



Research Article

The Impact of Ethical Norms of Applied Artificial Intelligence on Guizhou College Students' Personalized Learning Satisfaction

Hong Yang^{1*}, Jacky Mong Kwan Watt²

^{1,2} North Bangkok University, Thailand

* Corresponding Author: 844139185@qq.com

Abstract: This study investigates the impact of ethical norms in the application of artificial intelligence (AI) on personalized learning satisfaction among college students in Guizhou. The research focuses on how ethical aspects, such as data privacy, algorithmic fairness, and transparency, affect students' experiences with AI-driven educational tools. It underscores the importance of user control, ethics training, and system transparency in building trust and promoting active engagement in AI-powered learning environments. Findings from a sample of 388 college students reveal that when students are informed about the ethical considerations behind AI technologies and have control over their data, they exhibit higher satisfaction with personalized learning experiences. Furthermore, the study highlights that the integration of ethical principles into AI applications leads to a more supportive and trustworthy educational environment, improving overall learning outcomes. This research emphasizes that ethical AI practices are essential for fostering a positive and productive learning experience in the context of higher education.

Keywords: Applied Artificial Intelligence; Data Privacy; Ethical Norms; Learning Satisfaction; User Control.

1. Introduction

Artificial Intelligence (AI) is being recognized as a pivotal force in transforming education by significantly enhancing personalized learning experiences. By utilizing advanced technologies such as big data analytics, machine learning, and natural language processing, AI can customize educational experiences to meet the individual needs of learners (Chang, Sheng, and Ouyang, 2022). This tailored approach addresses diverse learning styles and paces, providing timely feedback that fosters student engagement and motivation, thereby improving the overall efficiency and effectiveness of educational outcomes. However, integrating AI into educational settings introduces several technical and ethical challenges that are currently the subject of extensive academic discourse (Cukurova, M., Giannakos, M., and Martinez-Maldonado, 2020). One primary concern is data privacy and security, particularly in environments where students' sensitive information is involved. The extensive data collected by AI systems raises important questions about how to protect this information. In addition to privacy issues, fairness and transparency in AI algorithms have emerged as key research topics. There is a significant risk that algorithmic biases could worsen existing disparities in access to educational resources, leading to unequal learning opportunities among different student demographics. For example, if an AI system is trained on data that incorporates societal biases, it may inadvertently perpetuate these biases in its recommendations and decisions (Shen, Yuan, and Wang, 2019). Furthermore, the ethical implications of AI in education necessitate careful consideration. Achieving a balance between personalized learning and educational equity is crucial for fostering an inclusive environment for all learners. Without proper guidance, AI applications could widen the gap between privileged and underserved populations, highlighting the urgent need to address these ethical challenges

Received: September 21, 2025

Revised: October 17, 2025

Accepted: November 09, 2025

Published: November 11, 2025

Curr. Ver.: November 11, 2025



Copyright: © 2025 by the authors.

Submitted for possible open

access publication under the

terms and conditions of the

Creative Commons Attribution

(CC BY SA) license

([https://creativecommons.org/li](https://creativecommons.org/licenses/by-sa/4.0/)

[censes/by-sa/4.0/](https://creativecommons.org/licenses/by-sa/4.0/))

proactively. As higher education increasingly embraces AI technologies, developing frameworks that prioritize equity and inclusivity is essential. This approach will help ensure that all students can benefit from advancements in AI while minimizing potential adverse effects (He, Xiangchun, and Guo, 2021).

2. Research Objectives

This study explores Guizhou college students' learning satisfaction through the ethical norms of Applied Artificial Intelligence (AI) with the following objectives: (1) To examine the influencing mechanisms of Applied AI on Guizhou college students' personal learning satisfaction based on user control, ethics training, and AI system transparency. (2) To offer suggestions for the policy of ethical norms on improving Applied AI learning by enhancing their level of control, training, and transparency, respectively.

