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Investigating the Role of AI in Improving Collegians Academic Level

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Abstract:

This study investigates the role of AI platforms in improving the academic level of collegians, using a case study approach at Alshemal College of Medical Sciences and Technology. Grounded in the Technology Acceptance Model (TAM), the research analyzed the perceptions of 194 male and female first-level students regarding the AI platforms' usefulness, ease of use, academic engagement, and potential barriers to adoption. The findings support the transformative potential of AI. All four hypotheses were statistically significant: Students report that AI improved understanding of topics and exam preparation. Respondents suggested a low barrier to technological adoption. AI significantly enhanced academic engagement, fostering increased interest and promoting independent learning. The study also identified significant barriers to sustained adoption. Students expressed considerable concern regarding data privacy and the pedagogical risk of over-reliance, which could potentially hinder the development of intrinsic problem-solving skills. Technical instability was also a noted practical barrier. While AI platforms are highly effective tools that increase student engagement and confidence, their successful, long-term integration into higher education mandates immediate institutional action. This must involve establishing clear data governance frameworks and developing AI literacy policies to ensure responsible use and attenuate the identified risks of privacy erosion and cognitive dependence.

Keywords: AI, Higher Education, Academic Performance, TAM, Perceived Usefulness, Student Engagement, Data Privacy.

1. Introduction

The rapid advancement of Artificial Intelligence (AI) has led to new era of technological revolution in various field, including higher education. No doubt the transformative ability of AI in improving academic outcomes for collegians is becoming increasingly evident. AI-powered tools and platforms are reshaping traditional learning environments by offering personalized learning experiences, streamlining administrative tasks, and providing innovative solutions for teaching and research. Historically, educational approaches have often struggled to cater to the diverse learning needs of individual students. AI presents a promising solution to this long-standing challenge by enabling adaptive learning pathways and providing tailored support. However, the blend of AI into higher education has its complexities. Concerns regarding data privacy, academic integrity, and the potential for widening the digital divide necessitate careful consideration and the development of strong ethical guidelines. Furthermore, the responsible and effective implementation of AI requires a nuanced understanding of its capabilities and limitations, as well as a commitment to fostering AI literacy among both students and educators. This paper will delve into the current applications of AI in higher education, examining how these technologies contribute to improve students' engagement, academic performance, and overall learning efficiency. It will also explore the emerging trends and future prospects of AI in higher education

2. Study Hypotheses

1. Collegians who use an AI-powered learning platform will report higher levels of engagement than those who do not.
2. Perceived Usefulness of the AI platform will be a significant positive predictor of academic performance among collegians in the treatment group.
3. Perceived Ease of Use of the AI platform will be a significant positive predictor of its adoption and continued use among collegians.
4. Collegians will identify specific challenges, including data privacy concerns and the potential for over-reliance, as significant barriers to AI adoption in learning.

3. Literature Review

The landscape of higher education is perpetually evolving, facing persistent challenges such as diverse student readiness, increasing enrollment, and the need for personalized instruction within large classroom settings (Bozkurt, 2023). In response, Artificial Intelligence has emerged as a transformative force with the potential to redefine pedagogical approaches and improve student outcomes. The integration of Artificial Intelligence into higher

education has emerged as a significant area of study, with a growing body of literature exploring its diverse impacts on collegians' academic levels. This review synthesizes current research on the benefits, challenges, and future prospects of AI in higher education, drawing upon recent findings and expert analyses.

3.1 AI Applications in Higher Education

One of the most prominent benefits of AI in higher education is its capacity to facilitate personalized learning experiences. Adaptive learning platforms leverage AI to tailor educational content and pace to individual student requirement, thereby improving engagement and academic achievement. This personalization allows students to progress at their own speed and in their preferred learning style, which has been shown to improve academic performance (Vieriu & Petrea, 2025). AI also plays a crucial role in providing enhanced support for both students and faculty. AI-powered teaching and learning assistants offer personalized educational support by answering questions, providing explanations, and delivering feedback on assignments. This assistance helps students grasp complex concepts more effectively and efficiently. For faculty, generative AI tools like ChatGPT aid in developing accessible course materials, including lecture notes, quizzes, assignments, and multimedia content, and facilitate interactive learning activities. Beyond direct instructional support, AI tools such as Grammarly, Humantelligence, and Microsoft Copilot contribute to improved writing skills, foster collaborative work environments, and automate routine tasks for both students and educators, thereby boosting overall productivity and effectiveness (American College of Education, 2025).

