

Assessing Students' Satisfaction with AI Tools in Higher Education

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ABSTRACT

Nowadays, AI-powered applications are increasingly integrated into academic fields, and numerous studies have discussed the acceptance of this technology among higher education students. With AI worldwide establishment, empirical research remains necessary to evaluate user satisfaction, effectiveness, and long-term sustainability. Since cultural, social, and economic factors influence how AI is implemented in education, the level of acceptance of AI tools among students also may vary from one country to another. This study aims to explore university students' satisfaction with AI tools in the context of higher education in Malaysia, specifically in Kelantan. This study examines how satisfied students are with AI technologies used for their learning, with an emphasis on emotional well-being, content quality, and perceived utility of the tools. Using a cross-sectional approach, 105 undergraduate students from various faculties at Universiti Teknologi MARA (UiTM) Kelantan were selected to participate in the study. Students were given a self-administered questionnaire using Google Forms to obtain the data. Simple random sampling was used in the study, and the data analysis was conducted using Multiple Linear Regression (MLR). The findings showed that the only significant variables influencing students' satisfaction with AI tools in their education are emotional well-being and perceived utility, while the quality of the content is not statistically significant. The findings show that how students feel when using AI tools together with their perception of the tool's benefit is crucial despite the content itself. The results indicate that, to drive user satisfaction and long-term usage of this technology, developers may prioritize usability, perceived benefits, and emotional engagement rather than solely enhancing algorithmic reliability or refining instructional content.

Keywords: artificial intelligence tools, student satisfaction, emotional well-being, perceived utility, higher education.

INTRODUCTION

Beginning in the 1950s, the idea of computers producing content marked the start of a remarkable development in Artificial Intelligence (AI) [1]. In some of the early attempts, computers were used to imitate human creativity through producing music and visual art that was radically unrealistic and distinct from humans [2]. For generated content to reach a high level of realism, years and major advances in AI were required. Nowadays, AI tools for education are currently among the most widely used tools by numerous parties. The way researchers, teachers, and students interact with educational content has been profoundly altered by the quick adoption of AI technologies in academic contexts. These technologies, which range from personalized learning platforms to AI-powered writing assistance and intelligent tutoring systems, provide previously unattainable chances to improve academic performance. However, beyond their practical advantages, there is growing demand for studying how these tools affect users' emotional well-being, the quality of academic material, and their perceived usefulness in accomplishing learning objectives.

The impact of AI tools on students' emotions, feelings, confidence, and general affective state throughout interaction with AI is all incorporated into the concept of emotional well-being. Tools that offer clear, helpful, and less cognitively demanding content can reduce negative feelings and increase satisfaction. According to Almufarreh, students who used these technologies and saw an improvement in their emotional well-being were likely more satisfied [3]. Alsaieri et al. found that the feedback that was enhanced with motivational or emotional content was seen far more favorably implying the significance of the factor as an indicator with the

tool's satisfaction [4].

Numerous recent research has demonstrated that one of the main factors influencing user satisfaction with AI technologies in education is content quality. It is believed that AI's capability to modify the content besides pacing the needs of use is an essential factor that boosts both engagement and productivity. Content quality refers to aspects such as relevance, accuracy, clarity, freshness, depth, and appropriateness of the content generated by or mediated through AI tools. A mismatch between content quality and learners' expectations, like poorly aligned material, can affect user satisfaction. In study at King Faisal University, information quality emerged as a strong predictor of satisfaction with ChatGPT for research tasks, confirming the importance of content being accurate, relevant, and useful [5]. For many students, if the AI tool is seen as directly helpful in preparing assignments, clarifying difficult concepts, or giving feedback, the satisfaction with the tools tends to increase. Research into ChatGPT usage revealed that perceived usefulness strongly influenced how beneficial students feel the tool is, which in turn boosts their overall satisfaction [6]. Another study of 328 college students has demonstrated that variables like perceived ease of use, compatibility, efficiency, and perceived usefulness affect user's satisfaction and willingness to keep using ChatGPT [7].

Furthermore, research from an established Chinese university showed that although students appreciated AI technologies for growing support and efficiency, they also raised concerns about the reliability of the content information and highlighted the importance of emotional support and personalization [8]. Collectively, these results imply that overall satisfaction with AI technologies for academic use incorporates more than just functionality or accessibility but also the emotional and qualitative experience. Almufarreh [3] has used a two-stage method of partial least squares structural equation modeling (PLS-SEM) and artificial neural network (ANN) to measure the satisfaction with AI tools among Saudi Arabian universities. The result demonstrated that emotional well-being is the most critical factor in user satisfaction. However, the findings might restrict their wide applicability to a certain demographic and cultural setting.

