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Perspectivas de estudiantes universitarios sobre la Inteligencia Artificial: Un estudio de actitudes y conciencia entre estudiantes de Arquitectura de Interiores

University students' perspectives on Artificial Intelligence: A survey of attitudes and awareness among Interior Architecture students

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RESUMEN

Este estudio explora las perspectivas de los estudiantes de arquitectura de interiores sobre las tecnologías de inteligencia artificial (IA) y sus implicaciones para las perspectivas futuras de carrera. Se realizó una encuesta a 230 estudiantes de tercer año de arquitectura de interiores en China, utilizando un cuestionario basado en el Modelo de Aceptación de Tecnología (TAM) que obtuvo 158 respuestas válidas. La investigación tuvo como objetivo evaluar la familiaridad de los estudiantes con los avances recientes en IA (por ejemplo, ChatGPT, Stable Diffusion, Midjourney) y su disposición para incorporar la IA en sus futuras carreras. Los resultados revelaron una conciencia limitada sobre las tecnologías de IA de vanguardia y preocupaciones sobre el impacto de la IA en las oportunidades laborales. Sin embargo, los estudiantes mostraron receptividad para integrar la IA con el fin de mejorar la productividad y la creatividad. El modelo de ecuaciones estructurales verificó la eficacia del TAM para predecir las intenciones de aceptación de la IA por parte de los estudiantes, resaltando la utilidad percibida y la facilidad de uso como factores cruciales. Las ideas obtenidas en el estudio ofrecen orientación a las instituciones educativas para cultivar la competencia en tecnologías emergentes entre los estudiantes, permitiéndoles sobresalir en una industria de diseño que está experimentando transformaciones impulsadas por la IA. La contribución del estudio radica en la aplicación del TAM para evaluar la aceptación de la IA en el ámbito específico de la

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educación en diseño de interiores.

PALABRAS CLAVE

IA; Diseño de interiores; TAM; SEM; Educación; ChatGPT; Stable Diffusion; Midjourney.

ABSTRACT

This study explores interior architecture students' perspectives on artificial intelligence (AI) technologies and their implications for future career prospects. A survey of 230 third-year interior architecture students in China utilized a Technology Acceptance Model (TAM)-based questionnaire, yielding 158 valid responses. The investigation aimed to gauge students' familiarity with recent AI advancements (e.g., ChatGPT, Stable Diffusion, Midjourney) and their readiness to incorporate AI into their future careers. Findings unveiled limited awareness of cutting-edge AI technologies and concerns about AI's impact on employment opportunities. Nonetheless, students exhibited receptiveness to integrating AI for enhanced productivity and creativity. The structural equation modeling verified TAM's efficacy in forecasting students' AI acceptance intentions, highlighting perceived usefulness and ease of use as pivotal factors. The study's insights offer guidance for educational institutions to cultivate emerging technology competence among students, enabling them to excel in a design industry undergoing AI-driven transformations. The study's contribution lies in the application of TAM to evaluate AI acceptance within the distinct domain of interior design education.

KEYWORDS

AI; Interior design; TAM; SEM; Education; ChatGPT; Stable Diffusion; Midjourney.

1. INTRODUCTION

1.1 Background

The rapid progress of Artificial Intelligence (AI) has permeated industries, revolutionizing practices and shaping work futures, including interior architecture. AI applications hold the potential to transform how interior designers conceive, create, and execute projects. From generative design to AI-powered data analysis, these technologies offer inventive solutions to optimize space, enhance user experiences, and streamline design processes. Recent studies underscore AI's transformative influence on industries and job roles (Cengage Group, 2023; KPMG LLP, 2023).

As AI becomes ingrained in design, comprehending university students' views on its impact on their interior architecture careers is vital. Grasping how students, particularly interior architecture hopefuls, perceive and react to these tech advancements is key as AI reshapes work and education in this field. Incorporating AI in interior architecture offers prospects and challenges, requiring informed students.

Interior architecture combines art and science to craft attractive indoor spaces. Traditionally, manual processes and creative expertise fulfilled client requirements. AI's rise prompts a transformative shift. AI tools like Stable Diffusion, Midjourney, and ChatGPT offer new paths for design automation, data analysis, and innovation. Reports predict major AI-related job changes, with Goldman Sachs estimating partial automation affecting two-thirds of US jobs (OECD, 2023). Thus, preparing workers for an AI-dominated future is paramount.

While generative AI's influence on creative and arts management roles may be limited, an estimated 15% automation rate by 2030 underscores the intricate and innovative essence of crea-

tive work that resists full automation (Ellingrud et al., 2023). However, generative AI can assist creative workers by generating content, sparking inspiration, and refining designs.

This study uses the Technology Acceptance Model (TAM) to analyze students' viewpoints. TAM, emphasizes Perceived Usefulness and Ease of Use, crucial for technology acceptance (Davis, 1989). Understanding students' perspectives empowers educators and professionals to adapt curricula and practices, ensuring future designers possess AI skills for an AI-augmented design environment, propelling the industry towards design excellence.

1.2 Research Aim

The primary aim of this research is to explore interior architecture students' perspectives, attitudes, and awareness of AI technologies and their integration in the field. The study seeks to gain insights into how AI is perceived by students and its potential implications for their professional growth.

1.3 Research Objectives

To achieve the aim of this research, the following objectives have been identified:

> **Objective 1:** To assess the level of awareness among interior architecture students regarding the latest developments in AI technologies, such as Stable Diffusion, Mid-Journey, ChatGPT, and other relevant advancements.
>
> **Objective 2:** To investigate interior architecture students' attitudes towards adopting AI technologies in their future careers and academic pursuits, as well as their perceptions of AI's potential impact on the job market and career opportunities within the design industry.

1.4 Significance of the Study

This study assesses university students' attitudes towards AI in interior architecture and its career implications, offering insights for educators and professionals in an AI-driven sector. Understanding student readiness guides policy adjustments to meet design profession demands.

Students' openness to AI impacts the industry's trajectory. Adapting curricula equips them for an AI workforce, addressing concerns and helping the industry harness AI's potential.

Comprehending interior architecture students' AI perceptions shapes the industry's future. Addressing these insights prepares academia and the industry for AI's transformative impact, ensuring a smooth transition into an AI-driven design landscape.

1.5 Scope and Limitations of the Research

This study explores interior architecture students' views on AI and its career implications. Surveying third-year students provides insights into their perceptions of AI in this field.