Furthermore, AI's applications extend to drawing administrative tasks and providing advanced analytics. AI can automate repetitive processes such as admissions, grading, and scheduling, freeing up educators to focus on more critical duties like student engagement and personalized support. AI chatbots, for instance, can efficiently handle common student inquiries. Crucially, AI can identify students at risk of academic difficulties, enabling early interventions and continuous tracking of academic progress to optimize learning outcomes (University of St. Augustine for Health Sciences, 2025). This data-driven approach allows for proactive measures to maintain and improve student success.

3.2 Challenges and Ethical Considerations of AI in Higher Education

Despite its benefits, AI in education raises ethical concerns, including data security, algorithmic transparency, and the potential reduction of human interaction in learning (Selwyn, 2019). Over-reliance on AI may also hinder critical thinking and creativity among students (Roll & Wylie, 2016). Data privacy and security are paramount concerns, as AI systems often require access

to sensitive student data. This raises critical questions about how such data is collected, stored, and utilized, necessitating robust institutional policies and ethical guidelines to ensure data protection potential for AI hallucinations, where AI tools generate misleading or inaccurate information, also poses a risk, underscoring the need for human oversight to validate AI outputs (American College of Education, 2025).

Academic integrity and plagiarism are also major points of contention. While AI can be a valuable tool for brainstorming, idea generation, and grammar checks, there is a fine line between acceptable use and over-reliance that could undermine students' critical thinking skills and lead to academic misconduct. Educational institutions must develop clear policies on the ethical use of AI in academic work to prevent misuse (American College of Education, 2025). The potential for AI to widen the digital divide is another concern, as unequal access to technology and AI tools among underserved populations could lead to disparities in learning opportunities (University of St. Augustine for Health Sciences, 2025).

literature extensively documents considerable challenges. A paramount concern is algorithmic bias AI systems trained on biased historical data can perpetuate and even amplify existing inequalities, leading to unfair outcomes for underrepresented student groups (Baker & Hawn, 2021). This raises critical questions about equity and fairness in AI-driven education. The personalized learning enabled by AI requires the collection and analysis of vast amounts of sensitive student data, creating risks related to ownership, consent, and protection under regulations like FERPA (Zawacki-Richter et al., 2019). A more pedagogical concern is the potential for AI to erode metacognitive skills. Over-reliance on AI-driven pathways could impair a student's ability to self-assess, plan their learning, and develop resilience in the face of academic challenges (Selwyn, 2022). Additionally, the "black box" problem where the AI's decision-making process is unintelligible can hinder transparency and trust, making it difficult for students to learn from the feedback provided (Knight, 2019). Practical implementation barriers exist, including high costs, the need for robust technological infrastructure, and a lack of adequate training for faculty, which can limit effective adoption (Crompton & Song, 2021).

Other risks include the simulation of human judgment in high-stakes decisions like grading or admissions, the loss of critical thinking and creativity if students become overly dependent on AI, and insufficient data protection leading to privacy breaches; the lack of AI literacy among leadership and faculty can also hinder effective integration and lead to misjudgments regarding AI capabilities and limitations (EDUCAUSE, n.d.).

3.3 AI Applications for Personalized Learning and Academic Support

A significant body of literature focuses on AI's capacity to personalize education. Intelligent Tutoring Systems are frequently highlighted as a primary application. These systems simulate one-on-one human tutoring by providing immediate feedback, hints, and personalized learning paths based on individual student performance (Nye, 2015). Research by Ma et al. (2014) demonstrated that ITS consistently lead to significant learning gains, often outperforming traditional instruction in STEM fields by adapting to each learner's pace and knowledge gaps.

Closely related are adaptive learning platforms, which use algorithms to curate and adjust instructional content in real time. These platforms diagnose student understanding and present material calibrated to their zone of proximal development, preventing cognitive overload and boredom (Somyürek, 2015). A study by Tyton Partners (2016) found that institutions implementing adaptive learning courses reported higher pass rates and increased student engagement, suggesting a direct positive impact on academic performance.