Although the acceptance of AI technology has been the subject of many studies, the findings might vary in each country due to digital literacy, infrastructure, educational traditions, and trust in technology. Understanding satisfaction with the tools ensures that technological innovation genuinely delivers significant educational results. To determine whether AI technologies are empowering students, continuous study should be done to help track students' views over time to ensure that these tools remain relevant. In addition, studies on AI tool satisfaction must be grounded in real student feedback to provide evidence-based guidance for governments and institutions. Here, in the context of the Malaysia region, satisfaction with AI tools in education has been analysed among 105 students from UiTM Kelantan Branch. Regression analysis is then used to analyze the data. The purpose of this study is to investigate the overall satisfaction of academic users with AI tools besides giving additional insight into how these technologies serve as valuable academic utilities, influence users' emotional well-being, and meet expectations for content quality. Besides, this study can contribute to the expanding body of knowledge regarding the acceptability of AI tools in Malaysia, as adoption factors can vary across regions. This alone can provide additional empirical data on the adoption of technology in education by comparing the findings. The results of this study will provide a thorough and detailed understanding of how much university students rely on AI tools for their academic work. By examining usage trends, the uses of AI tools, and the perceived advantages and difficulties of using them, this study can show how embedded AI technologies have become in students' educational experiences. Additionally, the findings may assist Malaysian policymakers, businesses, professional development programs, and the government in developing tools and strategies for incorporating AI into the educational system that meet the student needs and cultural expectations.

LITERATURE REVIEW

Satisfaction with AI Tools

The rise of AI technology drove widespread interest in the rapid global recognition of these tools. Numerous previous research has examined how satisfied and accepted users of AI tools are [9]. Past studies analyzed the technology acceptance model theory, which enables the prediction of users' intentions and behaviors. User satisfaction is an essential performance indicator in the educational technology field, particularly when

measuring the effectiveness and acceptance of platforms, apps, and tools. Satisfaction is typically measured using both quantitative and qualitative methods across students, educators, administrators, and many more. The satisfaction in AI tools includes usefulness, trust, transparency, engagement, accuracy, and emotional response while using the tools. According to [10], user experience and trust were influential on user satisfaction and played partial mediating roles between predictors and user satisfaction. The studies included the determinants of ChatGPT adoption among university students and its impact on learning satisfaction.

There are many factors influencing satisfaction [5]. User satisfaction with AI tools is influenced by a multifaceted interplay of factors that collectively shape the user experience. Accuracy is important because accuracy and reliable precise information enhance user trust as well as reinforce the perceived utility of the tools. A study by Xing and Jiang [11], for example, found that accuracy is a crucial factor in determining user satisfaction in AI chat systems, emphasizing its indirect impact through perceived utility. Likewise, usefulness has a direct impact on the system's perceived value. This is due to users are more likely to employ AI technologies when they find them useful for completing tasks. In addition, lowering cognitive effort and complexity increases user satisfaction, which is in line with Davis's (1989) Technology Acceptance Model, (TAM) which believes that user acceptance is significantly influenced by perceived ease of use.

According to recent research by Cetinkaya and Krämer [12], user satisfaction is strongly correlated with ethical AI concepts like transparency and fairness. The findings by Glassberg et al. [13] show that transparency and well-designed visuals of the tools are important mediators that affect user confidence in AI-powered digital adoption. According to [14], user satisfaction and trust in AI tools are augmented by the tool's performance expectancy. However, concerns about privacy and security affected user comfort and ethical trust. Phua et al. [15] highlighted the need of addressing security and privacy concerns to enhance student acceptances toward AI tools, which are crucial for their continuous use. Long-term engagement is believed to increase motivation and retention, thus encouraging consistent use of the tools. According to [7], engagement has a major impact on students' continuous use of ChatGPT in higher education. Furthermore, many researchers have adopted technologies due to their ability to support self-regulated learning have changed and motivated AI as a research assistant [16]. Together, these factors work together to determine how satisfied people are with AI technologies in general.

Emotional Wellbeing

Emotional well-being has a substantial factor in people's satisfaction with AI tools. People's perceptions of the threats and benefits of AI, their willingness to interact with AI, and their ability to give honest and unbiased responses regarding the tools are all greatly influenced by this factor. It plays a major role in determining how users interact with AI in education, especially in terms of their learning experience, tool usage, and engagement. Feelings of competence additionally affect the relationship between AI and well-being by influencing how people respond to inquiries regarding AI [17]. To conclude, learning systems use emotional well-being as a feedback loop regarding something.

The emotional well-being of students is a top priority of administrators, policymakers, and scholars [18]. It is positively influenced when users find the tools can boost confidence, motivation, and support. While emotionally supportive AI designs can enhance engagement, learning results, and overall user satisfaction, poor user experiences lead to frustration and reduced tool usage. AI tools may elicit user dissatisfaction and disengagement when their use leads to psychological discomfort, including anxiety, stress, or confusion [19]. This is due to users being satisfied with the tools whenever they provide interactions that feel safe, nonjudgmental, and empowering, besides helping users feel less anxious about their tasks [20]. Other forms of psychological discomfort include when users perceive the interaction as judgmental, emotionally disconnecting, or undermining their personal autonomy and control over the task or process at hand [21, 22]. Negative experiences of AI tools were associated with the perception of threat extended to AI technologies, regarded as a threat to several aspects of human life, including jobs, resources, identity, uniqueness, and value [23].

