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PERSONAL TUTOR OR ANSWER SHORTCUT: THE IMPACT OF GENERATIVE ARTIFICIAL INTELLIGENCE ON HIGH SCHOOL STUDENTS' UNIVERSITY ENTRANCE PREPARATION

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Abstract: Generative artificial intelligence (AI) platforms have rapidly become accessible study companions for high school students preparing for competitive university entrance examinations. This article examines how generative AI influences upper secondary students' conceptual mastery, test-taking autonomy, and exam readiness through a structured review of recent empirical studies, meta-analyses, and scoping reviews. Synthesized findings indicate that when applicants rely on AI as an immediate shortcut for ready-made practice test solutions and admission essays, they experience shallow cognitive processing, an illusion of competence, and elevated anxiety during proctored, offline examinations. Conversely, when generative AI is used after independent problem-solving attempts—to diagnose errors, clarify complex formulas, and simulate targeted practice—it significantly enhances learning efficiency and narrows tutoring access gaps. The article concludes that effective entrance preparation requires disciplined post-attempt AI workflows, critical AI literacy, and regular offline timed mock exams.

Keywords: generative artificial intelligence; high school students; university entrance exams; independent problem solving; cognitive offloading; AI tutoring; test readiness; AI literacy.

INTRODUCTION

Preparing for university entrance examinations—such as national standardized admission tests, subject-specific olympiads, and international language proficiency exams (e.g., IELTS, TOEFL, SAT)—places intense academic pressure on upper secondary students. High school learners must synthesize multi-year curricula, master complex quantitative and analytical skills, and develop strong time-management habits under strict exam conditions. In recent years, conversational generative AI platforms have emerged as ubiquitous, low-cost study tools capable of explaining difficult concepts, solving mathematics problems step by step, translating texts, and grading practice essays within seconds.

While generative AI democratizes access to individualized academic support—particularly for students who cannot afford private tutors—it also creates a critical pedagogical risk. When high school applicants consult AI before attempting to solve a practice problem or outline an essay independently, they bypass the productive cognitive struggle required for long-term memory consolidation. High-stakes university entrance exams are administered in strictly proctored, offline environments where external digital aids are prohibited. Consequently, the central question for secondary educators and applicants is not whether AI should be used during exam preparation, but how to structure AI interaction so that it builds genuine exam competence rather than fragile dependence.

LITERATURE REVIEW AND METHODOLOGY

Literature Review

Recent empirical research illuminates both the benefits and cognitive hazards of generative AI in exam-oriented learning. In a comprehensive meta-analysis of 69 experimental studies, Ruiqi Deng and colleagues (2025) demonstrate that ChatGPT significantly improves immediate task performance and student engagement while reducing perceived mental effort, yet warn that unguided reductions in cognitive exertion can impair deep, independent mastery. Similarly, Hao-Ping Lee and colleagues (2025) show that high trust in generative AI outputs lowers cognitive effort and shifts learners from active analytical reasoning to passive acceptance. Guanhua Wang and colleagues (2026) observe in their scoping review that habitual cognitive offloading weakens learner agency and creates an illusion of competence when AI replaces independent planning. Zeineb Farhat (2025) provides qualitative evidence that overreliance on ChatGPT erodes students' personal voice and academic self-confidence, triggering acute distress when AI access is removed—a dynamic directly relevant to offline entrance examinations. Furthermore, Jinrui Tian and Ronghua Zhang (2025) reveal that AI dependence negatively predicts critical thinking via cognitive fatigue, while information and AI literacy act as protective buffers. Conversely, Atiyah A. Alghamdi (2025) and Yaohuizhuo Liu and colleagues (2026) demonstrate that learners with strong AI self-efficacy and structured, inquiry-oriented instructional scaffolding achieve substantial gains in analytical reasoning and evaluation skills.

Methodology

This study utilizes a structured narrative synthesis approach to evaluate peer-reviewed empirical studies, systematic meta-analyses, and scoping reviews published in 2025–2026 across major scholarly databases (ScienceDirect, ACM Digital Library, SAGE Journals, Taylor & Francis Online, and MDPI). Studies were selected based on their examination of cognitive effort, AI-assisted tutoring, self-efficacy, and independent problem solving among secondary and incoming university learners. The synthesized findings were mapped onto the specific demands of university entrance preparation, contrasting unguided answer-seeking behaviors against structured, post-attempt scaffolding strategies.