3. Theoretical Foundation

Definition of Expectancy-Value Theory Related to College Students' Personal Learning Satisfaction under the Ethics Norms

Expectancy-Value Theory posits that an individual's motivation and behavior are influenced by their expectations of outcomes and the significance they attribute to those outcomes (Chan, Cecilia, and Zhou, 2023). This is relevant when considering college students' satisfaction with AI-driven personalized learning experiences. Students' expectations from AI systems are shaped by their previous experiences, perceptions of the technology's effectiveness, and ethical standards in its implementation. If students believe an AI system is fair, transparent, and respects their privacy, they are likely to have positive expectations, leading to increased motivation and satisfaction. Conversely, ethical concerns like data misuse or algorithmic bias can create negative perceptions, resulting in lower expectations and reduced value placed on personalized learning. This can ultimately lead to dissatisfaction if students feel the system does not meet their learning needs or respect their rights (Chai, C. S., Lin, P. Y., Jong, M. S. Y., Dai, Y., Chiu, T. K., & Qin, 2021).

Definition of Self-Determination Theory Related to College Students' Ethical Norms in Using AI Learning

Self-Determination Theory (SDT) explains the role of intrinsic motivation and basic psychological needs, including autonomy, competence, and relatedness. This theory can help us understand how college students think about and use AI tools for learning. When students feel they have control over their knowledge, they engage more with AI technologies. Ethical standards, like being transparent and respecting privacy, can boost their sense of control. If students know they can manage their data and that AI systems respect their choices, they are more likely to use these tools in their studies. The competence aspect of SDT demonstrates how AI can help students achieve their learning goals. AI systems that offer personalized feedback and adapt to different learning styles can improve students' feelings of ability. However, if ethical concerns arise—like biased algorithms or misuse of data—students may feel less capable and motivated, which can lead to less engagement with AI tools (Zeide, 2019).

Definition of Terms

College student learning satisfaction in the context of applied artificial intelligence (AI) refers to the degree to which students feel content and fulfilled with their educational experiences that involve AI technologies. This satisfaction is influenced by various factors, including the perceived effectiveness of AI tools in enhancing learning outcomes, the relevance of personalized learning experiences, and the ethical considerations surrounding data use and algorithmic transparency. When students believe that AI applications support their learning goals, please respect their privacy and provide equitable opportunities; they are more likely to experience higher levels of satisfaction. Ultimately, this concept encompasses both emotional and cognitive responses to the integration of AI in their educational journey, reflecting their overall engagement and motivation in learning (Almufarreah, 2024) (Almufarreah, 2024).

User control, in the context of learning satisfaction related to applied artificial intelligence (AI), refers to the extent to which students feel empowered to make decisions about their learning experiences when interacting with AI systems. This concept includes the ability to customize learning paths, choose the types of feedback received, and determine how personal data is utilized within AI platforms. When students believe they have substantial

control over these aspects, they are more likely to feel satisfied with their learning out-comes. This sense of agency enhances their motivation and engagement, leading to a more positive overall educational experience. Additionally, user control promotes a sense of autonomy, which is essential for in-trinsic motivation and ultimately contributes to higher levels of learning satisfaction in AI-driven environments(Crompton, H., & Burke, 2023)

Ethical training in college education, especially concerning applied artificial intelligence (AI), encompasses educational initiatives aimed at developing a deep understanding of ethical principles related to AI technologies. This type of training is designed to prepare students to effectively handle ethical challenges that may emerge from AI applica-tions, including issues such as data privacy, algorithmic bias, and the consequences of automated decision-making. When students undergo thorough ethical training, they are more likely to feel assured and satisfied with their learning experiences in the field of AI. This confidence allows them to interact with these technologies responsibly and criti-cally. Moreover, fostering a strong sense of ethical awareness not only enhances academic engagement but also promotes a supportive learning atmosphere where students feel that their values and concerns are recognized. As a result, this contributes to overall higher levels of sat-isfaction with their learning experiences (Chan, C. K. Y., & Hu, 2023)