Beyond content delivery, AI-powered automated assessment tools are revolutionizing feedback mechanisms. Tools like automated writing evaluation software can provide instant, formative feedback on grammar, structure, and argument coherence, allowing students to revise iteratively and freeing instructors to focus on higher-order conceptual feedback (Williamson, 2017). Similarly, learning analytics and predictive modeling leverage large datasets to identify students at risk of failing or dropping out, enabling timely and targeted interventions from academic support services (Siemens & Long, 2011).

3.4 Theoretical Underpinnings

The effectiveness of these AI applications is often explained through established educational theories. The personalization offered by ITS and adaptive platforms aligns with Cognitive Load Theory (Sweller et al., 2011), as AI can manage intrinsic load by sequencing content and reduce extraneous load by providing clear, tailored instruction, thereby freeing cognitive resources for germane learning (Somyürek, 2015). The adoption of these technologies by students and faculty can be understood through the Technology Acceptance Model (Davis, 1989). Research indicates that the perceived usefulness of an AI tool (e.g., its ability to improve grades) and its perceived ease of use are critical determinants of its successful integration and, consequently, its impact on academic outcomes (Almarzouqi et al., 2022).

3.5 AI in Learning

AI-powered adaptive learning systems tailor educational content to individual student needs, improving comprehension and retention (Luckin et al., 2016). These systems analyze student performance in real-time, adjusting difficulty levels and providing customized feedback (VanLehn, 2011). Studies indicate that AI-driven personalization enhances student engagement and

academic performance (Popenici & Kerr, 2017). AI-based grading systems reduce instructor workload while providing instant feedback, allowing students to identify and rectify mistakes promptly (Dikli, 2006). Natural Language Processing tools enable automated essay scoring, ensuring consistency and objectivity (Shermis & Burstein, 2013). Research suggests that timely AI-generated feedback improves learning outcomes (Zawacki-Richter et al., 2019).

Predictive analytics in education leverages AI to identify at-risk students by analyzing engagement patterns and academic history (Sclater et al., 2016). Institutions use these insights to implement early interventions, improving retention rates (Arnold & Pistilli, 2012). However, concerns about data privacy and algorithmic bias remain critical considerations (Williamson, 2017).

3.6 The Future of AI in Higher Education

The future of AI in higher education is characterized by immense promise and ongoing innovation. One exciting development is AI potential to enhance virtual and augmented reality experiences, creating immersive learning environments that simulate real-world scenarios and provide hands-on learning opportunities. Examples include virtual science labs like Labster and interactive platforms like Engage (American College of Education, 2025). Generative AI, in particular, is poised to revolutionize content creation, enabling professors to develop innovative teaching materials, simulations, and virtual labs that enhance student learning and creativity (University of St. Augustine for Health Sciences, 2025). Perhaps most importantly, AI is set to significantly improve accessibility for students with disabilities. Tools offering real-time captioning and transcription services (e.g., Microsoft Teams, Otter.ai) convert spoken language into text, making discussions and lectures accessible to students with hearing impairments. Similarly, text-to-speech converters (e.g., Natural Reader, Kurzweil 3000) assist students with reading disabilities or visual impairments (American College of Education, 2025). By identifying and adapting to unique learning styles and reducing language barriers, AI fosters more inclusive and supportive learning environments for all students (University of St. Augustine for Health Sciences, 2025). As AI continues to evolve, its thoughtful and strategic implementation will be crucial for higher education institutions to meet the evolving needs of the workforce and community, ultimately shaping a more personalized, efficient, and accessible educational landscape.

4. Methodology

The study aimed to investigate the role of AI in improving collegians academic level, to achieve the objective of the study the researcher designed a questionnaire consist of (16) items categorized into five groups aligned with the hypotheses of the study, the study applied at Alshemal College of Medical Sciences and Technology – first level (2025). The descriptive method was used to analyze the primary data.

5. Results & Discussion

5.1 First Hypothesis (H1): Perceived Usefulness of AI platforms will be a significant positive predictor of academic performance among collegians in the treatment group.