Students experiencing emotional distress struggle to stay focused and engaged with AI-supported learning environments, which negatively affects their overall experience and satisfaction [24]. However, a positive

emotional state can influence academic engagement, leading to higher satisfaction due to its ability to enhance a user's perception of the AI's usefulness, making the user more likely to find the tool valuable and satisfactory. When users feel emotionally secure and supported, they are more likely to be motivated and engaged with AI tools, leading to better interaction and higher satisfaction [25]. As stated by Choudhry et al. [26], students who are emotionally good are better able to concentrate and cooperate with AI tools, which enhances learning outcomes and overall satisfaction.

On the other hand, negative emotions like depression or anxiety can lead to disengagement. AI tools may be used as an escape by people who are struggling emotionally, which might result in dependence and a vicious cycle that eventually undermines both well-being and tools satisfaction [27]. Relationships between social anxiety, learning adaptability, AI tools usage, and behavioral problems among primary school students have been studied [2]. High levels of AI-related stress or anxiety might result in negative views of the technology and an inability to give useful or adequate responses. In addition, negative feelings may result from uncertainty and anxiety about future employment opportunities brought on by AI advancements [28].

Nonetheless, users' responses indicate that perceived competence with AI influences people's attitude and well-being. As AI technology continues to develop, addressing public concerns and controlling its application is necessary for the benefit of society. Therefore, it can also be argued regarding generative AI that satisfaction and adaptability of generative AI will be closely associated with the development of emotional well-being [29]. Surveys about AI may receive more thorough and useful answers from those with positive emotional states and have higher job satisfaction who are engaged with AI technologies more. Earlier research has shown that people who are emotionally stable are more likely to be satisfied with their lives [30]. A positive emotional state is frequently associated with a belief in the efficiency of AI, which improves job satisfaction and productivity, thus, influencing how people respond to answers regarding the advantages of AI [31].

Content Quality

Other key factors that contribute to the student's satisfaction in using AI tools are the quality of content produced. The content quality of AI tools depends on their authenticity, accuracy, legitimacy, and relevancy [32]. Among the many AI tools available on the current market, educational chatbots produce high-quality, personalized, and real-time feedback [33]. This tool is well-received since it is easy to use, the content produced is up to date, and it can support students regardless of their background, abilities, and needs.

To enhance users' satisfaction, especially in education, AI tools should focus on prioritizing the quality of users' experience when handling the tools, accuracy of the information produced, and have an interactive engagement platform [34]. Of all AI tools available, the most common and popular AI tools and platforms used by students at all levels are ChatGPT and Grammarly [35, 36]. These two tools were mainly used as grammar-checking tools and research information retrieval. Students value these AI platforms as they can simplify complex content, enhance personalized learning, improving writing quality, and optimize time [37, 38, 39]. Another key determinant of student satisfaction with the content quality produced by AI tools depends on its clarity and comprehensibility. Its ability to simplify the explanation of the concept used using clear language and visuals plays an important role for students' satisfaction. Students reported greater satisfaction and perceived the AI tool as more useful, accessible, and effective than traditional resources [3]. Learners in STEM fields often report higher satisfaction, as AI tools can explain complex concepts or provide problem-solving support [40].

Quality of information produced by AI tools was vast from real-world applications, case studies to hands-on practice. Relevant material produced by AI increases engagement and satisfaction since it offers more engaging and personalized content to its target audiences [41]. It also plays an important role in fostering student engagement as it has personalized tutoring quality, good technical assistance, relevant content generation [42] and hence, enhances the efficiency of learning.

There are mixed findings from other research on the relationship between the content quality of AI tool and student satisfaction. Content quality was reported as equally significant as perceived utility in predicting the outcome of satisfaction [3]. High satisfaction reported by [43], where students are very satisfied with the

effectiveness of AI tools, emphasizing that AI tools can address academic queries and generate quality content. Similar result obtained by [44] where the AI tool gave positive impact in students' learning and students are highly satisfied with the engaging and interactive academic content produced. However, contrasting evidence shows the level of satisfaction with adopting AI educational applications is decreasing despite moderate comfort with the technology [45]. This study concludes that there are other important factors other than content quality that influence students' acceptance of AI tools.

Perceived Utility (usefulness quality, ease of use, and effectiveness)

Perceived utility refers to a user's belief that using a tool will help them achieve their goals (helping in learning, improving performance, saving time). In educational settings, this is crucial because students are more likely to be satisfied with tools they find genuinely helpful for understanding complex topics, completing assignments faster or more effectively, getting personalized and instant feedback, and enhancing their learning experience. If students believe an AI tool added value to their academic experience, satisfaction levels are likely to increase.

