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Students' perceptions of benefits and opportunities of artificial intelligence (AI)

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Abstract

This study aims to determine students' perceptions of AI benefits and opportunities, focusing on AI usage, age, gender, major, and college status variables. An instrument with two constructs was designed and developed to measure the students' perceptions of AI benefits and opportunities. The instrument was administered electronically to students from two universities in the Southeast USA. A total of 463 usable data was collected and analyzed through ANOVA. Significant group differences were found between AI usage, gender, major, college status, and AI benefits. For AI opportunities, significant group differences were found only for AI usage. These results are discussed, and recommendations for future research are made.

Keywords: Artificial Intelligence, benefits, opportunities, higher education, perception

Introduction

Artificial intelligence (AI) is a field of computer science that trains data models to learn from experience and mimic natural human language. Generally trained on massive datasets, AI synthesizes, finds patterns, makes predictions based on programmed criteria, and then updates and adapts as events alter the original training model. AI technology learns (updates the model) by completing tasks and incorporating more data. Further, natural language processing allows the outputs to communicate in a human-like way. The dramatic emergence and adoption of AI technology enables a wide range of human-to-AI benefits, allowing efficiency, creativity, delegation of repetitive tasks, and enhanced decision-making, most of which are only now emerging (Bao et al., 2023).

While the gains afforded by human-AI collaboration span disciplines, each discipline has specific high-return applications. For instance, in medicine, machine learning learns how to read scans based on massive datasets, more significant than the body of knowledge possible in any practitioner's lifetime of experience, flagging quickly the scans needing follow-up with high accuracy (Poon & Sung, 2021). In infrastructure, AI can help predict water pipe failure (Arshad et al., 2015). In business, AI can improve the retention of employees, inventory management, and grooming of the customer base (Bhalerao et al., 2022). In liver disease, AI can help with organ allocation, donor selection, and recommending immunosuppression medications (Berry & Kotha, 2024). Some suggest AI can act as an auditor, detecting non-compliance (EFE, 2023). AI can customize nutrition recommendations to reduce dementia risk (Soares Dias Portela et al., 2024). Humans can assign various roles to AI, such as reviewer, expert advisor, guide, organizer, librarian, and scorekeeper (Bao et al., 2023).

In higher educational settings, AI is rapidly changing the academic landscape. A significant portion of students are embracing AI for learning. The impact of AI on higher education seems optimistic. Miszczak (2023) reported the following:

- Approximately 43% of college students in the US utilize AI tools, with 22% using them to complete assignments.
- AI-powered chatbots deliver personalized support with 91% accuracy.
- AI can improve student performance by 30% while reducing anxiety by 20%.
- AI can be used to predict final grades with an 80% success rate, potentially preventing student failure.
- AI is poised to become a significant educational force, driving nearly half of all learning management systems within the next three years.

With the influence of AI and its potential to revolutionize learning in higher education, it is vital to study students' perceptions of AI benefits and AI opportunities. This study aims to determine students' perceptions of AI benefits and AI opportunities, paying attention to several variables, i.e., AI usage, age, gender, major, and college status. Consistent with the purpose of the study, the following five research questions are asked:

RQ1. *Are there significant mean differences between students' AI usage and their perceptions of AI benefits and AI opportunities?*

RQ2. *Are there significant mean differences between students' age and their perceptions of AI benefits and AI opportunities?*

RQ3. *Are there significant mean differences between students' gender and their perceptions of AI benefits and AI opportunities?*

RQ4. *Are there significant mean differences between students' major and their perceptions of AI benefits and AI opportunities?*

RQ5. *Are there significant mean differences between students' college status and their perceptions of AI opportunities and AI benefits?*

Literature Review

The range of benefits for AI-human collaboration possibilities is sensed by professionals, experts, and everyday citizens and emphasized by the popular literature making far-reaching promises (Maheshwari, 2023). However, the ability to deploy these imagined opportunities into specific opportunities for an individual is somewhat dependent on an individual's AI literacy (Almatrafi et al., 2024). That is, users and organizations must understand the AI tool, at least at a basic level, to prompt the technology for a particular use. A recent literature review suggested that this AI literacy sequences through six levels: (1) recognize, (2) know and understand, (3) use and apply, (4) evaluate, (5) create, and (6) navigate ethically (Almatrafi et al., 2024). That is, awareness and recognition of benefits precede the knowledge of particular opportunities to the user.