Items	N	Agree	Neutral	Disagree	Mean	Std. D	T. value	Sig .
Using AI platforms helped me understand course concepts more effectively.	194	175	16	3	1.1134	.36353	42.660	.000
The personalized feedback from AI platforms improved my learning quality.	194	153	33	8	1.2526	.52217	33.411	.000
I found AI platforms useful for preparing for exams and quizzes.	194	155	25	14	1.2732	.58708	30.206	.000
AI platforms were useful for my academic performance and increased my productivity	194	138	41	15	1.3660	.62344	30.517	.000

Table (1) H1 results

Data in table (1) strongly suggests that college students found the AI platforms highly useful for their academic endeavors. For all four items, the vast majority of the (194) participant agreed with the positive statement regarding the AI platform's usefulness. (90.2%) of students agreed that using AI platforms helped them understand course concepts more effectively, and (78.9%) agreed that the personalized feedback from AI platforms improved their learning quality. (79.9%) of participant agreed they found the platforms useful for preparing for exams and quizzes. The majority of students (71.1%) agreed that AI platforms were useful for their academic performance and increased their productivity. The statistical results provide strong support for the students' positive perception of the AI platforms the P. value of (.000) indicates that the positive mean scores observed are highly statistically significant.

The statistical results strongly align with the direction of the hypothesis: "Perceived Usefulness of AI platforms will be a significant positive predictor of academic performance among collegians in the treatment group." Since the students reported a high level of perceived usefulness across areas directly related to academic performance (understanding concepts, exam prep, productivity), and these perceptions are highly statistically significant, the findings support the first half of the hypothesis: The perceived usefulness is very high.

5.2 Second Hypothesis (H2): Perceived Ease of Use of AI platforms will be a significant positive predictor of its adoption and continued use among collegians.

Items	N	Agree	Neutral	Disagree	Mean	Std. D	T. value	Si g.
Learning to interact with AI platforms was easy for me.	194	143	32	19	1.3608	.65476	28.948	.000
I found AI platforms flexible to interact with.	194	153	30	11	1.2680	.55785	31.660	.000
It was easy for me to become skillful at using AI platforms.	194	127	41	24	1.4588	.70590	28.784	.000
I found AI platforms easy to use.	194	156	28	10	1.2474	.53926	32.220	.000

Table (2) H2 results

The analysis of the study strongly suggests that collegians have a highly positive perception of AI platforms in two crucial aspects: Usefulness and Ease of Use. Both hypotheses presented (H1 regarding Perceived Usefulness and H2 regarding Perceived Ease of Use) are greatly supported by the students' responses.

The results confirmed that students do not perceive a significant barrier to using the technology. The majority of students found the platforms easy to interact with, with (80.4%) agreeing that the platforms were simply "easy to use." Even learning how to become skillful at using the AI platforms was found to be easy by (65.5%) of the respondents. The statistical results demonstrate that this positive perception of low effort and high flexibility is highly significant. This finding is crucial, as the Technology Acceptance Model (TAM), upon which H2 is likely based, posits that an easy-to-use system is more likely to be adopted and continually used by students. Therefore, the data strongly confirms the foundational variable for the hypothesis, suggesting that ease of use will be a significant positive predictor of sustained adoption.

The study successfully established that students view the AI platforms as both highly useful and remarkably easy to use. These two factors are critical precursors for the successful adoption and integration of any new technology in an educational setting. The strong, statistically significant agreement on both usefulness and ease of use lays a robust foundation for the study's overall conclusion: that AI platforms have a high potential to positively influence collegians' academic levels.

5.3 Third Hypothesis (H3): Students who use an AI-powered learning platform will report higher levels of engagement than those who do not.

Items	N	Agr ee	Neut ral	Disag ree	Mea n	Std. D	T. value	Si g.
Using AI platforms made me more interested in the course topics.	194	156	23	15	1.2732	.59584	29.762	
I felt more motivated to complete my coursework when using AI platforms.	194	144	27	23	1.3763	.68866	27.836	.000
AI platforms helped me identify my specific strengths and weaknesses in the subject.	194	148	23	23	1.3557	.68462	27.581	.000
I felt more confident in my abilities in courses when using AI platforms.	194	143	25	26	1.3969	.71417	27.244	.000
AI platforms helped me become a more independent learner.	194	141	31	20	1.3660	.66370	28.667	.000

Table (3) H3 results

The results clearly indicate a statistically significant and positive perception among the students that the AI platforms increased their academic engagement across multiple dimensions. The use of AI platforms appears to directly stimulate both the students' interest and motivation. Over (80%) of students agreed that using AI platforms made them more interested in the course topics, demonstrating a behavioral effect on their attentiveness and focus. Furthermore, (74.2%) reported feeling more motivated to complete their coursework, suggesting a positive influence on their persistence and effort. This motivational boost is complemented by an increase in self-efficacy, as (73.7%) of students felt more confident in their abilities in the courses after using AI tools.