The research examines students' familiarity with AI technologies, openness to integrating AI, current AI-related skills, and engagement with AI-related information. Additionally, the study delves into students' opinions on AI within interior architecture, including job opportunity concerns.

Furthermore, the research will explore students' perspectives on AI in interior architecture, addressing concerns about its impact on employment prospects.

2. Literature Review

AI is revolutionizing industries, with both benefits and concerns. The rapid progress of AI has sparked discussions about its integration in education and its impact on jobs. A survey highlighted Chinese respondents' strong belief in AI's benefits (IPSOS, 2022; Oracle and Future Workplace LLC, 2019). This review examines challenges and variations in AI's incorporation in education.

2.1 The Rapid Pace of AI Advancements:

AI is evolving rapidly, demanding integration of AI knowledge into education. However, updating curricula to match AI advancements poses challenges, risking an AI knowledge gap (KPMG LLP, 2023; PwC Middle East, 2023). The fast pace also raises uncertainty for students and educators about AI's future implications (JFF, 2023).

2.2 The Mismatch between Industry Needs and Academic Offerings:

AI revolutionizes industries and necessitates AI-skilled professionals. However, education lags behind job market needs. Institutions struggle to offer AI courses, delaying student readiness (Office of Educational Technology & U.S. Department of Education, 2923). Addressing this requires academia and industry cooperation to pinpoint and tackle essential AI skills (Ahmed et al., 2022; OECD, 2023).

2.3 The Digital Divide and Access to AI Education:

AI education's promise is marred by unequal access. Limited access deepens social inequalities, demanding equitable AI education (UNESCO, 2019; Zdravkova et al., 2022). Innovative pedagogy is vital, cultivating critical thinking, collaboration, and ethical awareness (Bates, 2022; Ng et al., 2023).

2.4 AI and Employment:

AI's impact on employment, including interior architecture, presents both concerns and opportunities. While it might lead to job displacement through automation or outsourcing, it could also create new roles with specific prerequisites. Understanding interior architecture students' views on AI integration and its career implications is crucial.

AI employment studies highlight job loss risks from automation, varying by sectors and roles (OECD, 2023; PwC's Global, 2023). Automation's extent depends on feasibility, incentives, regulations, social acceptance, and ethics. US research explored AI exposure across education, wages, experience, and occupation (RAKESH KOCHHAR, 2023). Globally, about 31% of surveyed workers anticipate AI enhancing productivity (PwC South Africa, 2023). Notably, arts/design roles display minimal AI exposure in the US (Muro et al., 2019), and China (NSD & Zhaopin Limited, 2023).

Reskilling is vital to adapt to evolving job requirements. A World Economic Forum study predicts 44% of skills changing within five years due to technology (World Economic Forum, 2023). Yet, accessibility to training often lags behind willingness, necessitating addressing skill gaps for productivity and innovation (PwC's Global, 2023).

AI also transforms work quality and dynamics. It can foster flexible, collaborative environments, promoting autonomy and creativity. However, challenges include perpetuating biases and worker well-being risks. Responsible AI development and transparency are critical for unbiased, harmonious workplaces (Ferrara, 2023; OECD, 2023).

2.5 Technology Acceptance Model (TAM)

Recent studies use the Technology Acceptance Model (TAM) to gauge users' acceptance of emerging technologies, including AI in education (Gansser & Reich, 2021; Marikyan & Papagiannidis, 2023; Na et al., 2022). TAM asserts that perceived usefulness and ease of use shape attitudes and intentions to use technology (Davis, 1989). In education, TAM examines students' AI adoption. However, its application in specialized domains like interior design is limited. TAM can illuminate how design students perceive AI's usefulness and ease of use, guiding educational strategies for technology integration.

2.6 Conclusion:

AI's transformative potential needs proactive policies for education, workforce transition, skills enhancement, and ethical AI integration. Challenges in AI education encompass rapid advancements, industry-academic disparity, digital access, pedagogical hurdles, and ethics. Collaborative efforts are essential to prepare for an AI-driven future.

3 MATERIAL AND METHODS

3.1 Research Methodology

This study focuses on interior architecture students at a respected Chinese university. A structured questionnaire targeted third-year students (230 total), yielding 158 responses for a reliable dataset. The survey featured single select, multiple-choice, and rating scale questions, gauging AI-related attitudes, and opinions. This group was chosen for its relevance and potential insights into future design professionals' perspectives. Collected data will undergo quantitative analysis for valuable insights.

3.2 Data Collection

A pilot survey with interior architecture students refined the questionnaire's clarity and relevance using feedback. The questionnaire explored AI's impact on interior architecture, covering awareness, willingness to adopt AI, job displacement concerns, career path effects, interest in AI courses, and prior AI exposure.

The refined questionnaire was distributed via an online platform, ensuring accessibility and privacy. Ethical approval was secured, and the main survey spanned four weeks for comprehensive responses.

3.3 Data Analysis

Quantitative analysis of collected data will employ statistical techniques, including descriptive statistics (mean, standard deviation), chi-square, correlation, regression, and structural equation modeling. Pearson correlation will assess variable relationships.

The study employs the Technology Acceptance Model (TAM) to analyze interior design students' AI acceptance and usage intentions, linking perceived usefulness and ease of use to attitudes and usage intentions (Davis, 1989). Key constructs include:

External Variables: Gender (Q1), AI Knowledge or Skills (Q10), Attention to AI News (Q20)

Perceived Usefulness (PU): Willingness to use latest AI technologies (Q3), AI's impact on work and career (Q5, Q6), AI as a necessary skill (Q7), AI's societal impact (Q17)

Perceived Ease of Use (PEOU): Satisfaction with AI (e.g., ChatGPT, Stable Diffusion) (Q14, Q16)

Attitude toward Using (ATU): Concerns about AI's job impact (Q4), Current AI attitude (Q11)

Behavioral Intention to Use (BIU): Willingness to learn AI courses (Q8)

Actual System Use: Have you used AI technology before? (Q28)

Results will be visually presented through graphs, charts, and tables to ensure clear and concise findings representation.

4. RESULTS

The survey targeted 230 interior architecture students, aiming to understand their AI-related perspectives. Completed and valid responses reached 158, achieving a response rate of around

68.7%. Cronbach's alpha, measuring scale reliability, yielded 0.904. This coefficient reflects internal consistency and construct reliability. Respondents included 62% male and 38% female participants (Table 4.1).