The educational landscape expects to be transformed by human-AI collaboration, with the literature and use cases growing exponentially (Acosta-Enriquez et al., 2024; Bao et al., 2023). The range of potential benefits of AI in higher education includes many aspirational goals, such as personalized learning support,

diverse learner access, increased student attention, automation of repetitive tasks, digital library services, and better student retention with lower cost and time to completion (Bates et al., 2020; Chan & Hu, 2023; Kuleto et al., 2021; Rawas, 2024; Slimi & Beatriz Villarejo Carballido, 2023). Literature has begun to share educational cases for AI use. For instance, AI can help students improve their presentation, especially those presenting with English as a second language (J. Chen et al., 2023). Teachers can be freed from tedious tasks such as error analysis, personalized weakness summaries, collection of learning resources, developing learning plans, and homework correction (Niu et al., 2024). While the potential use cases are compelling, student interaction with AI in education has been more limited so far, perhaps stemming from low levels of students' knowledge about the benefits of AI (Surugiu et al., 2024).

Unfortunately, current practices use very little of AI's potential in student-centered ways, such as optimizing class schedules, solving financial aid roadblocks, customizing the pace of learning, and providing feedback (Kuleto et al., 2021), potentially due to concerns about privacy, reliability, bias, and student plagiarism (Michel-Villarreal et al., 2023; Slimi & Beatriz Villarejo Carballido, 2023). While the literature is growing, most studies have centered on helping teachers and administrators find use cases and minimize risk, with little attention to student voices about the benefits and opportunities of AI in education (Niu et al., 2024).

The high level of interactivity and personalization with AI in education attracts students (Kuleto et al., 2021). AI technology's advanced conversational skills convert a student device into a personal tutor, generate useful feedback on drafts, and level the playing field for non-English speaking students (Michel-Villarreal et al., 2023). "AI educators" may be a sustainable way to address many students' needs that would have been too high a burden for human instructors. College students can often recognize their learning needs, making them mature enough to prompt an AI tool and direct their progress (Niu et al., 2024).

In a poll of students in high school, 69% indicated they have used generative AI tools, and 54% expect that colleges will teach them practical and ethical uses of AI. Males (35%) are more likely to report knowing about AI than females (21%) (Goebel et al., 2024). The poll also reported that 41% of high school students are using AI for "fun," and 26% use AI in academic settings to "do the work." Y. Chen et al. (2023) found that student ratings for comfort and ease of using a teaching assistant AI chatbot were very high, while the ratings for the quality of the chatbot were somewhat lower. Students find AI educators particularly gratifying because of the real-time information-gathering and entertainment value (Niu et al., 2024). The main benefits reported by students were responsiveness and real-time feedback. The AI teaching assistant functioned as a tireless learning companion, directing students to appropriate resources and answering questions, ultimately improving quiz scores. Students did notice limitations, including the fact that the chatbots did not always understand student prompts (Chan & Hu, 2023).

According to the situated expectancy-value theory (Eccles & Wigfield, 2020), student expectations for AI impact their motivation for learning and using AI (Wang et al., 2023). Further, students' peer groups, such as colleagues majoring in the same subject, provide clues about what is essential to know. As such, students majoring in computer science likely have higher expectations of AI benefits (e.g., career possibilities and personal use), leading to stronger beliefs about AI opportunities (Ojha et al., 2023; Wang et al., 2023).