AI system transparency in the context of college student learning satisfaction related to applied artificial intelligence (AI) refers to the clarity and openness with which AI technologies operate and make decisions. This transparency involves providing students with an un-derstanding of how AI systems function, the methodologies used, and the rationale behind specific recommendations or actions. When stu-dents are informed about the workings of AI tools, including data usage and algorithmic processes, they are more likely to trust these systems and feel empowered in their learning experiences. This sense of clarity fosters confidence and reduces anxiety about the technology, ultimately enhancing student satisfaction with their educational journey. By ensuring that AI systems are transparent, educational institutions can create an environment where students feel secure and engaged, leading to more positive learning outcomes (Chudhry, Muhammad. Cukurova, Mutlu. And Luckin, 2022)

Conceptual Framework

The framework for understanding how ethical standards in artifi-cial intelligence (AI) affect college students' learning satisfaction in Guizhou includes three main parts: user control, ethics training, and AI system transparency.

User Control: Students need to have autonomy over their learning processes when using artificial intelligence tools. When students can customize their learning paths, set their own study pace, and understand the recommendations provided by AI, they feel a greater sense of con-trol over their education. This increased autonomy not only boosts motivation but also enhances overall satisfaction with the learning experience. By actively managing their educational journey, students can develop a more meaningful and personalized approach to learning, ultimately contributing to their academic success (Maedche, A.; Legner, C.; Benlian, A.; Berger, B.; Gimpel, H.; Hess, T.; Hinz, O.; Morana, S.; Söllner, 2019)

Ethics Training: Offering ethics training is essential to help stu-dents understand the moral issues related to AI in education. By learning about concepts like data privacy and fairness in algorithms, students become more responsible users of AI. This knowledge in-creases their engagement and creates a supportive learning environ-ment, which enhances their satisfaction.(Li, H., Yu, L., & He, 2019)

AI System Transparency: Transparency in AI systems helps build trust between students and the technologies they use. When students know how AI works, what data it uses, and why it makes certain deci-sions, they are more likely to trust these tools. This understanding re-duces anxiety and creates a feeling of safety, which leads to greater satisfaction with their educational experience (Bates, T., Cobo, C., Mariño, O., & Wheeler, 2020)

These three parts—user control, ethics training, and AI system transparency—are interconnected and significantly impact the learning satisfaction of college students in Guizhou. By focusing on these areas, educational institutions can enhance the student experience and support a more effective and ethical use of AI in learning.

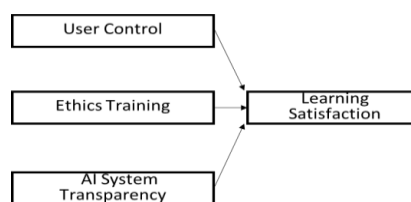


Figure 1. The Conceptual Framework.

Research Restriction

One main limitation is that students have varying levels of understanding and perspectives on AI ethics. Some students may be more aware of ethical issues than others, leading to varied responses. This inconsistency makes it hard to analyze satisfaction levels. Additionally, the differences in educational environments and school policies on AI can create further inconsistencies, making it challenging to draw general conclusions that apply everywhere. Another key restriction involves the availability and quality of data. It can be hard to access reliable information about students' experiences with AI tools. This lack of data limits the depth of analysis. Also, ethical concerns about data privacy and the importance of informed consent can make it harder to collect necessary information. The fast-changing nature of AI technologies also creates challenges. As ethical guidelines and practices develop quickly, research findings can quickly become outdated, limiting their usefulness. Furthermore, biases in research design, such as who is chosen as participants or how questions are asked, can affect the validity of results and interpretations.

Research Hypothesis

The Correlation between User Control and Learning Satisfaction

The connection between student control and learning satisfaction can be explored through ethical standards for artificial intelligence (AI). User control means how much students can shape their learning experiences with AI, such as customizing paths and choosing feedback. When students feel they have control, they are more satisfied with their learning outcomes and become more engaged. If this control aligns with ethical standards like transparency and respect for privacy, students are likely to trust AI systems. Trust is essential for satisfaction. Students who see AI as ethical view it as a helpful tool rather than intrusive. This relationship between user control and ethical standards empowers students to make choices, improving their learning experience. By focusing on user control and ethical AI use, schools can enhance the relationship between students and technology, leading to better learning satisfaction (Li, S., Wang, Q., and Li, 2024)

H1 There is no positive correlation between user control and learning satisfaction with the ethical norms of Applied Artificial Intelligence among Guizhou college students.

