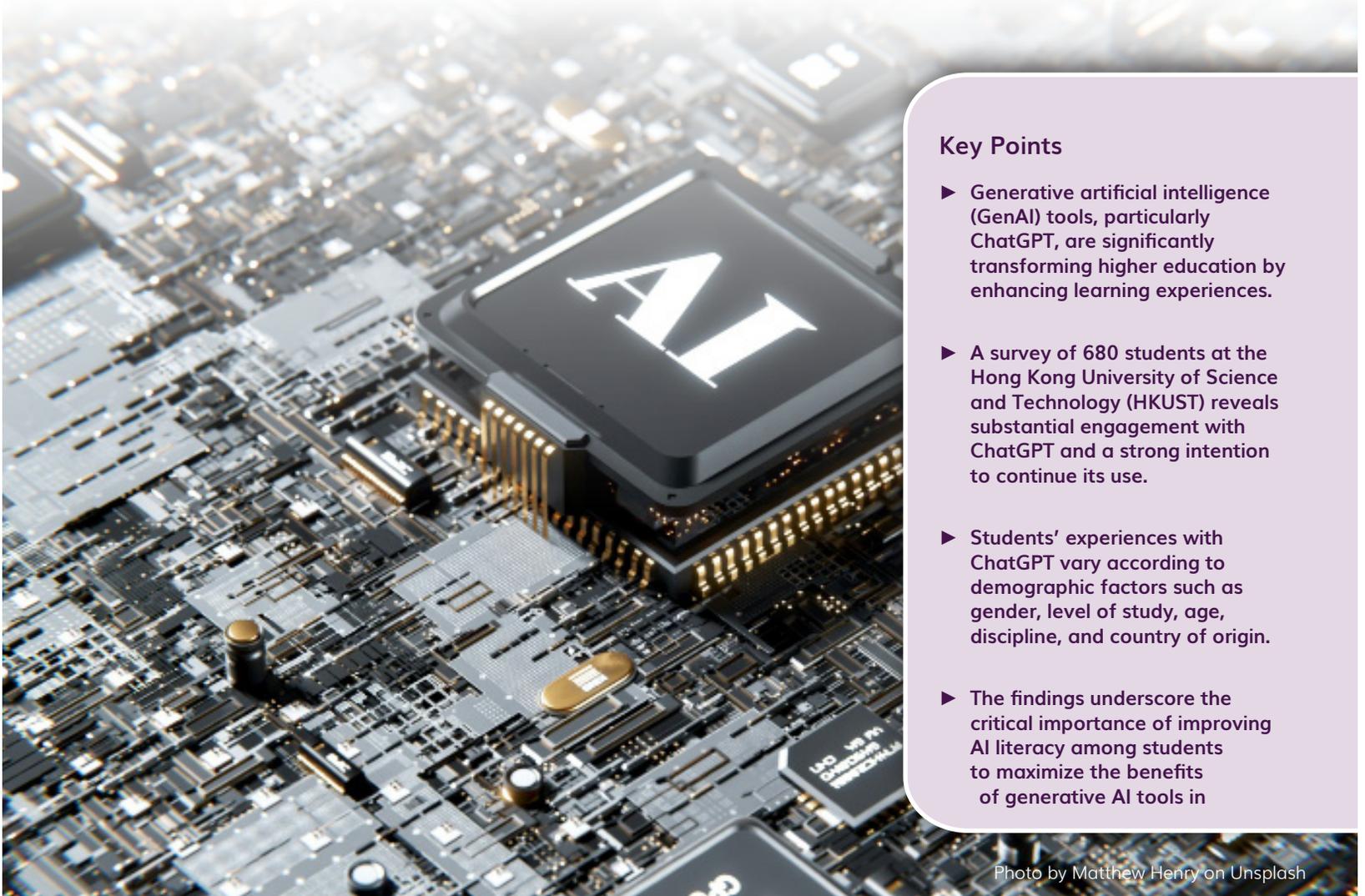


Embracing Generative Artificial Intelligence Tools in Higher Education: A Survey Study at the Hong Kong University of Science and Technology

