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An Analysis of Factors Influencing AI Adoption among Higher Education Students

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Abstract. As the digital transformation of global higher education deepens, the widespread adoption of artificial intelligence (AI)-assisted tools is profoundly reshaping educational paradigms and academic collaboration models. However, most current research focuses solely on single technical attributes such as accuracy or processing speed, with a significant lack of exploration into the interplay between institutional policies, cultural orientations, and individual socioeconomic status. This study employs the Technology Acceptance Model (TAM) as its core analytical framework—effectively explaining individual adoption—to investigate the combined effects of technological attributes, institutional environments, and individual differences on university students' willingness and depth of AI tool adoption. It examines three primary cases: the campus proliferation of Grammarly, the Russell Group's ethical policy formation process, and ChatGPT's progressive payment model. Findings reveal that perceived value is a necessary condition for technology adoption, while meso-level institutional orientations and normative ethical reasoning serve as key variables moderating students' technological readiness and reducing adoption anxiety. Notably, income disparities are emerging as an invisible technological barrier.

Keywords: Artificial intelligence adoption, Higher education, Technology acceptance model, Digital divide, Ethical awareness.

1. Introduction

As university education undergoes digital transformation, the integration of artificial intelligence (AI) tools is reshaping pedagogical practices and collaborative learning. While existing research has predominantly focused on the technical attributes of AI tools (e.g., accuracy and efficiency), it has largely overlooked the critical interplay among institutional policies, cultural norms, and individual socioeconomic status in shaping adoption behavior [1]. This gap creates a limitation for educators regarding outreach alternatives to promote more inclusive student engagement with AI tools.

The study will give a detailed analysis of the latent constructs affecting students' intention to adopt AI technology in higher education through the mediating roles of technology features, organizational support and individual differences in students' adoption intentions. The study will be restricted to the role of these variables in improving students' co-performance in school activity. Specifically, this study addresses three core questions:

·How do technological factors such as perceived ease of use directly impact adoption?

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·To what extent do institutional policies and ethical guidelines moderate students' willingness to engage?

·How do individual differences, particularly socioeconomic status and academic experience, jointly determine the depth of AI integration?

By integrating the Technology Acceptance Model (TAM) with Diffusion of Innovations and the Technology-Organization-Environment (TOE) framework, this study systematically investigates the multilevel determinants of AI adoption across technical, institutional, and individual dimensions.

The study narrows down to the case studies of Grammarly on campus, the Russell Group's activity in formulating policies, and the contrasting paid service of ChatGPT.

This research has important theoretical and practical implications. From the theoretical standpoint, through an extensive exploration of the implications of three dimensions (i.e., technical, contextual, and personal), this research contributes to the pragmatic validation variant of the TAM framework. Particularly, the research shows the implications of non-technical elements on the students' adoption of technology in a higher education setting.

2. Technical level

The perceived usefulness and the perceived ease of use are the two main reasons for the students' adoption of AI. The Grammarly Usage Survey administered by the University of Illinois at Chicago provides statistical background that supports this claim. Experts examining the ease-of-use construct report that 83% of users find the application simple to install and configure, indicating a low technical barrier to adoption. Regarding perceived usefulness, 85% of users of the application believe they use the application every day or every week as it effectively minimizes writing errors, and 82% believe it makes understanding the reader easier [2]. The beneficial effect can manifest itself in the behavior of non-native English speakers, and instructors particularly highlight the tool's conformity with the school's mission, that is, promoting inclusivity and catering to diverse learners, since it can help students overcome language barriers in an effective way. This divergence can be attributed to differences in AI functionality: Grammarly is an assistive proofreading tool with clear boundaries and verifiable outputs, whereas generative AI relies on complex contexts and individual writing styles [2].

This case serves as robust evidence for the assumptions held by the TAM and its extensions, which state perceived usefulness and ease of use have considerable positive influences on the students' intentions to adopt [3]. Students view such AI as a complementary resource for answering questions, brainstorming, and refining analyses to support their learning. High usability lowers adoption barriers and further increases usage frequency [4]. This extensive adoption trend supports the compatibility factor, for when innovative technologies have high compatibility in terms of value prioritization, current situation and practice, and the specific needs of the potential adopter demographic, it increases their intent to adopt remarkably [5]. The visibility enhancement and mistake decrease reported in the case support the favorable moderation of output quality on perceived usefulness. The quality of output positively influences students' awareness of the verifiability of outputs [3]. Furthermore, the non-native speakers' dependence on this tool corroborates the feasibility of AI in heterogeneous classrooms; hence, perceived usefulness varies not just with the tool itself but also with whether the tool assists different types of learners, offering necessary improvement resources and enhancing their learning.