Table 4.1 Gender

		Count	Percentage
Gender	Male	98	62%
	Female	60	38%

Responses from 158 participants underlie subsequent analysis, providing valuable insights into students' views on AI's role in interior architecture and its career impact. This diverse range of perspectives enhances study comprehensiveness and findings.

4.1 Students' AI Knowledge and Attitudes

The initial questions sought to assess participants' AI awareness. Most respondents (69.6%) were unfamiliar with recent AI technologies like Stable Diffusion, Midjourney, and ChatGPT. A chi-square test comparing male and female responses had a p-value of 0.662, exceeding the 0.05 significance level. Hence, we lack adequate evidence to reject the null hypothesis of no gender-response association. Chi-square outcomes show no statistically significant gender-based distribution difference, indicating gender's insignificance in responses.

This finding highlight that a considerable proportion of interior architecture students lack familiarity with AI advancements, irrespective of gender.

Table 4.2 Chi-square Test for AI Technology Awareness

Title		Gender		Total	Testing method	X^2	P
		Male	Female				
Q2. Are you aware of the latest AI technologies, such as stable diffusion, Midjourney and ChatGPT?	NO	67	43	110	Pearson chi-square test	0.192	0.662
	YES	31	17	48			
Total		98	60	158			

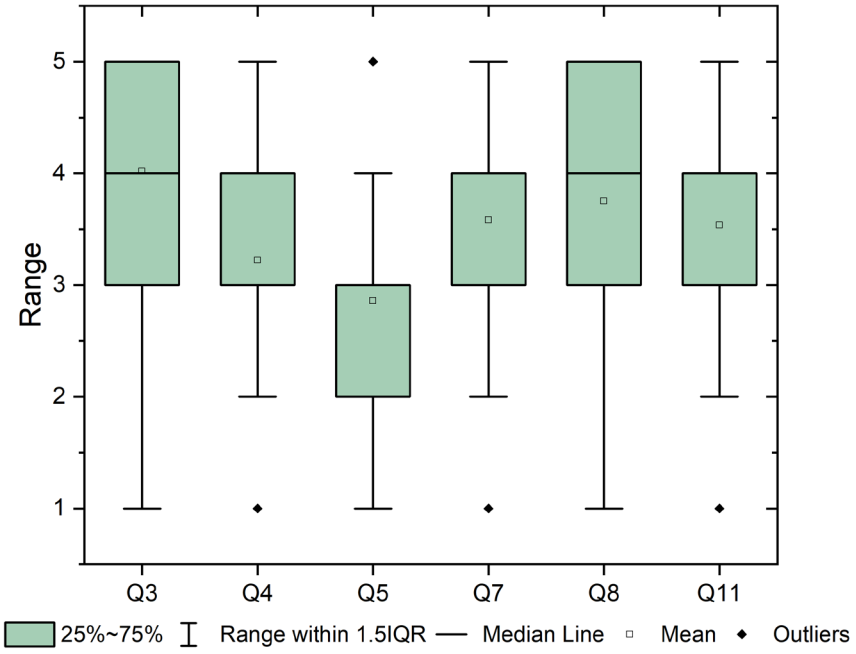
Note: ***, **, * represent the significance levels of 1%, 5%, and 10% respectively

Participants were questioned about their inclination to adopt AI technology for work or studies. Findings revealed a favorable disposition among students, reflecting an eagerness to integrate AI for heightened productivity and creativity.

Table 4.3 Descriptive Statistics for AI Cognition and Attitude

Variables	N	Max	Min	Mean	SD	Med	Var	Kurt	Skew	CV
Q3. Would you use the latest AI tech to aid your work or study	158	5	1	4.019	1.043	4	1.089	0.097	−0.788	0.26
Q4. Could AI cause job losses in certain sectors, and do you worry about its impact on your job?	158	5	1	3.222	1.109	3	1.231	−0.186	−0.053	0.344
Q5. Do you think artificial intelligence technology will affect the employment and career development of college students in the future?	158	5	1	2.861	1.208	3	1.458	−0.561	0.139	0.422
Q7. Do you anticipate artificial intelligence becoming a crucial skill in your future career?	158	5	1	3.582	0.946	3	0.894	0.123	−0.126	0.264
Q8. Are you interested in AI courses and willing to participate?	158	5	1	3.753	0.962	4	0.926	−0.197	−0.224	0.256
Q11. What is your current attitude towards AI technology?	158	5	1	3.538	0.886	3	0.785	0.332	−0.061	0.25

Figure 4.1 Boxplot for Distribution Comparison of AI Cognition and Attitude Variables



The following section presents the results of the survey conducted to investigate students' perceptions and attitudes towards AI technology in the context of work and study.

1. AI Technology Acceptance (Q3): Students exhibited a favorable attitude toward embracing AI technology for work and study, averaging a score of 4.019 on a 5-point scale.
2. Concerns about AI's Job Impact (Q4): Participants held reservations about AI's potential to impact employment, scoring an average of 3.222.
3. Anticipated Employment and Career Impact (Q5): Students foresaw AI influencing job opportunities and career growth, with an average score of 2.861.
4. Importance of AI Skills (Q7): Students remained neutral on AI skills' importance for career growth, scoring an average of 3.582.
5. Interest in AI-Related Courses (Q8): A moderate interest in AI courses was observed, scoring an average of 3.753.
6. Overall, AI Attitude (Q11): Students held a neutral overall attitude toward AI technology, averaging a score of 3.538, indicating balanced sentiments.

All questions had low standard deviations (0.9 to 1.2), reflecting consistent responses. Responses were normally distributed without significant skewness. The outcomes provide essential insights into students' positive AI acceptance while acknowledging reservations. These findings can steer educational institutions and policymakers in designing AI-related curricula and strategies for job market readiness.

However, the study's limitations include the potential impact of the sample size on result generalizability. Future research should involve a larger and more diverse sample for a comprehensive understanding of students' AI perspectives.

4.2 Students' AI Application Awareness and Usage

Participants were questioned about their readiness to adopt AI technology for work or studies. Notably, 62% of students exhibited a favorable inclination to integrate AI into their workflow, signaling a receptiveness to enhance productivity and creativity through AI utilization.

