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ANALYZING THE AI TOOLS' IMPACT ON CRITICAL THINKING IN BS ENGLISH STUDENTS AT PAKISTANI UNIVERSITIES

Waqar Mahmood Khan
Lecturer in English and Founder, Shaheen Empowerment and Guidance Center
University of Okara, Pakistan
waqar.m.khan@hotmail.com

Abstract

The increasing integration of Artificial Intelligence (AI) tools in academic settings has significantly altered student learning behaviors, mainly in English language and literature studies. While AI offers several advantages in enhancing productivity, its widespread use raises concerns about its potential impact on students' critical thinking, creativity, and intellectual independence. This study investigates how dependence on AI tools affects the critical thinking and independent learning processes of English language and literature students at Pakistani universities. Particularly, it explores whether excessive reliance on AI tools hinders students' analytical and interpretative skills and how university teachers can balance AI use with promoting independent cognitive development. Employing emergentism and mentalism as theoretical frameworks, the study analyzes AI use among students at two Pakistani universities, comparing BS English degree sessions of passed-outs (2019-2023) and newly enrolled students (2022-2026). Data were collected through qualitative content analysis of assignments and interviews with faculty members. The findings reveal that students in the post-AI session showed a marked decline in critical thinking, with their assignments showing less analytical depth and greater reliance on AI-generated content. Additionally, students' fear of academic penalties for non-compliance with assignment guidelines emerged as a significant driver for using AI tools. Interviews with teachers highlighted challenges in assessing AI-assisted work and the growing need for strategies to ensure independent thought. The study suggests that educational policies should regulate AI use for students under 20, promote intellectual autonomy, and incorporate critical thinking exercises into curricula. Furthermore, teacher training programs should include strategies for evaluating AI-assisted submissions, and workshops on the ethical use of AI should emphasize that these tools should enhance, not replace, critical thinking.

Keywords: AI, Language, Critical Thinking, Intellectual Independence, Emergentism, Mentalism, Writing Skills, Productive Skills, Educational Policy, Pakistan, English Literature, Linguistics, Sociocultural Theory, LAD, Noam Chomsky, Vygotsky, Mathematics**.**

Introduction

Artificial intelligence (AI) has emerged as a powerful tool in several disciplines, with education being one of the most important ones (Khan, 2023). The advent of AI tools such as ChatGPT and Grammarly has revolutionized educational practices, especially within English language, linguistics and literature programs. While these tools offer benefits by streamlining tasks like grammar correction, textual analysis, and assignment completion, their overuse poses risks to the intellectual development of students. This study explores how the integration of AI affects students' critical thinking, creativity, and writing abilities,

This trend is worrying in the wake of BS English programs, which are supposed to provide students with the wisdom of analysis and interpretation. This study compares assignments of students from two sessions: the pre-AI era, ranging from 2019-2023, and the post-AI emergence from 2022-2026, to understand how AI influences the intellectual growth of students. Beyond that, it enumerates a few suggestions to encourage a balanced approach toward integrating AI into education, with implications for the intellectual growth of Pakistan.

By employing emergentism, mentalism, and Vygotsky's sociocultural theory, this research seeks to understand the consequences of AI on intellectual autonomy and academic growth, ultimately calling for a balanced and regulated approach to technology in education.

Research Questions

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1. How does the use of AI tools affect the critical thinking, creativity, and intellectual independence of BS English students?
2. How has AI integration shifted the quality of writing assignments, especially in terms of originality and depth of analysis?
3. What role does the fear of marks deduction play in encouraging students' reliance on AI tools?
4. How do senior/passed-outs (2019-2023) and newly enrolled (2022-2026) students differ in their use of AI tools for academic tasks?
5. What theoretical frameworks can guide educators in balancing AI use with the promotion of critical thinking and independent learning?

Objectives

1. To evaluate the effects of AI tools on students' critical thinking, writing skills, and intellectual independence.
2. To explore the socio-cultural factors, such as fear of marks deduction, driving AI reliance among students.
3. To compare the cognitive and analytical skills of students before and after AI's widespread use.
4. To propose strategies and policies for the responsible integration of AI in education, promoting intellectual growth and creativity.