Jingwei He, Alex, Zhuoni Zhang, Pritish Anand, Sean McMinn



Key Points

- ▶ Generative artificial intelligence (GenAI) tools, particularly ChatGPT, are significantly transforming higher education by enhancing learning experiences.
- ▶ A survey of 680 students at the Hong Kong University of Science and Technology (HKUST) reveals substantial engagement with ChatGPT and a strong intention to continue its use.
- ▶ Students' experiences with ChatGPT vary according to demographic factors such as gender, level of study, age, discipline, and country of origin.
- ▶ The findings underscore the critical importance of improving AI literacy among students to maximize the benefits of generative AI tools in

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Policy Focus

The rapid advancement of generative artificial intelligence (GenAI) tools, especially ChatGPT, is significantly reshaping the landscape of higher education. As universities worldwide integrate these technologies, understanding their effects on student learning and development becomes crucial.

This study focuses on students at the Hong Kong University of Science and Technology (HKUST), one of the pioneering institutions in adopting ChatGPT for educational purposes. By examining students' behavioural and perceptual experiences with ChatGPT, the research aims to reveal

how students perceive the usefulness of GenAI tools such as ChatGPT for their study and career development

The findings are expected to inform higher education policymakers and administrators about how the opportunities and challenges posed by GenAI integration require targeted interventions for different demographics, such as gender, age group, and level of study. Furthermore, this study underscores the necessity of developing robust AI literacy programs to ensure that all students can leverage these tools effectively, promoting

equitable access and maximizing the educational benefits of generative AI in diverse learning environments

Study Methodology

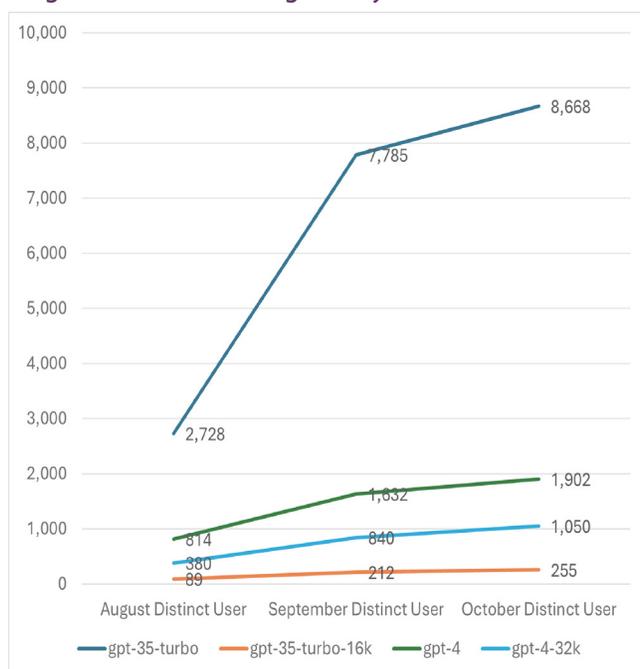
In November 2023, a comprehensive survey was conducted across the Hong Kong University of Science and Technology (HKUST) to assess students' interactions with ChatGPT. The survey focused on four key areas: the frequency of ChatGPT usage, students' intentions to use it as a learning tool in the future, perceived impacts on learning outcomes, and perceived effects on future career opportunities.

To analyse the data, the study employed the Technology Acceptance Model (TAM), which identifies perceived usefulness and ease of use as primary determinants of technology adoption. This methodological approach allowed for a nuanced understanding of the factors influencing students' engagement with generative AI tools, providing valuable insights for enhancing educational practices and policies.