Studies offer mixed results on the impact of demographic factors on expectations of AI technology. For instance, gender and school year level may impact beliefs about AI opportunities. In a study of pre-service teachers, seniors rated computer-assisted language learning as more useful than juniors (Mei, 2019). Chan & Lee (2023) report that younger teachers showed more optimism about AI benefits and educational opportunities. Wang et al. (2023) found that after adding a variable for the supportive social environment, gender and year level diminished in influence on beliefs about AI technology.

Methodology

We designed and developed an instrument with two constructs: 1) students' perception of AI's benefits and 2) students' perception of AI opportunities for learning. The AI benefits construct includes four themes: improved efficiency and convenience, enhanced decision-making, greater problem-solving, and innovation. The AI opportunities construct consists of five themes: personalized learning, enhanced research and analysis, skill development, personalized support/resources, and collaboration.

AI benefits construct with its associated items

1. Improved efficiency and convenience: AI systems are, in my opinion, a way to automate tasks to boost efficiency, improve productivity, and personalize experiences.
2. Enhanced decision-making: I believe AI can potentially augment human intelligence and decision-making.
3. Greater Problem-solving: AI systems have the potential to solve a wide range of challenges, such as recognizing objects and scenes in images and videos, controlling robots that can perform tasks in dangerous or difficult environments, detecting and preventing cyberattacks, identifying fraudulent transactions, etc.
4. Innovation: I believe AI systems can help optimize processes, predict risks, and make informed choices for humans.

AI opportunities construct with its associated items

1. Personalized learning: As a student, I believe AI can personalize my learning experiences by adapting to my needs and styles, leading to more engaging and effective education.
2. Enhanced research and analysis: As a student, I believe AI tools can assist me with research tasks like data analysis and literature review, freeing time to focus on critical thinking and interpretation.
3. Skill development: As a student, I believe I can develop my skills using AI tools.
4. Personalized support/resources: As a student, I believe AI tools can provide personalized support and resources to succeed in my education.
5. Collaboration: AI can be an excellent tool for facilitating my knowledge-sharing and collaboration with fellow students in the classroom.

The 5-point Likert scale consisted of 1 = Completely Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; and 5 = Completely Agree.

Subjects

The subjects of this study were from two universities (one public and the other private) in the southeast region of the USA. Upon approval from both universities' institutional review boards (IRB), the instrument was administered electronically to nearly 2000 students majoring in computer science/information technology and business. We received 474 responses. Of the 474, seven were eliminated because of incomplete data, and four were eliminated due to outlier analysis. This yielded 463 usable data for our study. The subjects were female and male and were of various age groups. Subjects were guaranteed confidentiality and anonymity.

Data Analysis

One-way analysis of variance (ANOVA) was conducted to test the significance of group differences. The ANOVA test determines the effect of one independent variable on one dependent variable. The independent variables were AI usage, Age, Gender, Major, and College status. The dependent variables were AI benefits and AI opportunities for students.

Participants were classified into five groups for AI use based on a five-point Likert scale for how likely they are to use AI in a typical week (5 = extremely likely; 1 = not at all likely). For age, the four groups included ages of (1) 18-24, (2) 24-29, (3) 30-39, and (4) above 39. For gender, groups were female or male. For major, we grouped by computer science or business major. For college status, we grouped by undergraduate or graduate level.

The three criteria for the one-way ANOVA are 1) the dependent variables are continuous, and the independent variables include two or more independent groups; 2) there is no relationship between the observations in each group or between the groups; and 3) outliers must be eliminated from the dataset (Mertler & Vannatta, 2001). Once the three criteria are met, data must be tested for homogeneity of variances using Levene's test for homogeneity of variances where $p < .05$. If the test of homogeneity of variances fails, Welch ANOVA is used.

The F test from the ANOVA procedure determines the significance of the groups. For groups with more than two levels, post hoc analysis is conducted. Finally, descriptive analyses present each dependent variable's means and standard deviation with independent variables.