Theoretical Background

This study is grounded in three foundational theoretical frameworks: emergentism, mentalism, and Vygotsky's sociocultural theory. These theories provide a strong lens for understanding how artificial intelligence (AI) interacts with cognitive processes and the development of critical thinking skills in educational contexts.

Emergentism claims that cognitive abilities, including critical thinking, emerge through active engagement in the learning process, especially through trial-and-error learning. This perspective suggests that intellectual development is not something that can be only transmitted or externally imposed, but rather is constructed through a dynamic interaction between the learner and their environment (MacWhinney, 1999). In this context, emergentism seems to support the idea that AI can enhance learning by providing real-time feedback and enabling iterative, personalized problem-solving experiences. However, overreliance on structured, AI-driven learning may inhibit the authentic cognitive engagement required for true intellectual growth, as the learner might bypass necessary cognitive struggles that promote critical thinking.

Mentalism, as argued by Chomsky (1965), warns against the dangers of over-dependence on external aids, especially in the context of language acquisition and cognitive development. According to mentalist theory, human cognition is fundamentally driven by internal processes LAD and capacities, and excessive reliance on external devices(AI as possibly being one of them) could undermine the natural cognitive architecture that supports deeper learning. From this viewpoint, the study critically examines whether AI, despite its many educational benefits, could unintentionally stifle students' intellectual independence, resulting in a reduction in their capacity for autonomous/ independent problem-solving and critical thinking.

Finally, **Vygotsky's Sociocultural Theory** (1978) offers a critical perspective on the interaction between social context, language, and cognitive development. Vygotsky emphasizes the importance of social interaction and teacher-guided scaffolding in the learning process, asserting that higher mental functions are developed through collaborative, socially-mediated activities. AI can serve as a useful tool for providing additional support in learning but should not replace

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the essential role of human interaction in cognitive development. Vygotsky's framework encourages a balanced approach, where AI complements human instruction and scaffolding, rather than attempting to replace the teacher-student dynamic entirely. The theory also highlights the importance of dialogue and collaborative problem-solving, which are essential in the development of higher-order cognitive skills such as critical thinking.

Together, these three theories provide the conceptual foundation for this study, informing the exploration of AI's role in enhancing or potentially hindering cognitive processes, particularly critical thinking, analytical depth, and intellectual freedom/ autonomy. The study aims to examine the nuanced effects of AI tools on students' cognitive development, particularly in relation to their engagement with academic tasks that require higher-level thinking.

Methodology

To investigate the impact of AI tools on students' critical thinking and writing abilities, this study adopts a **qualitative content analysis** approach. This method allows for a nuanced examination of how AI integration influences students' intellectual engagement over time. Particularly, the study compares data from two distinct academic periods: **pre-AI (2019-2023)** and **post-AI (2022-2026)**. By analyzing these two periods, the study aims to identify major shifts in students' cognitive processes, particularly in relation to their ability to think critically, analyze complex issues, and produce original, thoughtful written work.

A total of **200 students** were selected for the study, with **100 students from each degree session** (pre-AI and post-AI) at **two public universities in Pakistan**. These students were enrolled in the **BS English program**, which provides a relevant context for examining how AI tools influence both language acquisition and critical academic skills. Data collection involved the analysis of students' **assignments** and **semi-structured interviews** with their **teachers**.

Assignments were reviewed for key indicators of critical thinking and intellectual engagement, including:

- **Originality**: The degree to which students demonstrated independent thought and avoided reliance on AI-generated content or ideas.
- **Analytical Depth**: The extent to which students analyzed topics critically, provided evidence-based arguments, and demonstrated a high level of intellectual engagement with the material.
- **Critical Thinking**: The ability to evaluate, synthesize, and apply knowledge in novel/new contexts, indicating the development of higher-order cognitive skills.

In addition to assignment analysis, **semi-structured interviews** with teachers were conducted to gather qualitative data into the observed changes in students' cognitive and analytical abilities. Teachers provided firsthand accounts of how the integration of AI affected students' academic work, including both the **challenges** and **opportunities** presented by AI tools. These interviews also helped to uncover any shifts in the role of the teacher, as they adapted their instructional methods to incorporate AI, while still ensuring independent cognitive development.

Data Collection Techniques

The data collection process was carefully designed to provide a thorough understanding of how AI integration influenced students' critical thinking abilities. The following methods were employed:

- **Assignment Review:**
  Students' written assignments were analyzed to evaluate originality, analytical depth, and critical thinking. This helped assess whether AI usage led to formulaic and superficial responses or supported deeper cognitive engagement and independent problem-solving.