The Correlation between Ethics Training and Learning Satisfaction

The connection between ethics training and college students' satisfaction with learning about artificial intelligence (AI) is notable. Ethics training equips students with knowledge regarding responsible AI usage, addressing key topics such as data privacy, fairness, and social impact. This understanding can enhance students' confidence and satisfaction by promoting critical thinking about the technology. Additionally, training that focuses on teamwork, honesty, and respect can create a positive learning environment where students feel acknowledged. As students engage with ethics in AI usage, they may develop increased trust in these systems, contributing to overall satisfaction. Therefore, emphasizing ethics training has the potential to improve students' educational experiences and encourage responsible AI use in their studies. (Thekweazu, C. and Zhou, 2024)

H2 There is no positive correlation between ethics training and learning satisfaction with the ethical norms of Applied Artificial Intelligence among Guizhou college students.

The Correlation between AI System Transparency and Learning Satisfaction

The connection between AI system transparency and college students' learning satisfaction is essential. AI transparency means that students can easily understand how AI operates, including its algorithms and data. This clarity not only builds trust but also alleviates concerns about biases and ethical issues, making students feel more secure and satisfied with their educational tools. Transparency also fosters accountability and fairness, which boosts students' confidence in the technology. When students can see how recommendations and assessments are generated, they engage more meaningfully with AI. This understanding encourages them to express their learning needs, such as requesting personalized learning

approaches. By prioritizing AI trans-parency and ethical standards, schools can create a better learning environment. Institutions should ensure that AI systems are clear and uphold principles of fairness and accountability, helping students trust these tools and enhancing their educational experienc-es(Achhibat, 2025)

H3 There is no positive correlation between AI system transparency and learning satisfaction with the ethical norms of Applied Artificial Intelli-gence among Guizhou college students.

4. Research Methods Population and Sample

This research population of college students was selected in Guizhou, China, and participated in using AI for their educational learning. A sample of 388 was collected for this study's analysis in October 2025 through the WeChat Survey Platform. This study's minimum research sample size is based on the study of Etikan & Babatope. (Etikan, I. and Babatope, 2019). (a) The margin of error (confidence interval) – 95%. (b) Standard deviation 0.5. (c) 95% - Z Score = 1.96. (d) Sample size formula = $(Z\text{-score})^2 * Std\ Dev * (1\text{-}StdDev) / (\text{margin of error})^2$. (e) $(1.96)^2 * 0.5(0.5) / (0.05)^2$. (f) $(3.8416 * 0.25) / 0.0025$. (g) $0.9604 / 0.0025 = 384$. (h) 384 respondents would be needed for this study based on a confidence level of 95%

Research Model

Correlation Analysis

Correlation analysis is widely used to measure the degree of association between different variables. The Pearson correlation coefficient is commonly used to test the correlation between variables. The value of the correlation coefficient (r) indicates the strength of the correlation between variables, while the significance level of the correlation is shown in the P- value.

Table 1. Correlation Coefficient Classification.

Correlation coefficient r	Degree of relevance
$ r = 1$	Totally correlated
$0.70 \leq r < 0.99$	Highly correlated
$0.40 \leq r < 0.69$	Moderately correlated
$0.10 \leq r < 0.39$	Low correlation
$ r < 0.10$	Weak or unrelated

Correlation Analysis of User Control and Learning Satisfaction

The correlation coefficient r between user control and learning satisfaction is 0.769, and P=0.000 is less than 0.01. Thus, user control significantly correlates with learning satisfaction.

Table 2. Correlation analysis results between user control and learning satisfaction.

	User Control
Learning Satisfaction	1
Sig. (1-tailed) User Control	.769**
Sig. (2-tailed)	(.000)

Correlation Analysis of Ethics Training and Learning Satisfaction

The correlation coefficient r between ethics training and learning satisfaction is 0.782, and P=0.000 is less than 0.01. Thus, ethics training significantly correlates with learning satisfaction.

Table 3. Correlation analysis results between ethics training and learning satisfaction.

