligence (AI) tools and their psychosocial maturity. This hypothesis will be tested at a significance level of $\alpha = 0.05$.

MATERIAL AND METHODS

This study utilized a descriptive-correlational design to explore the relationship between students' dependence on artificial intelligence (AI) tools and their psychosocial development. The descriptive aspect provided a comprehensive examination of how students rely on AI tools and their psychosocial development, while the correlational component investigated the potential relationship between these two variables. South Cotabato State College (SCSC) in Surallah, South Cotabato, Philippines, was chosen as the research locale due to its large and diverse student population, which allowed for the recruitment of a representative sample and enhanced the generalizability of the findings to a broader student population.

The sample comprised undergraduate students enrolled at SCSC during the academic year 2023-2024. To determine the sample size, the Cochran formula was used, considering a 95% confidence level and a 5% margin of error, resulting in a sample of 276 students from a total population of 970. Random sampling was employed to ensure that the sample accurately represented the broader undergraduate population. Self-report questionnaires, developed by the researcher, were utilized to measure students' dependence on AI tools and their psychosocial development. To ensure the instrument's validity and reliability, it underwent expert validation and pilot testing. Feedback was obtained from specialists in education and psychosocial development, and pilot testing with a small sample of students assessed the instrument's clarity, comprehensiveness, and internal consistency. Based on pilot testing results, minor revisions were made, and the internal consistency analysis yielded a Cronbach's alpha coefficient of 0.91, indicating excellent reliability.

Data normality for key variables, including dependence on AI tools and psychosocial development scores, was assessed using the Shapiro-Wilk test, which confirmed a normal distribution. Pearson's correlation coefficient was then used to examine the strength and direction of the linear relationship between students' dependence on AI tools and their psychosocial development scores.

RESULTS AND DISCUSSION

The Extent of Students' Dependence on AI Tools for Academic Support, Learning Resources, and Productivity and Time Management

Artificial Intelligence (AI) has become essential to modern education, supporting various student learning and productivity aspects. This section examines the extent of students' dependence on AI tools for academic support, learning resources, productivity and time management.

Table 1 The Extent of Students' Dependence on AI Tools

Dependence on AI Tools	Mean	SD	Description
1. Academic Support	3.49	0.51	Moderate
2. Learning Resources	3.46	0.54	Moderate
3. Productivity and Time Management	3.51	0.51	High
Mean	3.49	0.30	**Moderate**

Legend: 4.50-5.00 Very High, 3.50-4.49 High, 2.50-3.49 Moderate, 1.50-2.49 Low, 1.00-1.49 Very Low

The extent of students' dependence on AI tools varies across three key areas: academic support, learning resources, and productivity/time management. The overall mean dependency across these categories is 3.49, indicating a moderate level. However, the specific areas present different degrees of reliance and implications for educational practices.

For academic support, the mean dependency is 3.49 with a standard deviation of 0.51, suggesting that students moderately rely on AI to personalize learning, guide study sessions, practice skills, track progress, and simulate scenarios. This level of dependency indicates that while AI is valuable in supplementing traditional education, it has not supplanted the need for conventional teaching methods or direct instructor interaction. Educators should note this balance, ensuring that AI tools enhance, rather than overshadow, traditional learning approaches.

When it comes to learning resources, the mean dependency is slightly lower at 3.46, with a higher standard deviation of 0.54. This moderate reliance indicates that students use AI-based platforms to access a variety of educational materials, conduct research, generate summaries, and reinforce course content, but the range of dependency is broader. This variability could stem from differing comfort levels with technology or a preference for traditional methods. The broader standard deviation suggests that educational institutions should provide varied resources to cater to all students' learning preferences.

In contrast, the mean dependency for productivity and time management is 3.51, with a standard deviation of 0.51, indicating a high level of reliance. This finding suggests that students find AI tools particularly useful for managing tasks, organizing schedules, and optimizing study sessions. Given the high dependency, institutions could focus on teaching students to effectively use these tools for time management while avoiding over-reliance.

The implications of these findings are significant. The overall moderate dependency indicates that while AI has become a vital part of education, it should be integrated in a way that complements traditional educational practices (Chen et al., 2020). Educators should ensure that AI tools support learning without replacing critical skills like problem-solving and human interaction. The high dependency on AI for productivity and time management also suggests that students value these tools for their efficiency, indicating a need for educators to help students strike a balance between AI-based efficiency and traditional learning methods. These insights underscore the evolving role of AI in education and the necessity of a balanced approach that supports academic success without compromising essential human elements.

Table 2 Level of Psychosocial Maturity among Students

Dependence on AI Tools	Mean	SD	Description
1. Emotional Regulation	2.94	0.68	Moderate
2. Social Responsibility	3.00	0.57	Moderate
3. Independence and Self-determination	3.00	1.40	Moderate
Mean	2.98	0.38	**Moderate**

Legend: 4.50-5.00 Very High, 3.50-4.49 High, 2.50-3.49 Moderate, 1.50-2.49 Low, 1.00-1.49 Very Low

The data in Table 2 shed light on the level of psychosocial maturity among students, with an overall mean of 2.98, indicating moderate development across three key areas: emotional regulation, social responsibility, and independence/self-determination.