Results

RQ1. *Are there significant mean differences between students' AI usage and their perceptions of AI benefits and AI opportunities?*

The test of homogeneity of variances for both AI benefits and AI opportunities was $p < .001$, indicating that variances are equivalent between the groups. The results of the ANOVA indicated significant group differences for the independent variable of *AI usage* and the dependent variables of AI benefits ($F_{4, 458} = 23.617 p < .001$) and AI opportunities ($F_{4, 458} = 34.882$ $p < .001$). For AI benefits and AI opportunities, students who were extremely likely to use AI tools in a typical week scored significantly higher than other groups. The Post hoc results are shown in Table 1. Table 2 shows the multiple comparison results. Table 3 shows the means and standard deviation for each dependent variable and the levels of the independent variable.

Table 1: ANOVA Table - AI Usage

		Sum of Squares	df	Mean Square	F	Sig.
Benefits * AI Usage	Between Groups	41.278	4	10.319	23.617	**<.001**
	Within Groups	200.125	458	.437		
	Total	241.403	462			
AI Opportunities * AI Usage	Between Groups	76.875	4	19.219	34.882	**<.001**
	Within Groups	252.340	458	.551		
	Total	329.215	462			

Table 2: Multiple Comparisons – AI Usage

Dependent Variable	(I) AI Use	(J) AI Use	Mean Difference	Std. Error	Sig.
AI Benefits	1	2	.12475	.12177	.902
		3	.12048	.10587	.862
		4	.29974	.10570	.092
		5	.79265*	.10284	**<.001**
	2	1	-.12475	.12177	.902
		3	-.00426	.10822	1.000
		4	.17500	.10805	.623
		5	.66790*	.10526	**<.001**
	3	1	-.12048	.10587	.862
		2	.00426	.10822	1.000
		4	.17926	.08975	.409
		5	.67216*	.08637	**<.001**
	4	1	-.29974	.10570	.092
		2	-.17500	.10805	.623
		3	-.17926	.08975	.409
		5	.49290*	.08615	**<.001**
	5	1	-.79265*	.10284	**<.001**
		2	-.66790*	.10526	**<.001**
		3	-.67216*	.08637	**<.001**
		4	-.49290*	.08615	**<.001**
AI Opportunities	1	2	.10469	.13674	.964
		3	.18597	.11888	.654
		4	.41462*	.11869	.017
		5	1.07538*	.11548	**<.001**
	2	1	-.10469	.13674	.964
		3	.08129	.12152	.978
		4	.30993	.12133	.165
		5	.97070*	.11820	**<.001**
	3	1	-.18597	.11888	.654
		2	-.08129	.12152	.978
		4	.22864	.10078	.274
		5	.88941*	.09698	**<.001**
	4	1	-.41462*	.11869	.017
		2	-.30993	.12133	.165
		3	-.22864	.10078	.274
		5	.66077*	.09674	**<.001**
	5	1	-1.07538*	.11548	**<.001**
		2	-.97070*	.11820	**<.001**
		3	-.88941*	.09698	**<.001**
		4	-.66077*	.09674	**<.001**

Table 3: Descriptives – Usage (N = 463)

AI Usage		AI Benefits	AI Opportunities
Extremely likely	Mean	4.9082	4.9098
	N	61	61
	Std. Deviation	.33381	.28879
Very likely	Mean	4.8035	4.7851
	N	57	57
	Std. Deviation	.44480	.41306
Moderately likely	Mean	4.7222	4.7894
	N	108	108
	Std. Deviation	.39229	.41322
Slightly likely	Mean	4.4936	4.6101
	N	109	109
	Std. Deviation	.68668	.61183
Not at all likely	Mean	3.8328	4.1172
	N	128	128
	Std. Deviation	1.14734	.99948

RQ2. *Are there significant mean differences between students' age and their perceptions of AI benefits and AI opportunities?*

The test of homogeneity of variances for AI benefits and AI opportunities was p = .146 and p = .279, respectively, indicating the variances are equivalent between the groups. The results of the ANOVA as shown in Table 4 indicated no significant group differences for the independent variable of *age* and the dependent variables of AI benefits ($F_{3, 459} = 1.064$, $p = .364$) and AI opportunities ($F_{3, 459} = 1.102$, $p = .346$). Table 5 illustrates the descriptive statistics amount the differage ages and groups.