Three components highly stimulate the perceived utility of AI tools, which are their usefulness, ease of use, and effectiveness. In education, if AI tools can give support in the teaching and learning process and promote effective learning outcomes, the tools will be highly accepted [46]. Based on the report by Louly [47], the use of AI was proven to be practical to enhance students' academic performance. From the experience using the AI tools, the platforms used are tailored to the students' needs, provide a personalized learning experience, and can adjust content delivery in real time to achieve learning objectives.

Much research on AI tools proved that perceived utility will significantly impact students' satisfaction. The intelligent feedback mechanism and personalized experience obtained from AI tools greatly improve students' engagement and achievement in the learning process and hence increase their satisfaction [48]. AI tools can enhance users' satisfaction in education via their personalization and instant feedback mechanism. 74% of students reported that they received tailored content [49], 72.5% of students rated AI personalization experience highly, and 80% found the AI tools very helpful from the instant feedback received [50]. Perceived usefulness and ease of use positively influenced students' satisfaction when handling ChatGPT, as reported by [7]. Since the medium used is easy to handle, it will eventually increase the learning satisfaction. Based on the findings obtained, when students perceive AI tools as useful and effective, their satisfaction with this educational aid will increase substantially.

METHODOLOGY

Study Design and Sampling Technique

A cross-sectional study has been applied for this study with data collection over three (3) weeks. This study was conducted at the Universiti Teknologi MARA (UiTM), Kelantan Branch. In this study, convenience sampling was used to select respondents. The reason for choosing this method is due to low cost and ease of use. Therefore, a total of 105 respondents participated in this study. This study was conducted to assess students' satisfaction with AI Tools Education in UiTM Kelantan Branch.

Data Collection Method and Research Instrument

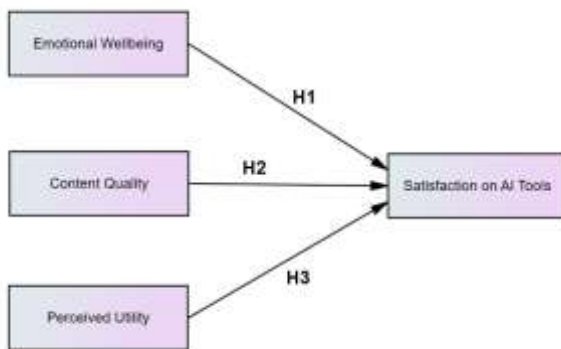
An online survey was created through Google Forms to get the information from respondents. This method was used due to its many benefits and applicability for this study. One of the benefits included a lower budget requirement since this survey was sent via student's email. A set of questionnaires was adapted from [3]. There are two (2) main sections in this questionnaire. The first section represents Section A, which contains four (4) items on the demographic profile of respondents, such as gender, age, semester, and faculty. While the second section represents Section B consists of 20 items on a 5-point scale ranging from strongly disagree to strongly agree. Strongly disagree receives a score of 1 and strongly agrees to receive a score of 5. This section assesses the degree of agreement among respondents on four (4) variables, which are Satisfaction on AI Tools, Emotional Wellbeing, Content Quality, and Perceived Utility.

Table 1 Number of Measurement Items

Variables	No. of items	Per Variable
Satisfaction with AI Tools	5	Q1 – Q5
Emotional Wellbeing	5	Q6 – Q10
Content Quality	5	Q11 – Q15
Perceived Utility	5	Q16 – Q20

Figure 1 reveals the research framework of this study. The dependent variable was satisfaction with AI Tools, while the three (3) independent variables were emotional wellbeing, content quality, and perceived utility.

Figure 1 Research Framework



RESULTS AND FINDINGS

Reliability testing

A test of reliability was conducted to check whether the respondents answered all the items with consistency or not. According to Taber (2018) stronger dependability is indicated by values near 1.0, which is a Cronbach's Alpha value of 0.7 or greater is typically considered adequate. The measure of internal consistency items for each variable in this study must exceed a minimum value of 0.7. The reliability test was carried out to confirm the internal consistency of items for satisfaction on AI tools, emotional well-being, content quality and perceived utility. Table 2 reveals that all the Cronbach's Alpha values greater than 0.7 indicate that the instruments are sufficiently reliable and consistent to be used.

Table 2 Reliability Test for All Variables

Variables	No. of items	Reliability (Cronbach's alpha)
Satisfaction with AI Tools	5	0.868
Emotional Wellbeing	5	0.864
Content Quality	5	0.773
Perceived Utility	5	0.868

Normality Test

Assessing the normality of the data is a must when using parametric statistics such as Multiple Linear Regression (MLR). This study used skewness and kurtosis to check the normality of data. The data is normally distributed if the values of skewness and kurtosis are between -2 and 2 [51]. The result in Table 3 indicates that all the variables have skewness values between -0.270 and 0.220, while for the kurtosis values between -0.555 and -0.324, which are within the acceptable range. This result implies that the data in this study are normally distributed for all variables.