Table 4.4 Descriptive Statistics for AI Application Awareness and Usage

Variables	N	Max	Min	Mean	SD	Med	Var	Kurt	Skew	CV
Q14. If you selected "Used before" or "Know about but not used" in the previous question, kindly rate your satisfaction with these products:	158	5	1	3.43	0.832	3	0.693	0.839	0.190	0.243
Q16. If you selected "Used before" or "Know about but not used" in the previous question, kindly rate your satisfaction with these products:	158	5	1	3.447	0.773	3	0.598	0.724	0.534	0.224

Figure 4.2 Bar Chart for Satisfaction of AI Application Awareness and Use

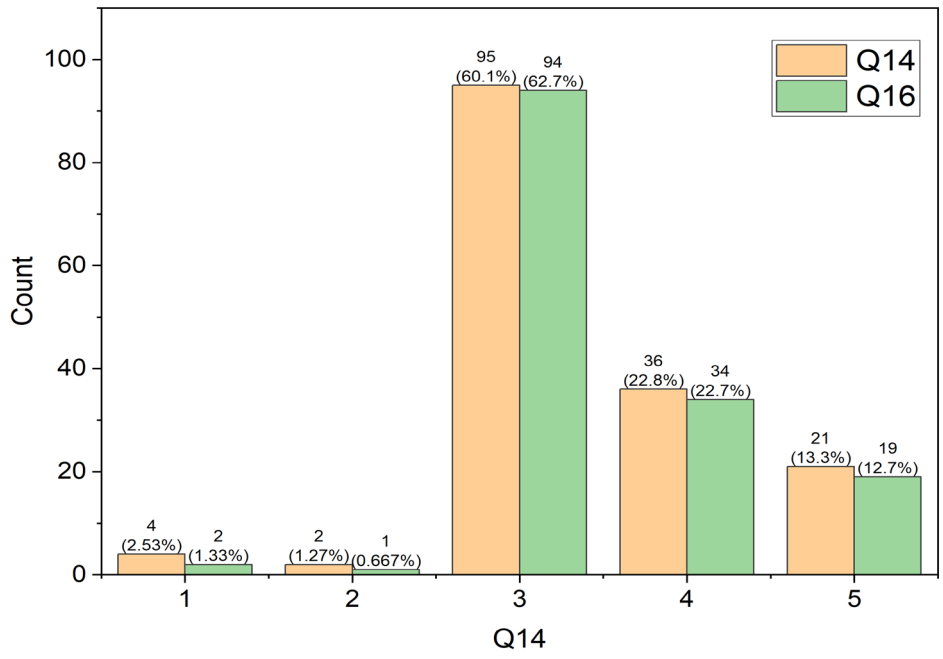


Table 4.5 Contingency Table for AI Application Awareness and Usage

Title		Gender		Total	Testing method	X^2	p
		Female	Male				
Q13. Have you used or been aware of conversational agents (e.g., ChatGPT) and other AI products? (Single select)	A) Have used before	13	24	37	Pearson chi-square test	0.166	0.920
	B) Know about but not used	31	49	80			
	C) Do not know about	16	25	41			
Total		60	98	158			
Q15. Do you know about or have used image AI products or services (e.g., image generation, restoration, enhancement)? (e.g., Stable Diffusion) (Single select)	A) Have used before	14	30	44		1.45	0.485
	B) Know about but not used	29	47	76			
	C) Do not know about	17	21	38			
Total		60	98	158			

Table 4.6 Frequency Analysis Table for AI Application Awareness and Usage (2 Outcomes)

Binomial Test

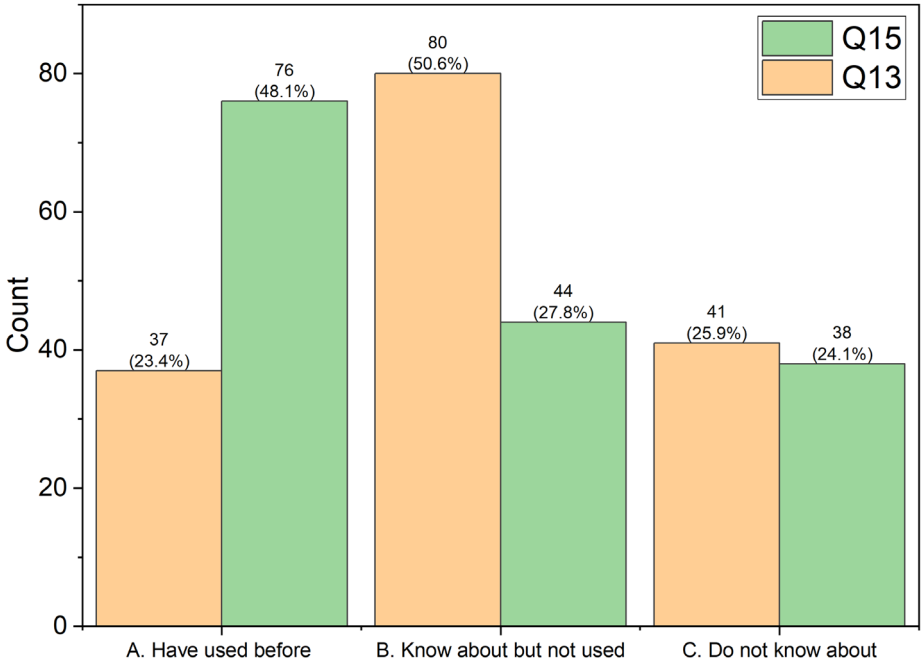
	Level	Count	Total	Proportion	p
Q12. Have you paid attention to recent AI news or research discoveries? (Multiple choice)	A) Machine learning algorithms and applications	71	71	1.000	< .001
	B) Natural language processing technologies	85	85	1.000	< .001
	C) Computer vision technologies	80	80	1.000	< .001
	D) Speech synthesis technology	44	44	1.000	< .001
	E) AI ethics and legal issues	37	37	1.000	< .001
	F) Have not paid attention before	36	36	1.000	< .001
	G) Other	1	1	1.000	1.000

Binomial Test

	Level	Count	Total	Proportion	p
Q13. Have you used or been aware of conversational agents (e.g., ChatGPT) and other AI products? (Single select)	A) Have used before	37	158	0.234	< .001
	B) Know about but not used	80	158	0.506	0.937
	C) Do not know about	41	158	0.259	< .001
Q15. Do you know about or have used image AI products or services (e.g., image generation, restoration, enhancement)? (Single select)	A) Have used before	44	158	0.278	< .001
	B) Know about but not used	76	158	0.481	0.691
	C) Do not know about	38	158	0.241	< .001
Q24. In your current work, study, or creation, have you used AI technology before? (Single select)	B) Yes, I occasionally use AI technology, and it provides some help for my work, study, or creation	50	158	0.316	< .001
	C) No, I have never used	64	158	0.405	0.021
	D) Unsure/Not applicable	23	158	0.146	< .001
	A) Yes, I often use, it improves my efficiency and quality	21	158	0.133	< .001
Q25. If you answered "Yes" to the previous question, which AI technologies have you used to assist your design? (Multiple choice)	A) Text AI	61	61	1.000	< .001
	B) Image AI	68	68	1.000	< .001