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- **Teacher Interviews:**
  Semi-structured interviews with teachers offered qualitative information into the broader educational context. These interviews explored how AI tools influenced student engagement, cognitive processes, and academic performance. Teachers also shared challenges in incorporating AI into teaching and provided feedback on whether AI enhanced or detracted from intellectual development.

Sampling Method

The study employed purposive sampling to ensure a representative sample of the student population from two public universities. Equal numbers of male and female students were selected to maintain gender balance and inclusivity. This approach specifically targeted students actively using AI tools integrated into their academic programs.

Limitations

Despite its strengths, the study faced certain limitations:

- **Limited Scope:**
  The research was restricted to two universities in Pakistan, which limits the generalizability of findings to other institutions or countries with different educational contexts.
- **Discipline-Specific Focus:**
  The study centered on the BS English program, narrowing its scope to a specific academic field. This focus might not capture the varied impacts of AI tools in disciplines like sciences or engineering.

Data Analysis

The study's results highlighted a significant contrast between pre-AI and post-AI sessions, particularly in the quality of student assignments. Key observations include:

- **Decline in Critical Thinking:**
  Post-AI students demonstrated a tendency for superficial engagement with assigned texts. Their responses were often formulaic and heavily derived from AI-generated content, lacking deeper critical analysis. This decline raises concerns about the erosion of critical thinking, a cornerstone of intellectual development.
- **Over-Reliance on AI Tools:**
  Many students' assignments reflected a lack of originality, as they relied heavily on AI for grammar correction, content generation, and text analysis. This dependency bypassed essential cognitive processes like independent thought and creative problem-solving, raising questions about the authenticity of their work.
- **AI Usage Parity Across Genders:**
  Both male and female students exhibited similar patterns of reliance on AI tools, indicating that the influence of AI on academic work is gender-neutral.
- **Teachers' Concerns:**
  University teachers highlighted the growing difficulty in distinguishing between student-generated and AI-assisted work. This blurred the lines of academic integrity, complicating grading and raising concerns about declining independent learning.

Findings and Discussion

1. **Impact on Critical Thinking:**
   Pre-AI students displayed higher intellectual curiosity and deeper engagement with texts, resulting in assignments marked by originality and analytical depth. In contrast, post-AI

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assignments were often shallow, with critical thinking reduced to basic summaries of AI-generated content. This trend aligns with prior research (Paul & Elder, 2019) indicating that AI usage can hinder cognitive rigor.

2. **Fear of Marks Deduction:**
   Many post-AI students admitted to using AI tools to avoid mistakes that might lower their grades. This fear-driven behavior prioritized error-free work over intellectual engagement, undermining trial-and-error learning principles. This may be aligned with research of the past. (MacWhinney, 1999).
3. **Role of AI Tools in Writing:**
   Post-AI students primarily used AI for surface-level improvements, such as grammar correction, rather than enhancing content understanding or critical engagement. Teachers noted that while the assignments were grammatically correct, they often lacked analytical depth.
4. **Teacher Perspectives:**
   Teachers expressed frustration over evaluating assignments influenced by AI, citing difficulties in distinguishing genuine effort from AI-assisted work. They stressed the need for educational strategies that promote independent thinking and creativity.

Implications for Policy and Practice

1. **Regulating AI Usage:**
   Policymakers should consider implementing regulations to limit AI usage during academic assignments for students under 20. Controlled use can ensure that foundational cognitive skills remain central to the learning process.
2. **Promoting Independent Learning:**
   Educational institutions should design assignments that encourage critical thinking and creativity, such as open-ended questions, debates, and reflective essays. Teacher training should emphasize strategies to promote intellectual risks and trial-and-error learning.
3. **Curriculum Revisions:**
   Curricula should include guidelines for responsible AI usage, outlining clear boundaries for its application. Incorporating collaborative learning activities like workshops, group projects, and discussions can enhance peer interaction and develop higher-order cognitive skills.

Conclusion

This study highlights the deep impact of AI tools on students' critical thinking and independent learning in the context of English language and literature education. While AI tools do offer convenience and efficiency, their overuse can greatly undermine the cognitive processes that are essential for genuine learning. The study's findings suggest that excessive reliance on AI leads to a decline in originality, analytical depth, and problem-solving skills, as students begin to prioritize AI-generated content over authentic intellectual engagement.