Table 3 Normality Results

Variables	Skewness	Kurtosis
Satisfaction with AI Tools	-0.270	-0.326
Emotional Wellbeing	-0.244	-0.365
Content Quality	0.220	-0.555
Perceived Utility	0.036	-0.324

Descriptive Statistics

Table 4 depicts the characteristics of the entire sample in terms of gender, age, semester, dan faculty among selected respondents. Respondents for this study consist of 23.8% males (25 respondents) and 76.2% females (80 respondents). The mean (standard deviation) respondent's age is 20.35 years (1.160 years). Most of the respondents come from semester 5 groups, which is 52.4% (55 respondents). Relating to the faculty, a slight majority of the respondents are from KPPIM (50.5%, $n = 53$ respondents) and only 3.8% (4 respondents) from FSPPP.

Table 4 Characteristics of Respondents

Item	Frequency (n = 105)	Percentage (%)
Gender		
Male	25	23.8
Female	80	76.2
Age	(mean $\pm$ std. deviation)	20.35 $\pm$ 1.160
Semester		
1	9	8.6
2	2	1.9
3	21	20.0
4	4	3.8
5	55	52.4
6	12	11.4

7	2	1.9
Faculty		
ACIS	7	6.7
KPPIM	53	50.5
KPSK	9	8.6
FP	10	9.5
FSPPP	4	3.8
FPM	22	21.0

Regression Analysis

According to the correlation results between emotional well-being, content quality, perceived utility and satisfaction on AI tools in Table 5, all the independent variables have a significant relationship with satisfaction on AI tools. The relationship between emotional well-being and satisfaction with AI tools is 0.796 ($p < 0.01$), which indicates a positive relationship between these two variables. While the relationship between content quality and satisfaction with AI tools is 0.667 ($p < 0.01$), it indicates that there is a positive relationship between these variables. Similarly, the relationship between perceived utility and satisfaction on AI tools among students is also a positive relationship, which is 0.704 ($p < 0.01$). Therefore, university students with positive emotional wellbeing, content quality, and perceived utility tend to have a positive relationship of satisfaction with AI tools.

Table 5 Correlation of Regression Analysis

Variables	Satisfaction with AI Tools	Emotional Wellbeing	Content Quality	Perceived Utility
Satisfaction with AI Tools	1	0.796**	0.667**	0.704**
Emotional Wellbeing		1	0.685**	0.692**
Content Quality			1	0.738**
Perceived Utility				1

Based on Table 6, there is a positive relationship ($r = 0.827$) between According to the correlation results between satisfaction with AI tools and the independent variables, which are emotional well-being, content quality, and perceived utility. The R-squared value of 0.683 indicates that 68.3% of the total variation in satisfaction with AI tools is explained by all the independent variables. While the other 31.7% are explained by the other factors that are not included in this study. The model is statistically significant as the F-test is 72.612 with a p-value (0.000) less than 0.05. This finding reveals that satisfaction with AI tools can be predicted by at least using one of the independent variables in this study.

Table 6 Model Summary of Regression Analysis

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	23.225	3	7.742	72.612	0.000

Residual	10.769	101	0.107		
Total	33.994	104			
	R	0.827	R-Square	0.683	

From the results in Table 7, there are only two (2) independent variables that are statistically significant, which are emotional well-being ($t = 6.675$, $p = 0.000 < \alpha = 0.05$) and perceived utility ($t = 2.647$, $p = 0.009 < \alpha = 0.05$). While content quality is not significantly assessed to satisfaction with AI tools among students. Therefore, the final model shows that only emotional well-being and perceived utility are significantly assessed to satisfaction with AI tools in education among students. The equation of the final model regression is written as:

$$\text{Satisfaction on AI Tools} = 0.570 + 0.524(\text{Emotional Wellbeing}) + 0.240(\text{Perceived Utility}) + \epsilon$$

Table 7 Coefficient of Regression

Model	Unstandardized B	t	Sig.
Constant	0.570	2.276	0.025
Emotional Wellbeing	0.524	6.675	0.000
Content Quality	0.113	1.266	0.208
Perceived Utility	0.240	2.647	0.009

DISCUSSIONS AND CONCLUSIONS

This study is to assess the satisfaction with AI tools in education among university students. The data collection from 105 students at UiTM Kelantan Branch was conducted through cross cross-sectional study and it was analysed using regression analysis. The findings revealed that only emotional well-being and perceived utility are statistically significant assess to satisfaction on AI tools in education among university students. This finding is similar to the previous study that emotional well-being is found significantly influenced by AI systems that can boost confidence, motivation, and sense of support [18]. There are lot of previous studies that proved that perceived utility significantly impacts students' satisfaction on AI tools. The intelligent feedback mechanism and personalized experience obtained from AI tools greatly improve students' engagement and achievement in the learning process and hence increase their satisfaction [48].