Note. H_a is proportion ≠ 0.5

Figure 4.3 Frequency Analysis of Awareness and Use of Text and Image AI Applications



This section examines students' AI awareness and usage. Findings show moderate satisfaction with AI products used (Q14 and Q16). Interest lies in language processing, computer vision, and machine learning (Q12). However, fewer than a third directly use conversational agents (e.g., ChatGPT) or image AI services (e.g., Stable Diffusion) (Q13 and Q15). Promoting and adopting AI applications remains a potential avenue. Image AI usage exceeds text AI (Q13 over Q15), indicating higher acceptance. Only 21 students reported frequent AI use, 50 occasional, 64 never, and 23 unsure (Q24). AI application in work or study is limited, with room for broader adoption. Image AI usage surpasses text AI (Q25). Notably, there's no significant gender difference in AI application awareness and usage (Q13 and Q15).

In summary, students show a desire to learn and use AI applications despite limited experience. Image AI gains prominence and usage, with gender differences absent in AI application awareness and usage.

4.3 Students' Views on Impacts of AI Technology on Job Displacement

A significant concern about AI is its potential impact on job displacement. When asked about AI's effect on job losses in specific industries and professions, 48 % of participants expressed concern, with 16 % showing significant distress. This highlights a substantial proportion of interior architecture students apprehensive about AI's effect on their future careers.

Table 4.7 Descriptive Statistics for Perceptions on AI Technology Development Impacts

Variables	N	Max	Min	Mean	SD	Med	Var	Kurt	Skew	CV
Q17. Do you think AI technology will have a major impact on the future of human society?	158	5	1	3.392	1.064	3	1.132	−0.02	−0.293	0.314
Q21. How do you think artificial intelligence technology will impact the design field in the future?	158	5	1	3.658	0.835	3.5	0.698	−0.073	0.118	0.228
Q28. Is current design education adequate to meet future AI development needs?	158	5	1	2.861	1.019	3	1.038	−0.231	−0.119	0.356

Figure 4.4 Boxplot for Perceptions on AI Technology Development Impacts

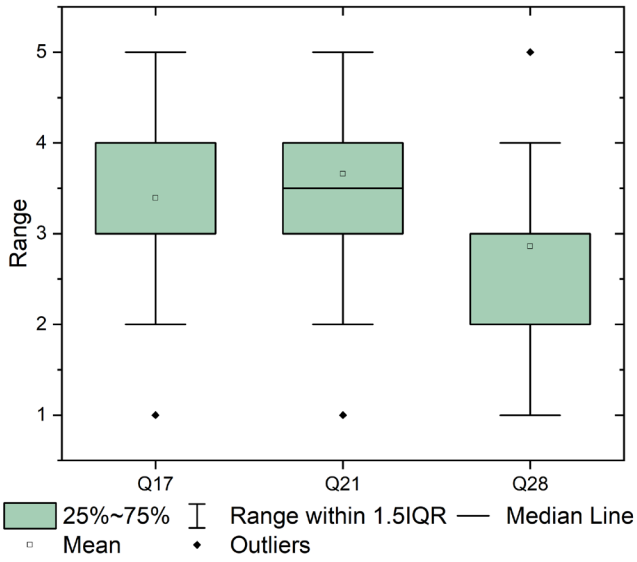


Table 4.8 Frequency Analysis Table for Perceptions on AI Technology Development Impacts (2 Outcomes) (Single select)

Binomial Test

	Level	Count	Total	Proportion	p
Q19. Do you think universities should strengthen AI education and training? (Single select)	A) Yes, AI-related courses should be strengthened	105	158	0.665	< .001
	B) Unsure	41	158	0.259	< .001
	C) No need to strengthen AI-related courses	12	158	0.076	< .001
Q26. For what design tasks do you think AI technology can be applied? (Single select)	A) Idea exploration	54	158	0.342	< .001
	B) Sketching and prototyping	28	158	0.177	< .001
	C) Image editing and beautification	15	158	0.095	< .001
	D) User experience and user research	5	158	0.032	< .001
	E) Brand design and brand promotion	2	158	0.013	< .001
	F) Color matching and style coordination	3	158	0.019	< .001
	G) 3D design and modeling	36	158	0.228	< .001
	H) Content creation and copywriting	1	158	0.006	< .001
	I) Rendering and effects	9	158	0.057	< .001
	J) Data analysis and decision support	4	158	0.025	< .001
	L) Other	1	158	0.006	< .001
Q27. Do you think the design industry needs more AI talent? (Single select)	A) Unsure	46	158	0.291	< .001
	B) No	24	158	0.152	< .001
	C) Yes	88	158	0.557	0.176
Q29. In your opinion, which aspects need strengthened governance and management during AI development? (Single select)	A) Data privacy and security	58	119	0.487	0.855
	B) Algorithm fairness and transparency	17	119	0.143	< .001
	C) Ethics and morals	18	119	0.151	< .001
	D) Legal liability and risk management	23	119	0.193	< .001
	E) Other	3	119	0.025	< .001

Note. H_a is proportion ≠ 0.5

Table 4.9 Frequency Analysis Table for Perceptions on AI Technology Development Impacts (2 Outcomes) (Multiple choice)

Binomial Test

	Level	Count	Total	Proportion	p
Q6. What impacts do you think AI technology will have on the career prospects and the nature of work/human labor in your major or field? (Multiple choice)	A) Create new job opportunities and new positions	108	108	1.000	< .001
	B) Expand existing positions and create more jobs	87	87	1.000	< .001
	C) Change job responsibilities and requirements	84	84	1.000	< .001
	D) Increase productivity and efficiency	92	92	1.000	< .001
	E) Increase innovation	79	79	1.000	< .001
	F) Reduce workload and stress	81	81	1.000	< .001
	G) Replace human jobs	46	46	1.000	< .001
	H) Reduce job opportunities	56	56	1.000	< .001
	I) Other	2	2	1.000	0.500
	J) Unsure	11	11	1.000	< .001
Q9. Have you learned about AI technology through online or offline channels? (Multiple choice)	A) Online self-learning	67	67	1.000	< .001
	B) Online courses	65	65	1.000	< .001
	C) In-person courses	48	48	1.000	< .001
	D) Reading	43	43	1.000	< .001
	E) Other	14	14	1.000	< .001
	F) Have not learned before	55	55	1.000	< .001
Q20. If you answered "Yes" to the previous question, which types of AI courses do you think should be strengthened? (Multiple choice)	A) Basic theory	114	114	1.000	< .001
	B) Application examples	125	125	1.000	< .001
	C) Programming practice	110	110	1.000	< .001
	D) Ethics and law	67	67	1.000	< .001
	E) Other	4	4	1.000	0.125