Findings and Analysis

Usage Patterns

Figure 1: ChatGPT usage analysis



Note: This figure presents data on the usage of different models of OpenAI's ChatGPT (in number of users) by HKUST staff and students from August to October 2023. (Source: Authors)

The survey results reveal significant engagement with ChatGPT among students at the Hong Kong University of Science and Technology (HKUST). Notably, 44.71% of respondents reported using ChatGPT more than five times a week, indicating a strong adoption of this technology as a regular study tool.

This high frequency of use suggests that many students find ChatGPT to be an integral part of their academic routine. Furthermore, an impressive 91.69% of students expressed a strong intention to continue utilizing ChatGPT as a learning tool in the future. This intention reflects not only satisfaction with the tool but also a recognition of its potential benefits for their educational journey.

Perceptions of Impact

The students' perceptions of ChatGPT's impact on their academic and professional lives are overwhelmingly positive. 86.47% of respondents believe that ChatGPT positively influences their learning outcomes, suggesting that they view it as an effective aid in their studies.

This perception aligns with the notion that generative AI can enhance personalized learning experiences, making complex subjects more accessible. Additionally, 73.82% of students feel that the skills and knowledge gained from using ChatGPT will be impactful for their future careers. This sentiment highlights the growing recognition of AI tools as valuable resources for developing competencies that are increasingly relevant in today's job market.

Demographic Influences

Demographic factors significantly influence students' experiences and perceptions of ChatGPT. Gender differences emerged, with male students reporting a stronger perception of ChatGPT's impact on both learning outcomes and career prospects compared to their female counterparts.

While the frequency of usage between genders was similar, the variance in perception indicates a need for targeted educational initiatives to ensure that female students also recognize and harness the potential of AI tools effectively.

Age is another critical factor; older students, particularly those aged 23-27 years, reported higher usage frequencies

than younger students. This trend may be attributed to the more complex academic demands faced by older students, who might find greater utility in AI tools like ChatGPT for tackling advanced coursework and research tasks.

Moreover, the country/region of origin plays a role in the engagement levels with ChatGPT. Students from Mainland China demonstrated higher usage rates and more positive perceptions of the tool compared to those from Hong Kong.

This disparity could reflect varying educational cultures and levels of technological acceptance between the two regions, suggesting that Mainland Chinese students might be more accustomed to integrating digital tools into their learning processes.

AI Literacy

A noteworthy finding is that 82.36% of respondents identified themselves as AI literate, indicating a foundational understanding of AI principles and applications. This high level of AI literacy among students is crucial, as it supports

effective engagement with generative AI tools like ChatGPT. Students who possess AI literacy are more likely to utilize these tools optimally, enhancing their learning experiences and academic performance.

Recommendations

Enhance AI Literacy Programs

To maximize the benefits of generative artificial intelligence tools like ChatGPT, universities should implement mandatory AI literacy courses for all students. These courses should emphasize practical applications of GenAI tools within academic contexts, equipping students with the necessary skills to leverage these technologies effectively. Given that 82.36% of students at HKUST identified as AI literate, integrating AI literacy into the curriculum can further enhance this foundational knowledge, ensuring that all students are prepared for an increasingly AI-driven workforce.