Moreover, the study also highlights the value of mistakes as an inevitable part of the learning process. In line with emergentism and mentalism, mistakes are viewed not as failures, but as necessary steps in the process of cognitive growth. Teachers must guide students through these mistakes, promoting an environment where intellectual independence and creativity are encouraged.

There is no denying that AI is a game-changer for students of literature and language. But unrestricted access to such technology for youth below the age of 20 may unintentionally nurture a generation that puts the future of the globe at stake. This raises huge concern in relation to the

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possible decline in the development of critical thinkers, effective policymakers, and visionary leaders necessary for shaping a sustainable and progressive future of our beloved country Pakistan in specific and the globe in general. Therefore, integration of AI in education is very important, which must be cautiously done by keeping controlled mechanisms for their responsible use among young learners.

Ultimately, this research calls for a balanced approach to AI integration in education. AI should be used as a supporting tool (facilitator), not a replacement for individual thinking. Educational policies should regulate AI use among younger students, while curricula and teacher training should focus on developing cognitive skills that AI cannot replicate such as creativity, independent problem-solving, and critical analysis. The goal is not to resist technology, but to harmoniously integrate it in a way that enhances the learning experience without sacrificing the foundational cognitive skills that are vital for long-term intellectual development.

Recommendations

- **Educational Policies:** Introduce regulations on the ethics and responsible usage of AI in academia at least for students below the age of 20 years.
- **Curriculum Design:** Include activities that will help develop critical thinking, such as open-ended questions, reflective essays, and debates.
- **Teacher Training:** To provide teachers with the strategies of evaluating the content produced by AI, and ways to encourage independent learning.
- **Student Workshops:** Workshops on ethics in using AI should be conducted and make it known, sketched, and emphasized that it is used as a support tool and not a substitute for critical thinking.
- **Encouragement of Creativity:** Classroom environments are supportive of mistakes, letting students learn at their own pace.
- **Technology Regulation:** The government should make AI tools and social media platforms less accessible for students below 20 years old to encourage foundational skill development.
- **Balanced Integration:** This would involve promoting the use of AI to assist teachers in lesson planning and evaluation, rather than students directly using it.

Future Research Directions on AI Integration Across Disciplines: Implications for Cognitive Development and Academic Performance

Looking ahead, research on AI in education should go beyond its application in English Linguistics, Language and Literature. We need to explore how AI is impacting various fields such as healthcare, finance, engineering, and others. As students increasingly depend on AI tools, understanding the long-term effects on their cognitive development and academic performance is important. This includes examining how AI influences their ability to learn, think critically, and solve problems.

AI holds a great potential to change the way we teach and learn, offering new ways to acquire knowledge and develop skills. However, it's essential that this shift does not come at the cost of intellectual growth, especially in areas like critical thinking and creativity. Educators, policymakers, and curriculum designers must find a way to use AI's strengths while ensuring students retain the foundational cognitive abilities that support deep learning and independent thinking.

For example, in mathematics education, AI can be a powerful tool for providing personalized feedback, helping students spot errors and refine their problem-solving techniques. While this

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can greatly improve their understanding of concepts, teachers must also encourage students to think for themselves and try different approaches to problems, so they do not become excessively dependent on AI-generated solutions.

Similarly, in language learning , AI-powered translation tools can help bridge communication gaps, especially for students who speak different languages. While these tools can be useful, it's still important for teachers to emphasize the need for true language proficiency, encouraging immersive learning and real-world communication.

The real challenge lies in finding the right balance by leveraging AI to improve learning outcomes while still ensuring critical thinking, creativity, and intellectual independence. Getting this balance right will be key to preparing students for the future, where technology plays an ever-larger role in both academic and professional life. teachers will need to not only teach students how to use AI effectively but also ensure they develop the intellectual flexibility to tackle new challenges and seize new opportunities.

As AI technology continues to evolve, we must continue researching its long-term impact on students' academic success and cognitive development across a wide range of disciplines. By understanding these effects, we can shape the future of education in a way that uses technology as a tool to enhance, rather than replace, the fundamental skills that drive deep, independent learning.

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