Binomial Test

	Level	Count	Total	Proportion	p
Q22. What impacts do you think image AI technologies (e.g., Stable Diffusion, Midjourney) will have on design creation and learning? (Multiple choice)	A) improve creation efficiency and quality	107	107	1.000	< .001
	B) stimulate creativity, inspire ideas, improve design skills	105	105	1.000	< .001
	C) Will not impact creation	40	40	1.000	< .001
	D) Have some negative impacts	40	40	1.000	< .001
	E) May weaken designers' career prospects	44	44	1.000	< .001
	F) Specific impacts will change with technological developments	60	60	1.000	< .001
	G) Unsure	22	22	1.000	< .001
Q23. In your opinion, how will AI technology impact the design industry in the next few years? (Multiple choice)	A) Improve the speed, quality, and efficiency of design	104	104	1.000	< .001
	B) Collaborate with designers to complete design tasks, but not completely replace designers.	100	100	1.000	< .001
	C) help designers explore new design fields and methods	84	84	1.000	< .001
	D) allows designers to focus more on creative and innovative work	79	79	1.000	< .001
	E) provide more design resources and materials to enrich content and quality	81	81	1.000	< .001
	F) weaken the humanistic care and creativity of the design industry	41	41	1.000	< .001
	G) bring more job opportunities	28	28	1.000	< .001
	H) reduce job opportunities	35	35	1.000	< .001
	I. completely replace designers	12	12	1.000	< .001
	J. change the nature and requirements of the design industry	25	25	1.000	< .001
	K. Designers will still be indispensable	40	40	1.000	< .001
	L. Unsure	15	15	1.000	< .001

Note. H_a is proportion ≠ 0.5

This section examines students' views on AI development. Results indicate acknowledgment of AI's positive roles in boosting innovation, efficiency, and job opportunities (Q6), alongside concerns about job displacement (Q6). Online self-learning is the primary method for acquiring AI knowledge (Q9). Anticipation of significant societal and design field impacts from AI is evident

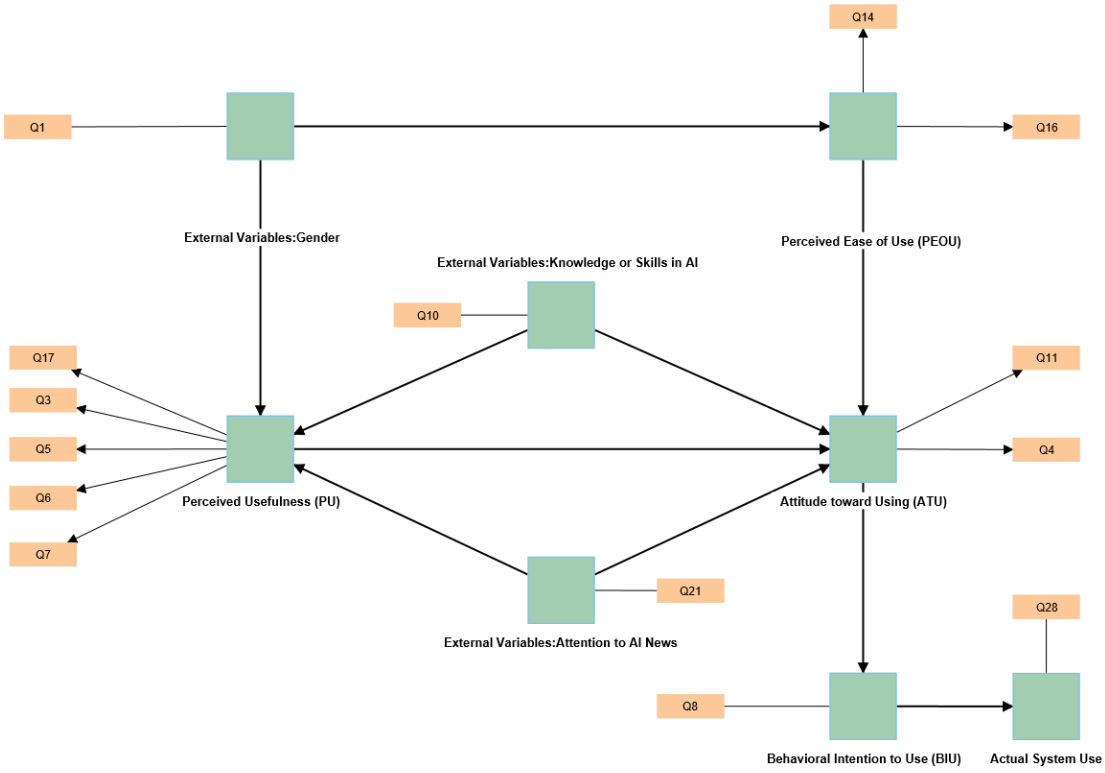
(Q17, 21). However, students' express discontent with current AI education (Q28). A majority (over 60 %) support enhancing AI education (Q19), particularly in application examples and programming practice (Q20). AI is viewed as a tool to enhance design quality (Q22, 23), despite around 30 % expressing concerns about negative effects (Q22) and job loss (Q23) linked to AI. Most students agree the design industry needs more AI talents (Q27). Concerning AI governance, over half of students feel data privacy and security require reinforcement (Q29), while attention is directed towards algorithm transparency, ethical norms, and legal regulations related to AI (Q29). In conclusion, students have a positive outlook on AI development but maintain reservations about its consequences.

4.4 A Technology Acceptance Model (TAM) Perspective

This study used the Technology Acceptance Model (TAM) to explore students' AI acceptance. Both measurement and structural models showed a good fit. Indicator loadings exceeded 0.5, and reliability metrics met recommended thresholds, confirming accurate measurement. Structural equation modeling aligned with TAM hypotheses: perceived usefulness and perceived ease of use positively impacted attitude towards use, subsequently influencing usage intention. All path coefficients were statistically significant. Specifically, perceived usefulness (β=0.424, $p<0.001$) and perceived ease of use (β=0.524, $p<0.001$) positively influenced attitude towards AI technology use, ultimately affecting intention to use (β=0.570, $p<0.001$). While usage intention positively predicted actual system use, its effect size was small (β=0.225, $p<0.001$, $R2$=0.053).