	Ethics Training
Learning Satisfaction	1
Sig. (1-tailed) User Control	.782**
Sig. (2-tailed)	(.000)

Correlation Analysis of AI System Transparency and Learning Satisfaction

The correlation coefficient r between AI system transparency and learning satisfaction is 0.805, and P=0.000 is less than 0.01. Thus, AI system transparency significantly correlates with learning satisfaction.

Table 4. Correlation analysis results between AI system transparency and learning satisfaction.

	AI System Transparency
Learning Satisfaction	1
Sig. (1-tailed) User	
AI System Transparency	.805**
Sig. (2-tailed)	(.000)

5. Conclusions Research Results

Recent research highlights a positive relationship between user control, ethics training, and AI system transparency, significantly impacting college students' learning satisfaction, particularly within Guizhou's ethical norms surrounding applied artificial intelligence.

Students with considerable control over their interactions with AI systems frequently report higher satisfaction levels. This control fosters a sense of agency, allowing students to customize their learning experiences, boosting their motivation and engagement (Lei, N., An, D., and Guo, 2020).

Additionally, ethics training plays a vital role in enhancing this dynamic. By educating students on key ethical principles associated with AI, such as data privacy and algorithmic fairness, they become more informed and responsible users of AI tools. This increased awareness leads to a more meaningful educational experience, as students are encouraged to think critically about the technology they use (Zhao, Y., Hu, Y., and Gong, 2021).

Moreover, transparency in AI systems is essential for building trust and satisfaction. When students have insight into how AI algorithms function and the nature of the data utilized, they tend to trust these systems more. This understanding helps mitigate concerns about biases and ethical issues, leading to a more positive learning environment (Du, 2022).

H1 There is a positive correlation between user control and learning satisfaction with the ethical norms of Applied Artificial Intelligence among Guizhou college students.

H2 There is a positive correlation between ethics training and learning satisfaction with the ethical norms of Applied Artificial Intelligence among Guizhou college students.

H3 There is a positive correlation between AI system transparency and learning satisfaction with the ethical norms of Applied Artificial Intelligence among Guizhou college students.

6. Managerial Implications

The integration of artificial intelligence (AI) technology into personalized learning offers substantial opportunities to improve educational outcomes. By employing advanced data analytics, AI customizes learning experiences to meet the individual needs and preferences of students. This approach facilitates the development of tailored learning paths and provides immediate feedback. AI models use deep learning techniques to analyze extensive educational datasets, creating adaptive trajectories that focus on each student's strengths and weaknesses. Additionally, AI generates personalized recommendations for resources and study materials, ensuring support that aligns with distinct learning styles. This targeted assistance enhances student engagement and effectively addresses knowledge gaps, leading to improved academic performance. Key components of this model include a theoretical model, a learning process database, and an adaptive learning path construction engine. These elements enable the generation of succinct and precise adaptive learning paths from various complex resources and activities, ultimately enhancing learners' efficiency, performance, and satisfaction (Kong, Wei-liang., Han, Shu-yun., and Zhang, 2020). Furthermore, the growth of distance education contributes to improving learning efficiency and fairness in education, while promoting a more personalized experience for students. As educational policies evolve, it will be essential for technology developers and educators to collaborate closely. This collaboration aims to ensure the effective and widespread use of AI technology in personalized learning, emphasizing the importance of robust data protection measures, ethical guidelines, technological equity, and the seamless integration of educators and AI in the learning process (Mingshui, 2024).