Table 4: ANOVA Table - Age

		Sum of Squares	df	Mean Square	F	Sig.
AI Benefits * Age	Between Groups	1.667	3	.556	1.064	.364
	Within Groups	239.736	459	.522		
	Total	241.403	462			
AI Opportunities * Age	Between Groups	2.354	3	.785	1.102	.348
	Within Groups	326.861	459	.712		
	Total	329.215	462			

Table 5: Descriptives – Age (N = 463)

Age		AI Benefits	AI Opportunities
18 - 24 years	Mean	4.4278	4.5507
	N	281	281
	Std. Deviation	.90155	.78709
25 – 29 years	Mean	4.3200	4.4786
	N	35	35
	Std. Deviation	.91805	.66524
30 - 39 years	Mean	4.4986	4.7007
	N	71	71
	Std. Deviation	.63774	.49573
40 or older	Mean	4.5895	4.6020
	N	76	76
	Std. Deviation	.74968	.67352

RQ3. *Are there significant mean differences between students' gender and their perceptions of AI benefits and AI opportunities?*

The test of homogeneity of variances for AI benefits and AI opportunities was not computed because there were fewer than three groups. Therefore, Welsh ANOVA was used. The results of the Welsh ANOVA indicated significant group differences for the independent variable of *gender* and the dependent of variable of AI benefits ($F_{1, 461} = 4.254$ $p = .040$). However, the results of the Welsh ANOVA indicated no significant group differences for the independent variable of *gender* and AI opportunities ($F_{1, 461} = .004$ $p = .947$). See Table 6. Male students scored significantly higher than female students, indicating a higher perception of AI benefits. Table 7 includes means and standard deviation for each dependent variable and the levels of the independent variable.

Table 6: ANOVA Table - Gender

		Sum of Squares	df	Mean Square	F	Sig.
AI Benefits * Gender	Between Groups	2.207	1	2.207	4.254	**.040**
	Within Groups	239.196	461	.519		
	Total	241.403	462			
AI Opportunities * Gender	Between Groups	.003	1	.003	.004	.947
	Within Groups	329.211	461	.714		
	Total	329.215	462			

Table 7: Descriptives – Gender (N = 463)

Gender		AI Benefits	AI Opportunities
Female	Mean	4.4540	4.4975
	N	200	200
	Std. Deviation	.86279	.77370
Male	Mean	4.4593	4.6369
	N	263	263
	Std. Deviation	.83134	.67697

RQ4. *Are there significant mean differences between students' major and their perceptions of AI benefits and AI opportunities?*

The test of homogeneity of variances for AI opportunities and AI benefits was not computed because there were fewer than three groups. Therefore, Welsh ANOVA was used. The results of the Welsh ANOVA indicated significant group differences for the independent variable of *major* and the dependent variable of AI benefits ($F_{1, 461} = 5.663$ $p = .018$). Computer science/information technology students scored significantly higher than business majors, indicating a higher perception of AI benefits. However, the results of the Welsh ANOVA revealed no significant group differences for the independent variable of *major* and the dependent variable of AI opportunities ($F_{1, 461} = 1.493$ $p = .222$). See Table 8.

Table 9 includes means and standard deviation for each dependent variable and the levels of the independent variable.

Table 8: ANOVA – Major

		Sum of Squares	df	Mean Square	F	Sig.
AI Benefits * Major	Between Groups	2.929	1	2.929	5.663	**.018**
	Within Groups	238.474	461	.517		
	Total	241.403	462			
AI Opportunities * Major	Between Groups	1.063	1	1.063	1.493	.222
	Within Groups	328.152	461	.712		
	Total	329.215	462			

Table 9: Descriptives – Major (N = 463)

Major		AI Benefits	AI Opportunities
Computer Science/IT	Mean	4.5067	4.6592
	N	223	223
	Std. Deviation	.78264	.66897
Business	Mean	4.4108	4.5000
	N	240	240
	Std. Deviation	.89670	.76296