Notably, students following AI news saw AI as more useful. Females found AI more user-friendly than males. Skilled students perceived AI's utility. These insights inform strategies to enhance AI acceptance.

Figure 4.5 Understanding Students' Acceptance of AI Technology: TAM



5. DISCUSSION

The survey findings have important implications for interior design education and the design industry's future. The insights into students' AI awareness highlight the value of incorporating AI-related content into the curriculum. Given the mixed outlook on AI's impact on jobs, educational institutions are crucial in preparing students for the AI-driven future post-graduation. While AI offers productivity gains, it also raises employment concerns. Introducing AI concepts and applications can equip students with essential skills. However, further analysis is needed to align the results with the specific research objectives:

5.1 Assessing Students' AI Awareness

Survey reveals knowledge gap on AI technologies like Stable Diffusion, MidJourney, and ChatGPT, prompting awareness needs. Implications for institutions include updating tech education. The findings serve as valuable guidance for institutions to adapt AI-related courses, narrowing the chasm between technological progress and instructional content.

5.2 Investigating Students' Attitudes Towards AI

Findings stress job concerns due to AI's impact on employment, necessitating more research for student adaptation. Survey shows positive attitudes towards AI integration, signaling openness to innovation. Job-related concerns underscore need for education and industry guidance amidst design changes (Chen et al., 2023). As technological shifts often create new work opportunities (Ellingrud et al., 2023). Tech shifts can yield new opportunities (Ellingrud et al., 2023), enhancing student comprehension and easing worries.

5.3 Lag Between Education Systems and AI Developments

Survey shows educational lag in AI evolution. Curricula struggle with rapid AI advancements (Chan & Hu, 2023), limiting student understanding. Reforms in teaching and skill development are vital for AI-preparedness.

Institutions must promote AI engagement. Workshops and programs facilitate hands-on experience with AI tools, enhancing understanding. Addressing gaps and promoting adoption readies students for the evolving AI landscape.

5.4 Understanding Students' Perspectives on AI Development

The findings offer insights into students' mixed views on AI development, emphasizing the need for improved AI education and addressing job security and ethical concerns in AI's influence on various sectors, including design (Ellingrud et al., 2023; OECD, 2023). This data can guide policymakers and educational institutions in designing focused programs to foster responsible AI adoption and development among students.

5.5 Additional Insights

5.5.1 AI Acceptance Intention vs Actual Usage

A notable finding is that students' intention to adopt AI did not necessarily translate into actual usage. Enhancing acceptance intention alone might not prompt practical AI application due to existing teaching settings. To address this, educators should provide hands-on opportunities like projects and case studies to bridge the gap between intention and behavior.

5.5.2 Importance of Diversified AI Education

Exogenous variables' impact emphasizes the need for diverse AI education to boost students' acceptance awareness. Frequent exposure through social media, news, and campus activities can increase AI familiarity. Addressing the digital divide is vital to ensure equal AI education access.

5.6 Validating the TAM Model

Moreover, the findings validate the TAM model's predictive power for students' AI technology acceptance, in line with previous studies. Perceived usefulness and ease of use stand out as critical factors driving students' willingness to embrace AI. This highlights the significance of demonstrating AI's practical benefits and enhancing its user-friendliness in educational settings.

5.7 Comparison with Related Survey Reports

5.7.1 Impact on Employment

This survey highlights a contrast in students' perspectives compared to the public. 68.35% of students anticipate AI creating new job opportunities, surpassing PwC's China (36%), Asia Pacific (25%), and global data (21%). Conversely, 35.44% worry about AI reducing job opportunities, exceeding Asia Pacific (16%) and global data (13%) (PwC Asia, 2023; PwC China, 2023). This underscores students' higher optimism for AI's positive impact and reduced concerns regarding its potential negative effects.

5.7.2 Understanding of AI

The Ipsos report shows that the Chinese public's favorable view of AI products (78%) (IPSOS, 2022), surpasses global trends, echoing students' positive stance. Notably, 66.5% of students emphasize AI education, matching the 65.8% intention for AI skills training (NSD & Zhaopin Limited, 2023). These findings highlight the shared desire to enhance AI capabilities among individuals and students.

5.7.3 Impact on Efficiency

The survey reveals that 58.23% of students believe AI can enhance work efficiency, surpassing PwC's China (44%) and Asia Pacific data (41%), and even exceeding global data (31%) (31%) (PwC Asia, 2023; PwC China, 2023). This underscores students' recognition of AI's capacity to improve work efficiency.

5.7.4 Impact on Design Industry

This survey reveals students' positive perceptions of AI's potential in design, with 67.72% and 65.82% believing image AI and AI in general enhance quality and efficiency, and 66.46% seeing potential for creativity. Yet, 25.95% and 22.15% express concerns about AI's impact on humanistic care and job opportunities. Overall, students are optimistic about AI's role in design, offering insights for educational enhancements.

6. CONCLUSIONS

6.1 Key Survey Insights

The survey reveals that interior architecture students have limited awareness of cutting-edge AI technologies but demonstrate a willingness to embrace AI in their work and studies, reflecting openness towards technological advancements. However, concerns exist regarding AI's potential impact on job prospects, necessitating supportive measures for smooth industry transition.

The application of TAM enriches understanding of students' AI acceptance within interior design education.

6.2 Implications for Interior Architecture Education

The findings highlight the need to incorporate AI-related skills and knowledge into curricula, through AI courses and project-based learning. Specifically, institutions could offer courses on AI programming, ethics, and applications in interior design. Adopting project-based learning using real-world case studies can provide hands-on experiences for students to gain AI skills. This equips students with crucial capabilities to excel in an AI-driven design industry. Fostering a supportive environment addressing anxieties is vital for AI adoption. This study verifies TAM's efficacy in evaluating students' AI acceptance levels within interior design education, enriching the theoretical application of TAM.

6.3 Limitations and Future Research Directions

The study's limitations including sample size and single-university focus may restrict generalizability. Future studies could diversify samples and employ qualitative methods for deeper insights. Additionally, qualitative approaches through interviews and focus groups could reveal in-depth perspectives to supplement the quantitative results. Longitudinal research tracking evolving perspectives will enrich understanding.