The mean for emotional regulation is 2.94 with a standard deviation of 0.68, suggesting that students are generally capable of managing their emotions, but there is some variation in this ability. This moderate score implies a potential need for additional resources to build emotional resilience and stress-management skills, given that some students may require more support than others.

Similarly, the mean for social responsibility is 3.00 with a standard deviation of 0.57, indicating that most students exhibit a sense of accountability and community engagement. However, the slight variability in this score suggests that some students may have a more profound sense of civic duty than others, highlighting a need to reinforce these values in educational programs.

The mean for independence and self-determination also stands at 3.00, but with a much higher standard deviation of 1.40. This wide range suggests a significant disparity in students' confidence and decision-making abilities. While some show considerable independence, others might need additional support and guidance to develop these skills. This variation underscores the importance of personalized educational strategies to help all students grow in self-determination and autonomy.

Therefore, the moderate scores across the three key areas of psychosocial maturity—emotional regulation, social responsibility, and independence/self-determination—indicate that students are making progress toward developing the skills needed for success in emotional and social contexts. However, these scores also suggest considerable room for improvement. Educational institutions should consider targeted interventions that focus on building emotional resilience, reinforcing a sense of social responsibility, and promoting independence and self-determination (Greenberg et al., 2017).

Table 3 Relationship between Students' Dependence on AI Tools and Their Psychosocial Maturity

Variables	Mean	r	Degree of Relationship	p-value	Remark
AI Dependence	3.49	-0.045	Very weak negative correlation	0.452	Not Statistically Significant
Psychosocial Maturity	2.98				

*Tested at 0.05 level of significance

Table 3 examines the correlation between students' reliance on AI tools and their psychosocial maturity. Pearson's correlation coefficient is used to measure the relationship, and the statistical significance helps determine whether the observed correlation is meaningful or could occur by chance.

The Pearson correlation coefficient for the relationship between dependence on AI tools and psychosocial maturity is -0.045. This value suggests a very weak negative correlation, indicating that an increase in AI reliance may correspond to a slight decrease in psychosocial maturity, but the effect is minimal. The p-value of 0.452 is well above the standard threshold of 0.05, which means the correlation is not statistically significant. Thus, the observed relationship is not strong enough to draw any solid conclusions about the impact of AI use on psychosocial development.

These findings have implications for educational strategies. Since the correlation between AI dependence and psychosocial maturity is weak and not statistically significant, educators can integrate AI into educational settings without worrying that it might harm students' emotional or social development. This suggests that technology can be used as a supplementary tool to support academic progress without adversely affecting psychosocial skills.

However, the weak negative correlation, even though not statistically significant, may still be worth exploring further. It suggests that increased AI dependence could potentially influence psychosocial maturity, albeit to a very slight degree. Educators and academic institutions should remain conscious of the balance between technology use and traditional methods that encourage emotional regulation, social responsibility, and self-determination (Ryan & Deci, 2020). As such, educators can continue to integrate AI into their teaching practices while maintaining a focus on traditional elements that promote well-rounded student development. However, ongoing monitoring and research are advised to ensure that the integration of technology does not detract from the development of essential psychosocial skills.

FINDINGS AND CONCLUSIONS

The analysis of the correlation between students' dependence on AI tools and their psychosocial maturity shows a weak negative relationship, with a Pearson correlation coefficient of -0.045 and a p-value of 0.452. This indicates that the observed correlation is not statistically significant, suggesting that any relationship between these factors is likely due to chance.

These findings imply that students' reliance on AI tools for academic support, learning resources, and productivity does not significantly affect their psychosocial maturity. This is reassuring for educators, indicating that integrating AI into educational practices does not necessarily hinder the development of essential psychosocial skills such as emotional regulation, social responsibility, and independence.

However, the presence of a weak negative correlation, even if not significant, suggests the need for a balanced approach to integrating AI in education. This ensures technology does not overshadow the development of key psychosocial skills. Educational institutions should continue to emphasize traditional teaching methods and human interaction to ensure well-rounded student development.

These results offer a starting point for future research into the effects of AI on education. Further studies should investigate factors that might influence psychosocial maturity and explore ways to use AI to support learning without compromising personal growth. A balanced approach to AI in education allows institutions to benefit from technology while fostering comprehensive student development.

RECOMMENDATIONS

To successfully integrate AI into education while supporting psychosocial development, a balanced approach is essential. AI should complement traditional teaching methods that encourage human interaction and critical thinking, ensuring that technology does not undermine key psychosocial skills.

Schools can support emotional regulation by offering programs that build resilience and stress management skills. Mindfulness sessions, counseling, and workshops can be effective. To strengthen social responsibility, schools could implement collaborative projects and community-based learning, promoting a sense of civic duty and teamwork.

To foster independence and self-determination, institutions should provide personalized support. Mentorship, student-led projects, and decision-making opportunities can help students build confidence and autonomy.

Continuous monitoring is necessary to ensure AI does not negatively impact psychosocial development. Regular assessments and research will help educators adapt strategies as needed. Future studies should explore long-term effects and identify best practices for integrating AI into education.

Faculty development and training are crucial to ensure educators can effectively use AI while upholding traditional educational values. Professional development programs should focus on equipping teachers with skills to balance AI use with fostering psychosocial skills.

Implementing these recommendations will allow educational institutions to harness the benefits of AI while supporting both academic success and students' psychosocial maturity.

DECLARATION OF CONFLICT

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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