Beyond simple interest, the AI platforms fostered deeper cognitive engagement. A high percentage of students recognized the platform's ability to support self-regulated learning. For instance, (76.3%) agreed that AI platforms helped them identify their specific strengths and weaknesses in the subject. This

personalized insight is significant for effective studying. Correspondingly, (72.7%) reported that AI tools helped them become more independent learner, which is arguably the highest measure of deep, sustained academic engagement. The findings strongly validate the foundational premise that the AI platform facilitates high levels of student engagement.

5.4 Fourth Hypothesis (H4): Collegians will identify specific challenges, including data privacy concerns and the potential for over-reliance, as significant barriers to AI adoption in learning.

Items	N	Agree	Neutral	Disagree	Mean	Std. D	T. value	Sig .
I was concerned about how my data (performance, clicks, time spent) was being used by AI platforms.	194	110	46	38	1.6289	.79271	28.620	.000
I felt that I might become overly reliant on AI platforms and not develop my own problem-solving skills.	194	107	32	55	1.7320	.87588	27.542	.000
I encountered some technical problems such as bugs, errors and confusing interfaces while using the platforms.	194	92	42	60	1.8351	.87190	29.314	.000

Table (4) H4 results

The result proved that collegians recognize specific challenges associated with AI use, primarily centered around data privacy and the risk of over-reliance. These concerns are identified as significant potential barriers to AI adoption. It also provided statistically significant support for Hypothesis four: that collegians will identify specific challenges as significant barriers to AI adoption in learning. This contrasts with the previous findings of high usefulness and ease of use (H1 and H2), highlighting a necessary awareness of the exchange involved in educational technology.

The two core barriers identified by the students were data privacy and the potential for over-reliance. The most prominent concern was data privacy, with (56.7%) of students agreeing that they were worried about how their performance data, clicks, and time spent were being used by AI platforms. This indicates a fundamental trust deficit that institutions must address through clear, ethical data governance policies. Closely following this (55.2%) of students expressed concern about the risk of becoming overly reliant on the AI platforms,

potentially hindering the development of their own critical problem-solving skills. This suggests that students are actively considering the pedagogical impact of the technology, recognizing the fine line between helpful support and detrimental dependence.

While the platforms were generally perceived as easy to use (H2), the data reveals that nearly half of the students (47.4%) encountered technical problems such as bugs, errors, and confusing interfaces. This finding serves as a practical warning: even the most useful and engaging platform will struggle with sustained adoption if it is not technically stable and flawlessly executed. Addressing these usability issues is a non-negotiable step to convert positive perceptions into long-term integration into the academic workflow.

6. Discussion

The study aimed to investigate the role of AI in improving the academic level of collegians, focusing specifically on their perceptions of usefulness, ease of use, engagement, and potential barriers to adoption at Alshemal College. The analysis of student responses across all four hypotheses provided statistically significant findings that collectively affirm the transformative potential of AI in this higher education setting, while simultaneously identifying critical areas for institutional policy and technical refinement.

6.1 Validation of the Technology Acceptance Model

The findings from the first two hypotheses (H1 and H2) strongly validate the core tenets of the Technology Acceptance Model as applied to educational technology adoption (Davis, 1989; Almarzouqi et al., 2022). Students exhibited an overwhelmingly positive perception of the AI platform's Perceived Usefulness (H1), with the vast majority agreeing that it improved concept understanding (90.2%), personalized feedback (78.9%), and productivity. This suggests that the platform successfully met the fundamental academic needs of the students by directly assisting with exam preparation and enhancing learning quality.

Correspondingly, the high agreement on Perceived Ease of Use (H2), with (80.4%) finding the platform simply "easy to use," confirms that the technology presents a low cognitive barrier to entry. This dual finding of high usefulness and high ease of use establishes a powerful foundation for predicting successful, sustained adoption and integration of AI tools into the curriculum, confirming the study's central proposition.