Moreover, user confidence identified in the survey is directly associated with user satisfaction, a key positive factor influencing students' continuous intention to adopt AI. This general awareness of tools greatly enhances students' perceived usefulness, resulting in favorable attitudes and intentions

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[6]. Conversely, user dissatisfaction arising from a lack of situational familiarity with generative AI capabilities, coupled with poor interactivity and weak technical design, presents a significant challenge [7]. When the technology's ability to produce the results required by the task or concern about the precision of the results could cause distrust, the psychological distrust may lower the willingness to adopt, indicating that adopting AI is not only a technical parameter issue but also a psychological preparation issue [8]. Although it has been suggested that information accuracy may not be the only factor that affects adoption [4], in this case, it is obvious that the effectiveness of functionality is the element that can create stickiness for the users. If the technology has not reached the desired state of readiness or has some unreliability in terms of the user experience, the students would resist. Therefore, the practicality of technological functions and the optimization of user experience together form the foundation for students to adopt AI, which also raises the question of how to further regulate and guide the application of this technology in the institutional and cultural environment. In order to close these gaps, the developers can create discipline-specific corpora or intent-recognition modules/intention recognition modules, which will improve context understanding. Besides, schools and universities must offer specific educational assistance to students so they can learn to use generative tools at higher or more advanced levels.

3. Cultural background

The implementation of artificial intelligence is governed by a complicated framework of cultural levels where macro-level societal customs influence the overall advancement, mid-level institutional policies and ethical guidelines provide authoritative directions, and micro-level individual norms play a crucial role in influencing human behaviors through peer and faculty interferences. The co-creation of generative AI principles by 24 Russell Group universities is a case study, which shows that elite universities have transitioned from a prohibitive defense mentality to a proactive adjustment mentality. Vice-principals of all schools jointly signed the code, aiming at taking advantage of the transformative opportunities brought by AI and protecting the academic rigor and integrity of higher education [9]. These guidelines explicitly state that universities should support students and staff in developing AI literacy, respond to the widespread use of generative AI by adapting teaching and assessment methods rather than simply imposing bans, and emphasize educating students about the risks of plagiarism, bias, and inaccuracy [9]. Professor Andrew Brass of the University of Manchester particularly emphasized the importance of working with students to develop guidelines, pointing out that restrictions should not be imposed solely top-down, but the reasons behind the rules must be clearly explained to students; otherwise, students will always find ways to bypass restrictions [9]. Professor Michael Grove from the University of Birmingham also pointed out that this should be seen as an opportunity to rethink the role of assessment, rather than a threat, and the use of AI can help students better evaluate their own educational benefits.

Current literature supports the necessity of ethical awareness to improve students' intention of AI adoption, and awareness of ethical policies may help positively orient this intention [7]. The case of an inclusive learning culture demonstrates that trust and prior knowledge serve as key antecedents of behavioral intention. Higher education institutions can enhance students' trust in technology by clarifying the legal nature of AI through institutional policies [1]. The case of the Russell Group shows the importance of the Facilitating Conditions level, which means that having a perception of using existing organizational and technical infrastructural orientation systems, the intention to adopt it by students would substantially increase [5]. Moreover, the subjective norm will also have an indirect impact on the adoption intention through the moderation of the perceived usefulness. Since authorities and teachers acknowledge and regulate the implementation of AI, students are more

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likely to consider this technology useful for academic purposes. Additionally, formal training can significantly deepen the perceived usefulness and indirectly enhance the frequency of use by relieving students' worries about the accuracy of AI, and the protection of privacy and ethics. This positive orientation can reduce students' anxiety stemming from security concerns and fears of technological replacement, helping them achieve the psychological readiness needed to better accept new technologies [8]. More exposure and experience in formal educational training often make students more optimistic towards AI, whereas the absence of such a direction can cause them to refuse to adopt it due to uncertainty [10]. Therefore, technological support and AI Strategic Alignment offered by institutions are vital environmental elements needed to help students integrate AI applications smoothly [5]. While supportive culture is set by the policy of the institution, individual variation helps to achieve equity in adoption. Socioeconomic status is the primary factor that determines access, while academic background is the moderating factor that affects acceptance and access perception by students.