Table 1. Empirical Evidence on Generative AI and Implications for Entrance Exam Preparation

Authors & Year	Study Design & Scope	Core Finding on Learning	Implication for Entrance Applicants
Deng et al. (2025)	Meta-analysis of 69 experimental studies	ChatGPT raises short-term scores and engagement while lowering mental effort.	Boosts daily practice speed, but shallow effort risks poor retention on final exams.
Lee et al. (2025)	Empirical task survey (N = 319, 936 tasks)	High confidence in GenAI reduces cognitive effort and critical evaluation.	Blindly trusting AI solutions prevents applicants from spotting subtle test traps.
Farhat (2025)	Qualitative interview study of students	Overreliance erodes self-confidence and causes anxiety when AI is unavailable.	Heavy AI users face severe stress and blanking during offline proctored exams.
Tian & Zhang (2025)	Quantitative survey (N = 580 students)	AI dependence lowers critical thinking via fatigue; AI literacy buffers harm.	Training applicants in critical AI literacy protects independent analytical skills.
Wang et al. (2026)	Scoping review in higher education	Habitual cognitive offloading weakens learner agency and planning skills.	Applicants must plan study schedules and solve problems before prompting AI.
Alghamdi (2025) & Liu et al. (2026)	Empirical survey & flipped classroom study	High AI self-efficacy and structured inquiry classrooms enhance critical thinking.	Using AI as a Socratic tutor strengthens deep conceptual mastery before university.

RESULTS

Synthesizing the empirical evidence reveals that generative AI exerts a dual, conditional impact on high school students preparing for university admission. First, when used as an immediate problem-solving shortcut, AI creates a deceptive 'illusion of competence.' Students who paste multiple-choice

questions, algebra problems, or reading comprehension passages directly into AI platforms complete practice sets rapidly and perceive high productivity (Deng et al., 2025). However, because the learner bypasses hypothesis generation and error correction, neural encoding remains superficial. As Farhat (2025) and Wang et al. (2026) demonstrate, once technological assistance is removed—mirroring the exact conditions of national entrance tests and international exams—students experience sharp drops in recall, weak analytical endurance, and heightened exam anxiety.

Second, when integrated as a post-attempt cognitive scaffold, generative AI acts as a highly effective personalized tutor. High school applicants who first attempt practice tests independently and subsequently use AI to diagnose mistakes, request step-by-step hints, or generate analogous practice items retain high cognitive engagement (Liu et al., 2026). In language preparation (such as IELTS or TOEFL writing and speaking), AI provides immediate, granular feedback on grammatical accuracy, lexical range, and argument coherence, accelerating improvement for learners without access to private tutors.

Figure 1. Dual Pathways of Generative AI Use in University Entrance Preparation

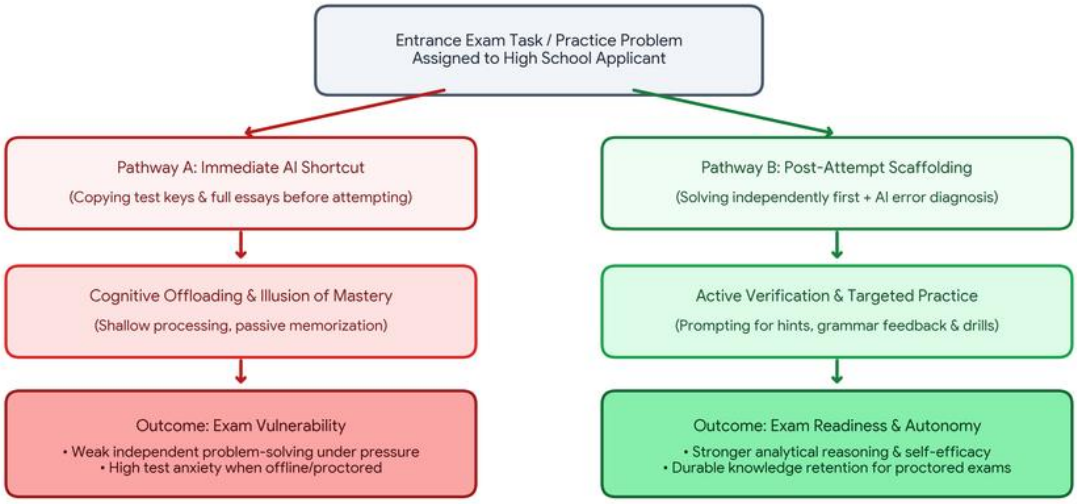


Figure 1 illustrates the two contrasting preparation trajectories: early offloading produces fragile exam readiness, whereas post-attempt scaffolding reinforces independent mastery.

DISCUSSION

The findings carry important practical implications for upper secondary students, teachers, and parents navigating the university admissions process. Generative AI should be viewed neither as a magic key to university admission nor as a prohibited threat, but as an amplifier of study habits. As illustrated in Figure 2, unguided AI shortcuts yield the lowest scores across conceptual retention, independent problem solving, and proctored exam readiness. In contrast, combining AI error analysis with regular offline timed mock exams outperforms both unguided AI use and isolated conventional study.