References

- Achhibat, I. (2025). The impact of artificial intelligence on student satisfaction in higher education: Opportunities and ethical challenges. *International Journal of Information and Education Technology*, 15(6), 1182-1192. <https://doi.org/10.18178/ijiet.2025.15.6.2321>
- Alumufarreh, A. (2024). Determinants of students' satisfaction with AI tools in education: A PLS-SEM-ANN approach. *Sustainability*, 16(13), 53-54. <https://doi.org/10.3390/su16135354>
- Bates, T., Cobo, C., Mariño, O., & Wheeler, S. C. (2020). Artificial intelligence: Can it transform higher education? *International Journal of Educational Technology in Higher Education*, 17(1), 42. <https://doi.org/10.1186/s41239-020-00218-x>
- Chai, C. S., Lin, P. Y., Jong, M. S. Y., Dai, Y., Chiu, T. K., & Qin, J. (2021). Perceptions of and behavioral intentions towards learning artificial intelligence in primary school students. *Educational Technology & Society*, 24(3), 89-101.
- Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education*, 5(3), 112-125. <https://doi.org/10.1186/s41239-023-00411-8>
- Chan, C., & Zhou, W. (2023). An expectancy value theory (EVT) based instrument for measuring student perceptions of generative AI. *Computer Science and Engineering*, 10(1), 23-28. <https://doi.org/10.1186/s40561-023-00284-4>
- Chang, S., & Ouyang, G. (2022). From teaching to learning: The educational connotation of learning space and its constructive path. *Education Science*, 38(3), 60.
- Chudhry, M., Cukurova, M., & Luckin, R. (2022). A transparency index framework for AI in education. *ResearchGate*, 10(2), 222-224. https://doi.org/10.1007/978-3-031-11647-6_33
- Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education*, 20, 8. <https://doi.org/10.1186/s41239-023-00392-8>
- Cukurova, M., Giannakos, M., & Martinez-Maldonado, R. (2020). The promise and challenges of multimodal learning analytics. *Journal of Software*, 51(5), 1441-1449. <https://doi.org/10.1111/bjiet.13015>
- Du, Y. (2022). On the transparency of artificial intelligence systems. *Journal of Autonomous Intelligence*, 5(1), 13-22. <https://doi.org/10.32629/jai.v5i1.486>
- Etikan, I., & Babatope, O. (2019). A basic approach in sampling methodology and sample size calculation. *Medtext Publications*, 1, 50-54.
- He, X., & Guo, S. (2021). Research on the path of teaching innovation assisted by artificial intelligence. *Journal of the National Academy of Education Administration*, 09, 31-38.
- Ihekweazu, C., & Zhou, B. (2024). Ethics-driven education: Integrating AI responsibly for academic excellence. *Information Systems Education Journal*, 22(3), 36-46. <https://doi.org/10.62273/JWXX9525>
- Kong, W., Han, S., & Zhang, Z. (2020). Construction of adaptive learning path supported by artificial intelligence. *Modern Distance Education Research*, 32(03), 94-103.
- Lei, N., An, D., & Guo, Y. (2020). A geometric understanding of deep learning. *Engineering*, 20(3), 361-374. <https://doi.org/10.1016/j.eng.2019.09.010>
- Li, H., Yu, L., & He, W. (2019). The impact of GDPR on global technology development is significant. *Journal of Global Information Technology Management*, 22, 1-6. <https://doi.org/10.1080/1097198X.2019.1569186>
- Li, S., Wang, Q., & Li, R. (2024). How aging impacts environmental sustainability: Insights from the effects of social consumption and labor supply. *Humanities and Social Science Communications*. <https://doi.org/10.1057/s41599-024-02914-9>
- Maedche, A., Legner, C., Benlian, A., Berger, B., Gimpel, H., Hess, T., Hinz, O., Morana, S., & Söllner, M. (2019). AI-based digital assistants: Opportunities, threats, and research perspectives. *Business Information Systems Engineering*, 61, 535-544. <https://doi.org/10.1007/s12599-019-00600-8>
- Mingshui, L. (2024). The application of personalized learning of artificial intelligence in the teaching of computer information technology. *Information & Computer*, 36(08), 254-256.
- Shen, Y., & Wang, Q. (2019). Ethical arguments of AI in education: An analysis of the EU's ethics guidelines for trustworthy AI from an educational perspective. *Peking University Education Review*, 17(04), 18-34.
- Zeide, E. (2019). Artificial intelligence in higher education: Applications, promise and perils, and ethical questions. *Educause Review*, 31-39.
- Zhao, Y., Hu, Y., & Gong, J. Y. (2021). Research on domestic standardization of software quality and software testing. *Standard Science*, 11(4), 25-31.