4. Individual differences

As for individual differences, access rights common to social-economical status constitute the digital divide that strongly impacts students' readiness to accept AI technology. Currently ChatGPT is split into the free version and the paid Plus subscription, and this type of economic barrier determines the stratification of students' technological experience. Assessment of paid subscription privileges shows that, in addition to faster response and high priority in accessing the service, it also includes GPT-4o power and Sora video generation options, while free tier clients face the ultimate limitation of 10 messages every 5 hours, and being pushed to use a downgraded GPT-5 mini version under heavy traffic [11]. This functional hierarchy is particularly evident in academic research scenarios. For students who need to perform serious deep literature research, the free version only provides a maximum of 4 "deep research" functions per month, while the paid version has 24 functions and can connect to personal data like Google Drive for better results [11]. Moreover, paid users can develop custom GPTs and utilize the Canvas collaboration feature for writing or programming activities, resulting in limited memory or restricted capabilities when performing complex tasks [11].

This remarkable service disparity is evidence that perceived costs dramatically destruct adoption intentions, showing that financial resources have become the major hindrance for students to leverage high-standard AI products, as in [4]. While the free version may suffice for leisure users who only need to handle basic homework assignments, the $20-per-month subscription comes as a major hindrance for students passionate about using AI to enhance their academic competitiveness [11]. An article has argued that low social status students may struggle to cover such supplementary costs, and this difference in availability is a factor that can detract from their perceived usefulness because they do not achieve the enhancement in productivity that arises from adopting advanced models of technology, which in turn increases the digital gap [6]. When the students do not have availability of the resources, they will never get an opportunity to familiarize themselves with AI tools, and this is a direct suppression of the positive relationship between facilitating conditions and adoption intentions [5].

Beyond economic factors, a student's major field and the experience accumulated along their academic pathway also serve as important moderators in the technology adoption process.

Experienced students often have a greater ability to adapt to technologically demanding environments while inexperienced students, who may have only experienced the limited capabilities of AI when using free upper and lower boundaries, may generate negative beliefs from poor experiences. Mishra & Mishrana stated that exposure plays an important role in constructing

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opinions and having good personal experience to facilitate a good understanding of the capabilities of AI education [10]. However, the formation of this positive cognition depends on equal access. If students are excluded from advanced functions because of their lack of ability to pay, it will be difficult for them to establish enough self-efficacy to control these tools [3]. In addition, the lack of experience in using advanced tools may lead to students' understanding of AI at the basic level, being unable to understand its true value in inclusive learning or complex data analysis, thus inhibiting their willingness to integrate AI into the learning process [1].

5. Conclusion

This study demonstrates that the acceptance of artificial intelligence by students in colleges and universities presents a multifaceted problem where technology features, cultural characteristics, and personal differences are major factors that interact to determine the outcome. It is demonstrated that adoption willingness is contingent on the fundamental prerequisites of perceived usefulness and perceived ease, just as amplifying the perceived efficiency of supplementary AI for writing is crucial. However, with the example of the Russell Group of Universities, it becomes clear that at the meso level institutional guidelines and ethics have an irreplaceable role in creating trust and lowering technical anxiety, and that leading students' adherence to rational and compliant behavior can be done when having well-placed institutional guidance. Most critically, ChatGPT's case of service differentiation shines a spotlight on the payment barrier's role in undermining fairness among scholars since personal economic status and academic experience have a high impact. Finally, the combined effect of what students perceive as value, racial empowerment, and economic accessibility is shaping the scope and speed of adoption of AI technology in higher education.

Although this study is rich in insights with a multi-dimensional approach, limitations still exist. First, although the case study method strengthens the contextual realism of empirical research, the ability to generalize results of research across various geographical environments and cross-regional educational contexts has yet to be tested as the sample data is confined to specific regions with universities. Second, the theory of this research is mainly derived from existing academic literature, public survey reports, and other secondary data, lacking longitudinal data to capture long-term psychological changes of specific groups of students during the adoption of AI technology. Future research should give priority to cross-disciplinary and cross-cultural comparative analysis to verify the stability of influencing factors in different academic fields and cultural backgrounds. At the same time, further research should explore specific paths to bridge the digital divide, particularly in terms of funding from research institutions, open-source alternative solutions, and how school policies can effectively mitigate the negative impact of economic disparities on educational equity.

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