In conclusion, this study offers a comprehensive exploration assessing satisfaction with AI tools in education among university students. The study emphasizes the key roles of emotional well-being and perceived utility in assessing satisfaction with AI tools in education among students. These findings are significant for theoretical advancement, practical interventions, and policy formulation.

Limitations And Future Research Directions

Despite the contributions of the study, there are several limitations. The sample size was relatively small and limited only to UiTM Kelantan branch, which could restrict the applicability of the findings to a broader context. Future research can extend to a larger sample size from different universities throughout Malaysia. Other than that, this study only assesses three (3) independent variables; future research should include other variables that are not involved in this study.

REFERENCES

1. Pataranutaporn, P., Danry, V., Leong, J., Punpongsanon, P., Novy, D., Maes, P. & Sra, M. (2021). AI-

- generated characters for supporting personalized learning and well-being. *Nature Machine Intelligence*. 3(12), 1013–1022. <http://dx.doi.org/10.1038/s42256-021-00417-9>
2. Ma, G., Tian, S., Song, Y., Chen, Y., Shi, H. & Li, J. (2025). When Technology Meets Anxiety: The Moderating Role of AI Usage in the Relationship Between Social Anxiety, Learning Adaptability, and Behavioral Problems Among Chinese Primary School Students. *Psychol Res Behav Manag*. 18, 151-167. <https://doi.org/10.2147/prbm.s502337>
3. Almufarreh, A. (2024). Determinants of Students' Satisfaction with AI Tools in Education: A PLS-SEM-ANN Approach. *Sustainability*, 16(13), 5354. MDPI Journal. <https://doi.org/10.3390/su16135354>
4. Alsaiani, O., Baghaei, N., Lahza, H., Lahza, H., Lodge, J., Boden, M. & Khosravi, H. (2024). Emotionally Enriched Feedback via Generative AI. *arXiv*. 2410, 15077. <https://doi.org/10.48550/arXiv.2410.15077>
5. Almulla, M. A. (2024). Investigating Influencing Factors of Learning Satisfaction in AI ChatGPT for Research: University Students Perspective. 10(11), e32220. *10.1016/j.heliyon*. 2024.e32220.
6. Jo, H. (2024). From concerns to benefits: a comprehensive study of ChatGPT usage in education. *International Journal of Educational Technology in Higher Education*. 21(35). <https://doi.org/10.1186/s41239-024-00471-4>
7. Yu, C., Yan, J., & Cai, N. (2024). ChatGPT in higher education: factors influencing ChatGPT user satisfaction and continued use intention. *Frontiers in Education*, 9, 1354929. <https://doi.org/10.3389/feduc.2024.1354929>
8. Yan, Y., Wu, B. & Zhang, X. (2025). Perceptions of AI in Higher Education: Insights from Students at a Top-Tier Chinese University. *Education Science*. 15(6), 735. <https://doi.org/10.3390/educsci15060735>
9. Liu, Z. The Study of Users' Satisfaction and Acceptance on Artificial Intelligence (AI). *Journal of Education Humanities and Social Sciences*, 27, 117-122. <https://doi.org/10.54097/f4hgqw30>
10. Uzir, M.U., Al Halbusi, H., Lim, R., Jerin, I., Hamid, A.B., Ramayah, T., & Haque, A. Applied Artificial Intelligence and usersatisfaction: Smartwatch usage for healthcare in Bangladesh during COVID-19. (2021). *Technology in Society*. 67, 10178. <https://doi.org/10.1016/j.techsoc.2021.101780>
11. Xing, J., & Jiang, Q. (2024). Factors influencing user experience in AI chat systems – a satisfaction study based on factor analysis and linear regression. *Kybernetes*. <https://doi.org/10.1108/K-10-2023-2237>
12. Cetinkaya, N. E., & Krämer, N. (2025). Between transparency and trust: identifying key factors in AI system perception. *Behaviour & Information Technology*, 1–15. <https://doi.org/10.1080/0144929X.2025.2533358>
13. Glassberg, I., Ilan, Y. B. & Zwilling, M. (2025). The key role of design and transparency in enhancing trust in AI-powered digital agents. *Journal of Innovation & Knowledge*. 10(5), 100770. <https://doi.org/10.1016/j.jik.2025.100770>
14. Choudhury, A., & Shamszare, H. (2024). The impact of performance expectancy, workload, risk, and satisfaction on trust in ChatGPT: Cross-sectional survey analysis. *JMIR Hum Factors*. 11, e55399. <https://doi.org/10.2196/55399>
15. Phua, J. T. K., Neo, H. F., & Teo, C. C. (2025). Evaluating the impact of artificial intelligence tools on enhancing student academic performance: Efficacy amidst security and privacy concerns. *Big Data and Cognitive Computing*, 9(5), 131. <https://doi.org/10.3390/bdcc9050131>
16. Izhar, N. A., Teh, W. V. Y., & Adnan, A. (2025). Unlocking AI Potential: Effort Expectancy, Satisfaction, and Usage in Research. *Journal of Information Technology Education: Innovations in Practice*, 24, 005. <https://doi.org/10.28945/5450>
17. Jain, G., Pareek, S. & Carlbring, P.. (2024). Revealing the source: How awareness alters perceptions of AI and human-generated mental health responses. *Internet Interventions*. 36, 100745. <https://doi.org/10.1016/j.invent.2024.100745>
18. Elhosiny, E. (2024). Prioritizing Mental Well-Being: Placing Student and School Staff Mental Health at the Forefront of Education.
19. Maral, S., Naycı, N., Bilmez, H., Erdemir, E. I. & Satıcı, S. A. (2025). Problematic ChatGPT Use Scale: AI-Human Collaboration or Unraveling the Dark Side of ChatGPT. *International Journal of Mental Health and Addiction*. <https://doi.org/10.1007/s11469-025-01509-y>
20. Samiullah, M. Awan, W. I., Nasir, N. & Aziz, H. (2025). Harnessing Emotionally Adaptive AI to Boost