RQ5. *Are there significant mean differences between students' college status and their perceptions of AI benefits and AI opportunities?*

The test of homogeneity of variances for AI opportunities and AI benefits was not computed because there were fewer than three groups. Therefore, Welsh ANOVA was used. The results of the Welsh ANOVA as shown in Table 10 indicated significant group differences for the independent variable of *status* and the dependent variable of AI benefits ($F_{1, 461} = 7.440$ $p = .007$). Graduate students scored significantly higher than undergraduates, indicating a higher perception of AI benefits. However, the results of the Welsh ANOVA indicated no significant group differences for the independent variable of *status* and the dependent variable of AI opportunities ($F_{1, 461} = 2.799$, $p = .095$). Table 11 includes means and standard deviation for each dependent variable and the levels of the independent variable.

Table 10: ANOVA Table - Status

		Sum of Squares	df	Mean Square	F	Sig.
AI Benefits * Status	Between Groups	3.834	1	3.834	7.440	**.007**
	Within Groups	237.569	461	.515		
	Total	241.403	462			
AI Opportunities * Status	Between Groups	1.987	1	1.987	2.799	.095
	Within Groups	327.228	461	.710		
	Total	329.215	462			

Table 11: Descriptives – Status (N = 463)

Status		AI Benefits	AI Opportunities
Undergraduate	Mean	4.4275	4.5357
	N	385	385
	Std. Deviation	.87260	.76813
Graduate	Mean	4.6026	4.7788
	N	78	78
	Std. Deviation	.67265	.37792

Discussion

AI usage: The results suggested significant group differences for the independent variable of *AI usage* and the dependent variables of AI opportunities and AI benefits. For AI opportunities and AI benefits, students who were extremely likely to use AI tools in a typical week scored significantly higher than other groups in recognizing the benefits of AI as well as the learning opportunities of AI. This may signal that the AI experience helps students see the broader possibilities (benefits) and specific personal uses (learning opportunities). With educators concerned about preventing students from misusing AI, a valid concern is that they may be withholding the opportunities for teaching students about AI tools, including how to leverage them for academically sound purposes. Decision-makers in higher education may also discount the motivating aspect of AI tools, the "entertainment value." Any tool that increases students' time on task can be a winner academically.

Age: The results indicated no significant group differences for the independent variable of *age* and the dependent variables of AI opportunities and AI benefits. Given that all the participants are enrolled in college, the distribution of age ranges was limited, which may have suppressed any possible age effect.

Gender: The results indicated no significant group differences for the independent variable of *gender* and the dependent variable of AI opportunities. However, there were significant group differences for the independent variable of *gender* and the dependent variable of AI benefits. Male students scored significantly higher than female students, indicating a higher perception of AI benefits. Men are generally more interested in technology tools and more likely to major in computer science, exposing them to AI benefits. Interestingly, the men's general knowledge about AI benefits did not translate into knowing how to leverage the tool for learning opportunities. This may reflect that knowing how to use AI in specific contexts requires some level of AI literacy (Almatrafi et al., 2024).

Major: The results showed no significant group differences for the independent variable of *major* and the dependent variable of AI opportunities. However, there were significant group differences for the independent variable of *major* and the dependent variable of AI benefits. Computer science/information technology students scored significantly higher than business majors, indicating a higher perception of AI benefits. This result mirrors the result on gender. General awareness of the benefits of AI is not enough to translate into leveraging the tool for personal use (learning opportunities).

Status: The results showed no significant group differences for the independent variable of *status* and the dependent variable of AI opportunities. However, there were significant group differences for the independent variable of *status* and the dependent variable of AI benefits. Graduate students scored significantly higher than undergraduates, indicating a higher perception of AI benefits. This result also mirrors the result on gender and major, indicating that early exposure, while giving ideas about benefits, may not be deep enough to know how to use AI for personal use (learning opportunities). An alternate explanation for knowing AI benefits but not how to leverage them for learning is that educators may be concerned about the misuse of AI tools and, therefore, discourage experimenting with them for academic tasks. This seems to be at odds with students' expectations that they will learn the range of positive and destructive uses of AI in college (Goebel et al., 2024).