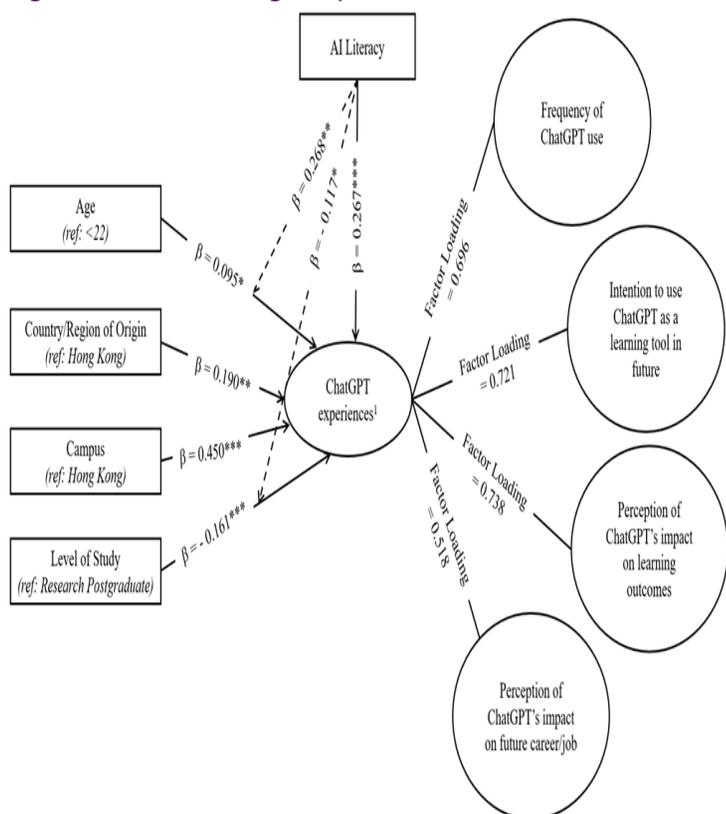
Develop Tailored Support

Recognizing the higher engagement levels among research postgraduate students, universities should develop specialized resources and training that cater specifically to this demographic. These students, who often face complex research tasks, can greatly benefit from targeted support that enhances their use of ChatGPT for academic success. By providing tailored workshops, mentorship programs, and access to advanced AI tools, institutions can foster a more supportive environment that encourages the effective use of GenAI technologies in research and professional development.

Promote Inclusive Engagement

It is essential to promote initiatives that ensure diverse demographic groups, particularly female students, feel confident in their AI literacy and can effectively utilize GenAI tools. The findings indicate a gender gap in perceptions of the impact of ChatGPT, with male students reporting stronger beliefs in its benefits. Universities should create programs that specifically address these disparities, such as mentorship opportunities, workshops, and awareness campaigns aimed at increasing female students' engagement with AI tools. By fostering an inclusive environment, institutions can ensure that all students, regardless of their background, can fully benefit from the advantages that generative AI offers in higher education.

Figure 2: ChatGPT usage, experiences, intentions, AI



Note: This figure illustrates the relationships between ChatGPT experiences, usage frequency, intention to use as a learning tool, perceptions of impact of ChatGPT on learning outcomes and career, and the moderating effects of AI literacy among HKUST students. (Source Authors)

Main Reference

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Prof. Alex Jingwei He is Associate Professor of the Division of Public Policy at The Hong Kong University of Science and Technology, where he also serves as the Acting Director of the Institute for Public Policy. He specializes in policy process theories, policy innovation, and social policy. He has been ranked as the world's top 2% most cited scientists since 2021.



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Pritish Anand is a PhD student in the Division of Public Policy at The Hong Kong University of Science and Technology. He holds a Master's degree in Public Policy. His research areas include social policy, gender inequality, and digital education, particularly in lower-middle-income countries. His work explores how institutions, society, and political economy shape social policy interventions and affect public attitudes, actions, and citizen-state relations in the Global South. Prior to his research journey, Pritish worked with various educational and social sector organizations on education, digital literacy, and gender-targeted projects.



Dr. Sean McMinn is the Director of the Center for Education Innovation at The Hong Kong University of Science and Technology (HKUST). His role includes leading the development of digital education at the HKUST. Sean also currently sits on multiple international committees, including the AI and Education International Panel, Digital Education Council, and the Cyber-Physical Learning Alliance. He has won various awards for his work in digital education, including the 2024 Global MOOC and Online Education Alliance (GMA) Award for his work in AI Education, the 2016 School of Humanities and Social Science (SHSS) Teaching Excellence Award and the Excellence Award and the 2007 Teaching Innovation Award for his work with podcasts and education at HKUST.

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