- Academic Motivation and Combat Dropout Rates in Virtual Learning Environments. *The Critical Review of Social Sciences Studies*, 3(2), 1614-1628. <https://doi.org/10.59075/hsaqxf40>
21. Hu, B., Mao, Y. & Kim, K. J.. (2023). How social anxiety leads to problematic use of conversational AI: The roles of loneliness, rumination, and mind perception. *Computers in Human Behavior*. 145, 107760. <https://doi.org/10.1016/j.chb.2023.107760>
22. Tao, M. & She, S. (2022). How Does the Autonomy of AI Products Affect Consumers' Purchase Intention. *American Journal of Applied Psychology*, 11(6), 162-166. 10.11648/j.ajap.20221106.13
23. Alessandro, G., Dimitri, O., Cristina, B. & Anna, M. (2024). The emotional impact of generative AI: negative emotions and perception of threat. *Behaviour and Information Technology*. 44. <https://doi.org/10.1080/0144929X.2024.2333933>
24. Yang, H. & Rui, Y. (2025). Transforming EFL students' engagement: How AI-enhanced environments bridge emotional health challenges like depression and anxiety. *Acta Psychologica*. 257. <https://doi.org/10.1016/j.actpsy.2025.105104>
25. Marvi, R., Foroudi, P. & AmirDadbar, N. (2025). Dynamics of user engagement: AI mastery goal and the paradox mindset in AI–employee collaboration. *International Journal of Information Management*. 83, 102908. <https://doi.org/10.1016/j.ijinfomgt.2025.102908>
26. Choudhary, L. & Sybol, S. (2025). Impact of AI on Students Mental Health and Well-Being. In book: *Human-Centered Learning Design in the AI Era*. <http://dx.doi.org/10.4018/979-8-3373-5786-7.ch008>
27. Bukhari, S. R., Batool, S., Shahab, I., Jalil, R., Arshad, A., Zahra, S. Q., Karim, S., Jamil, N. & Khan, N.. (2025). Role of AI Dependency in Psychological Distress and Academic Performance Among University Students. *International Journal of Social Sciences Bulletin*. 3(3).
28. Kim, B. J. & Kim, M. J. (2024). How artificial intelligence-induced job insecurity shapes knowledge dynamics: the mitigating role of artificial intelligence self-efficacy. *Journal of Innovation & Knowledge*. 9(4), 100590. <https://doi.org/10.1016/j.jik.2024.100590>
29. Volpato, R., DeBruine, L. & Stumpf, S. (2025). Trusting emotional support from generative artificial intelligence: a conceptual review. *Computers in Human Behavior: Artificial Humans*. 5, 100195. <https://doi.org/10.1016/j.chbah.2025.100195>
30. Dr, Kanchan & Shukla, Kanchan. (2023). Psychological Well-being Related to Life Satisfaction and Happiness in Among Relationships. 11. 289-294.
31. Chuang, Y. T., Chiang, H. L. & Lin, A. P. (2025). Insights from the Job Demands–Resources Model: AI's dual impact on employees' work and life well-being. *International Journal of Information Management*. 83, 102887. <https://doi.org/10.1016/j.ijinfomgt.2025.102887>
32. Huang, Q., Lv, C., Lu, L., & Tu, S. (2025). Evaluating the Quality of AI-Generated Digital Educational Resources for University Teaching and Learning. *Systems*, 13(3), 174. <https://doi.org/10.3390/systems13030174>
33. Zhao, C. (2025). AI-assisted assessment in higher education: A systematic review. *Journal of Educational Technology and Innovation*, 6(4).
34. Ifraheem, S., Rasheed, M., & Siddiqui, A. (2024). Transforming Education Through Artificial Intelligence: Personalization, Engagement and Predictive Analytics. *Journal of Asian Development Studies*, 13(2). <https://doi.org/10.62345/jads.2024.13.2.22>
35. Raheem, B. R., Anjum, F., & Ghafar, Z. N. (2023). Exploring the Profound Impact of Artificial Intelligence Applications (Quillbot, Grammarly and ChatGPT) on English Academic Writing: A Systematic Review
36. Sanosi, A. B., & Mohammed, M. O. M. (2024). The effectiveness of automated writing evaluation: A structural analysis approach. *International Journal of Evaluation and Research in Education*, 13(2), 1216–1226. <https://doi.org/10.11591/ijere.v13i2.25372>.
37. Kartika, S. (2024). Enhancing writing proficiency through AI-powered feedback: A quasi-experimental study using Google Gemini. *LinguaEducare: Journal of English and Linguistic Studies*, 1(2), 83–96.
38. Mosae, T., & Kaushal, R. (2025). Navigating the influence of AI tools on students' learning experiences in higher education: A qualitative study. *Journal of Informatics Education and Research*, 5(2). <https://doi.org/10.52783/jier.v5i2.2627>
39. Jabeen, F., Kazmi, S. M., & Asif, F. (2025). Use of Various Artificial Intelligence Tools for Academic Writing by University Students in Rawalpindi / Islamabad. *Physical Education, Health and Social Sciences*, 3(2). *Wisdom Education & Research Hub*. View the study