6.4 Conclusion

The survey provides valuable empirical data on students' AI attitudes and awareness within interior design education. The application of TAM verifies its efficacy in evaluating AI acceptance levels. The insights can guide educational strategies to harness AI's potential in shaping a creative, efficient, and sustainable design future. The empirical findings provide valuable insights into students' AI perspectives, informing efforts to harness AI's potential to transform design. The study's contribution lies in demonstrating TAM's value in assessing technology acceptance within specialized domains like interior design. Compared to the public, students demonstrate greater optimism about AI's positives. Institutions should capitalize on this receptiveness to strengthen AI capacities.

7 REFERENCE

Ahmed, F., Fattani, M. T., Ali, S. R., & Enam, R. N. (2022). Strengthening the Bridge Between Academic and the Industry Through the Academia-Industry Collaboration Plan Design Model. *Frontiers in Psychology*, 13, 875940. https://doi.org/10.3389/fpsyg.2022.875940

Bates, A. W. (Tony). (2022). *Teaching in a digital age—Third edition—Translators' version*. Tony Bates Associates Ltd. https://opentextbooks.uregina.ca/teachinginadigitalagev3/

Cengage Group. (2023). *Cengage group 2023 graduate employability report: AI joins the workforce*. https://cengage.widen.net/s/nvd6ghd8vl/final-cg-employability-survey-report-july2023

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*, *20*(1), 43. https://doi.org/10.1186/s41239-023-00411-8

Chen, L., Chen, X., Wu, S., Yang, Y., Chang, M., & Zhu, H. (2023). The future of ChatGPT-enabled labor market: A preliminary study. https://doi.org/10.48550/ARXIV.2304.09823

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319. https://doi.org/10.2307/249008

Ellingrud, K., Sanghvi, S., Dandona, G. S., Madgavkar, A., Chui, M., White, O., & Hasebe, P. (2023). *Generative AI and the future of work in America* [McKinsey Center for Government]. https://www.mckinsey.com/mgi/our-research/generative-ai-and-the-future-of-work-in-america

Gansser, O. A., & Reich, C. S. (2021). A new acceptance model for artificial intelligence with extensions to UTAUT2: An empirical study in three segments of application. *Technology in Society*, 65, 101535. https://doi.org/10.1016/j.techsoc.2021.101535

IPSOS. (2022). *Global opinions and expectations about AI*. https://www.ipsos.com/sites/default/files/ct/news/documents/2022-01/Global-opinions-and-expectations-about-AI-2022.pdf

JFF. (2023). *2023 artificial intelligence & the future of work survey highlights*. https://info.jff.org/artificial-intelligence-the-future-of-work-survey

KPMG LLP. (2023). *Generative AI: From buzz to business value*. https://advisory.kpmg.us/articles/2023/2023-kpmg-generative-ai-survey.html

Marikyan, D., & Papagiannidis, S. (2023). *Technology acceptance model—TheoryHub—Academic theories reviews for research and T&L*. https://open.ncl.ac.uk/theories/1/technology-acceptance-model/

Na, S., Heo, S., Han, S., Shin, Y., & Roh, Y. (2022). Acceptance model of artificial intelligence (AI)-based technologies in construction firms: Applying the technology acceptance model (TAM) in combination with the technology–organisation–environment (TOE) framework. *Buildings*, *12*(2), 90. https://doi.org/10.3390/buildings12020090

Ng, D. T. K., Leung, J. K. L., Su, J., Ng, R. C. W., & Chu, S. K. W. (2023). Teachers' AI digital competencies and twenty-first century skills in the post-pandemic world. *Educational Technology Research and Development*, *71*(1), 137–161. https://doi.org/10.1007/s11423-023-10203-6

NSD & Zhaopin Limited. (2023). How does ChatGPT affect our work? — Research on the potential impact of AI large model on my country's labor market. National School of Development at Peking University.

OECD. (2023). OECD employment outlook 2023: Artificial intelligence and the labour market. OECD. https://doi.org/10.1787/08785bba-en

Office of Educational Technology & U.S. Department of Education. (2923). *Artificial Intelligence and Future of Teaching and Learning: Insights and Recommendations*. https://www2.ed.gov/documents/ai-report/ai-report.pdf

Oracle and Future Workplace LLC. (2019). *Oracle & Future Workplace AI@Work Study 2019*. https://www.oracle.com/a/ocom/docs/applications/hcm/ai-at-work-ebook.pdf

PwC Asia. (2023). *Asia pacific workforce hopes and fears survey 2023*. https://www.pwc.com/gx/en/about/pwc-asia-pacific/hopes-and-fears.html

PwC China. (2023). *Hopes and fears survey 2023—China*. https://www.pwccn.com/en/events/hopes-and-fears-survey-2023-asia-pacific-china-snapshots.pdf

PwC Middle East. (2023). *Middle east workforce hopes and fears survey 2023*. https://www.pwc.com/m1/en/issues/pdf/me-workforce-hopes-and-fears-survey-2023.pdf

PwC South Africa. (2023). *PwC's global workforce hopes and fears survey 2023—African perspectives*. https://www.pwc.co.za/en/publications/global-workforce-hopes-and-fears-survey.html

PwC's Global. (2022). *Global workforce hopes and fears survey 2022*. https://www.pwc.com/gx/en/issues/workforce/hopes-and-fears-2022.html

PwC's Global. (2023). *Global workforce hopes and fears survey 2023. PwC*. https://www.pwc.com/gx/en/issues/workforce/hopes-and-fears.html

RAKESH KOCHHAR. (2023). *Which U.S. workers are more exposed to AI on their jobs?* https://www.pewresearch.org/social-trends/2023/07/26/which-u-s-workers-are-more-exposed-to-ai-on-their-jobs/

UNESCO. (2019). *Artificial intelligence in education: Challenges and opportunities for sustainable development*. https://unesdoc.unesco.org/ark:/48223/pf0000366994

World Economic Forum. (2023). *The future of jobs report 2023. Asia Pacific*. https://www.weforum.org/reports/the-future-of-jobs-report-2023/

Zdravkova, K., Krasniqi, V., Dalipi, F., & Ferati, M. (2022). Cutting-edge communication and learning assistive technologies for disabled children: An artificial intelligence perspective. *Frontiers in Artificial Intelligence*, 5(970430). https://doi.org/10.3389/frai.2022.970430