To maximize admission success while preserving intellectual autonomy, high school applicants should follow a structured four-stage preparation protocol (Table 2). Crucially, every AI-assisted study session must be balanced with offline, timed simulation tests that replicate real examination constraints. Schools and preparatory centers should likewise incorporate brief AI-literacy workshops teaching students how to verify AI explanations against official curriculum textbooks and spot hallucinated facts or flawed mathematical steps.

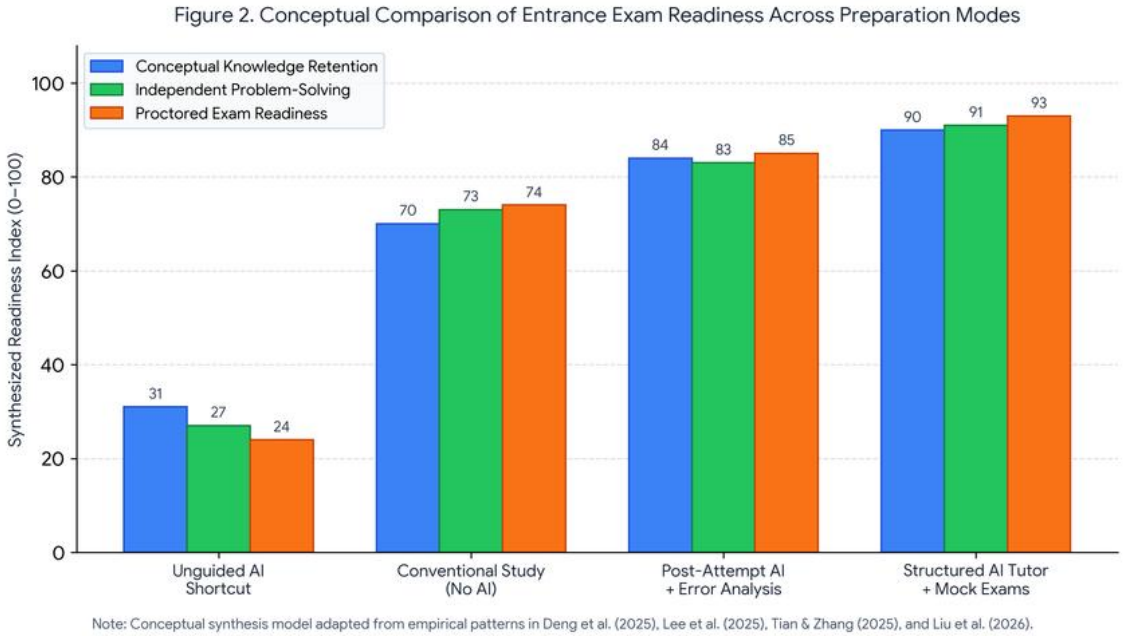


Figure 2 compares projected readiness outcomes across four study modes, highlighting the advantage of pairing post-attempt AI feedback with offline mock testing.

Table 2. Four-Stage Framework for Responsible AI Use in University Entrance Preparation

Preparation Stage	Unproductive Habit (Exam Failure Risk)	Productive Applicant Strategy (Mastery-Building)	Teacher / Mentor Support
1. Practice Test & Problem Solving	Pasting test questions into AI immediately to copy the final answer.	Solving problems independently first; asking AI for step-by-step hints only when stuck.	Assign diagnostic problem sets requiring handwritten solution steps.
2. Essay & Language Preparation	Generating full IELTS/admission essays with AI and memorizing them.	Writing drafts independently; prompting AI to highlight grammar errors and weak logic.	Use rubrics evaluating original voice, coherence, and revision drafts.
3. Concept Review & Verification	Relying solely on brief AI summaries instead of core textbooks.	Cross-checking AI explanations against official syllabi and requesting self-quiz items.	Teach students how to detect AI hallucinations and verify formulas.

Preparation Stage	Unproductive Habit (Exam Failure Risk)	Productive Applicant Strategy (Mastery-Building)	Teacher / Mentor Support
4. Final Exam Simulation	Practicing exclusively with unlimited time and open AI access.	Taking weekly timed, offline mock exams under strict proctored conditions.	Organize regular paper-based or offline computer mock assessments.

CONCLUSION

Generative artificial intelligence offers high school students unprecedented access to personalized explanations, instant feedback, and adaptive practice on the path to university admission. However, empirical evidence demonstrates that bypassing independent cognitive effort in favor of immediate AI answers undermines deep retention, critical thinking, and offline exam resilience. When used as a post-attempt cognitive partner alongside disciplined offline mock testing and strong AI literacy, generative AI significantly strengthens university entrance readiness while preparing students for autonomous higher education.

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