40. Xu, W. & Ouyang, F. The application of AI technologies in STEM education: a systematic review from 2011 to 2021. *IJ STEM Ed* 9, 59 (2022). <https://doi.org/10.1186/s40594-022-00377-5>
41. Ota, R., Ray, S. S., & Alli, S. S. (2024). Exploring the Impact of Artificial Intelligence on Content Creation: A Comprehensive Study. *International Journal of Research Publication and Reviews*, 5(7), 597–604. <https://doi.org/10.55248/gengpi.5.0724.1620>
42. Heung, Y. M. E., & Chiu, T. K. F. (2025). How ChatGPT impacts student engagement from a systematic review and meta-analysis study. *Computers and Education: Artificial Intelligence*, 8, 100361. Available via ScienceDirect.
43. Mat Yusoff, S., Mohamad Marzaini, A. F., Hao, L., Zainuddin, Z., & Basal, M. H. (2025). Understanding the role of AI in Malaysian higher education curricula: An analysis of student perceptions. *Discover Computing*, 28, Article 62. <https://link.springer.com/article/10.1007/s10791-025-09567-5>
44. Mabborang, J. M., Pulintan, P. M. B., Javier, G. T., Tacang, D. T. S., & Tindowen, D. J. C. (2025). *The use of AI tools in enhancing student learning. Psychology and Education: A Multidisciplinary Journal*, 37(4), 313–317. <https://doi.org/10.70838/PEMJ.370401>
45. Rodway, P., & Schepman, A. (2023). *The impact of adopting AI educational technologies on projected course satisfaction in university students. Computers and Education: Artificial Intelligence*, 5, 100150. <https://doi.org/10.1016/j.caeai.2023.100150>
46. Mustaffa, S. N. N. B., & Bahador, Z. B. (2025). Analysis of the usage of artificial intelligence (AI) applications among university students in Malaysia. *International Journal of Information Technology and Systems*, 7(2), 45–52.
47. Louly, M. (2024). Application of AI tools in education: A conceptual framework. REST Publisher. <https://restpublisher.com/wp-content/uploads/2024/07/1.-Application-of-AI-Tools-in-Education-A-Conceptual-Framework.pdf>
48. Yusoff, S. M., Marzaini, A. F. M., Hao, L., Zainuddin, & Basal, M. H. (2025). Understanding the role of AI in Malaysian higher education curricula: An analysis of student perceptions. *Discover Computing*, 28, Article 62.
49. Randieri, Cristian. “Personalized Learning and AI: Revolutionizing Education.” *Forbes Technology Council*, July 22, 2024. <https://www.forbes.com/councils/forbestechcouncil/2024/07/22/personalized-learning-and-ai-revolutionizing-education>.
50. Jegede, A. (2024). AI and English language learning: A study on personalization and feedback. *Universal Library of Languages and Literatures*, 2(1), 22–39. https://ulopenaccess.com/ulpages/fulltextULLLI?PublishID=ULLLI20240102_002
51. Hair, J.F., Black, W.C. & Babin, B.J. (2010). *Multivariate data analysis: a global perspective*. Pearson Prentice Hall.