6.2 The Impact of AI on Student Engagement and Autonomy

The results supporting the third hypothesis (H3) provide crucial insight into the pedagogical benefits of AI beyond mere utility, specifically regarding academic engagement and self-regulated learning. The AI platform acted as a catalyst for intrinsic motivation, with a high percentage of students reporting increased interest (over 80%) and motivation to complete coursework (74.2%). This aligns with literature on Intelligent Tutoring Systems (ITS), which demonstrate that immediate, adaptive feedback and personalized pathways boost student morale and persistence (Nye, 2015).

More significantly, the AI tools fostered independent learning. A large majority of students agreed that the platforms helped them identify their personal strengths and weaknesses (76.3%) and become more independent learners (72.7%). This ability of AI to provide metacognitive support (helping students understand how they learn) is arguably the highest measure of deep, sustained academic value and suggests a shift toward more autonomous student behavior, a critical skill for success in higher education.

6.3 Identifying Critical Barriers: Privacy, Dependence, and Usability

While the benefits were pronounced, the fourth hypothesis (H4) confirmed that collegians are acutely aware of the risks, identifying specific challenges that could serve as barriers to wider adoption. The two most prominent concerns were data privacy (56.7% agreement) and the potential for over-reliance (55.2% agreement). The privacy concern reflects the broader ethical discourse in the literature (Selwyn, 2019), underscoring a fundamental trust gap that institutions must bridge through transparent data governance and strong security protocols.

The worry about over-reliance is a significant pedagogical finding. It indicates that students actively recognize the delicate balance between helpful AI support and the detrimental erosion of their critical thinking and problem-solving skills (Roll & Wylie, 2016). Institutions must proactively address this through clear policy on the ethical, responsible, and complementary use of AI, ensuring it is used as a tool for augmentation, not replacement, of cognitive effort. Furthermore, the practical issue of technical problems encountered by nearly half the students (47.4%) is a non-negotiable usability issue that must be resolved to guarantee consistent long-term integration.

7. Summary of Findings

Based on the quantitative analysis of 194 collegians at Alshemal College of Medical Sciences and Technology, the study's principal findings are as follows:

Collegians reported that AI platforms are highly useful for improving academic performance, particularly in understanding concepts and preparing for exams.

Students found the AI platforms easy to interact with, flexible, and simple to learn, suggesting low implementation barriers for continued adoption.

The use of AI platforms significantly increased students' interest and motivation in coursework, boosted their self-confidence, and fostered a greater sense of independent learning.

Students actively recognized major challenges, primarily concerning the security and usage of their personal data (data privacy), and the risk of developing an excessive dependence on the tools, which could hinder their intrinsic problem-solving skills. Technical instability (bugs and confusing interfaces) was also identified as a practical barrier to consistent use.

8. Recommendations and Suggestions

1. Establish a Transparent Data Governance Framework.
2. Develop an AI Literacy Curriculum and Usage Policy.
3. Prioritize Technical Stability and User Experience.
4. Leverage AI for Early Intervention.
5. A follow-up study should assess if the implementation of a clear data governance and ethical use policy reduces student concerns about privacy and over-reliance, serving as an empirical test of the institutional recommendations.
6. Research should investigate the perceived usefulness and ease of use among faculty, as their readiness and ability to effectively integrate AI tools are critical to maximizing the benefits for students.

9. Conclusion

This study successfully demonstrated that AI platforms hold a significant and statistically positive potential to enhance the academic journey of collegians at Alshemal College of Medical Sciences and Technology. The findings reveal a powerful acceptance of AI driven by its perceived utility in improving learning quality and its ease of use, which directly contributed to higher levels of academic engagement, motivation, and, critically, the development of independent learning skills. The research concludes with a cautionary note: this potential cannot be fully realized until the associated ethical and technical challenges are systematically addressed. The students' profound concerns over data privacy and the pedagogical risk of over-reliance demand immediate institutional action through clear policy and ethical governance. By addressing these barriers while simultaneously leveraging the validated benefits of AI, higher education institutions can thoughtfully and effectively usher in a new era

of personalized and efficient learning, thereby improving overall collegian academic levels.

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