Conclusion

This work investigates whether undergraduate and graduate college students recognize the benefits of AI technology to society and if they believe AI tools will specifically provide learning opportunities. Interestingly, we found that students can imagine general benefits but have a more limited imagination for specific personal use (learning opportunities) of AI. While the literature has deservedly focused on the

teacher's perspective on AI tools, this work balances the literature by reflecting student voices. Students know less about how to leverage "AI educators." AI educators provide impressive levels of customization and enjoyment. As tireless teachers who are fun to play with, AI tools can offer 24/7 tutoring that would be too much of a burden for instructors. Notably, a motivating tool can increase time-on-task. That can be a win-win for educators and students. This study has several limitations. First, our sample included students at two universities who were studying in the fields of information technology, computer science, and business. Future studies should be carried out to include samples from other disciplines in multiple institutions of higher education to improve the generalizability of results. Second, the convenience sample used in this study may be substituted by a random sample in future studies to enhance the generalizability of the results. Third, this study used a self-reported survey instrument to collect data; although this method is commonly used in research design, it may have the potential for bias that could influence the generalizability of the results. Future studies may consider a qualitative or mixed methods approach, which could improve the generalizability of the results.

References

Acosta-Enriquez, B. G., Arbulú Ballesteros, M. A., Huamaní Jordan, O., López Roca, C., & Saavedra Tirado, K. (2024). Analysis of college students' attitudes toward the use of ChatGPT in their academic activities: Effect of intent to use, verification of information and responsible use. *BMC Psychology*, *12*(1), 255–255. https://doi.org/10.1186/s40359-024-01764-z

Almatrafi, O., Johri, A., & Lee, H. (2024). A systematic review of AI literacy conceptualization, constructs, and implementation and assessment efforts (2019–2023). *Computers and Education Open*, *6*, 100173. https://doi.org/10.1016/j.caeo.2024.100173

Arshad, S. Z., Zhou, J., Bridon, C., Chen, F., & Wang, Y. (2015). *Investigating User Confidence for Uncertainty Presentation in Predictive Decision Making*. 352–360. https://doi.org/10.1145/2838739.2838753

Bao, Y., Gong, W., & Yang, K. (2023). A Literature Review of Human–AI Synergy in Decision Making: From the Perspective of Affordance Actualization Theory. *Systems (Basel)*, *11*(9), 442. https://doi.org/10.3390/systems11090442

Bates, T., Cobo, C., Mariño, O., & Wheeler, S. (2020). Can artificial intelligence transform higher education? *International Journal of Educational Technology in Higher Education*, *17*(1), 1–12. https://doi.org/10.1186/s41239-020-00218-x

Berry, P., & Kotha, S. (2024). The fundamental importance of exploring the risks alongside the benefits of artificial intelligence. *Journal of Hepatology*, *80*(5), e223–e225. https://doi.org/10.1016/j.jhep.2023.06.020

Bhalerao, K., Kumar, A., Kumar, A., & Pujari, P. (2022). A STUDY OF BARRIERS AND BENEFITS OF ARTIFICIAL INTELLIGENCE ADOPTION IN SMALL AND MEDIUM ENTERPRISE. *Academy of Marketing Studies Journal*, *26*, 1–6.

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), 43–18. https://doi.org/10.1186/s41239-023-00411-8

Chan, C. K. Y., & Lee, K. K. W. (2023). The AI generation gap: Are Gen Z students more interested in adopting generative AI such as ChatGPT in teaching and learning than their Gen X and millennial generation teachers? *Smart Learning Environments*, *10*(1), 60. Coronavirus Research Database; ProQuest Central. https://doi.org/10.1186/s40561-023-00269-3

Chen, J., Lai, P., Chan, A., Man, V., & Chan, C.-H. (2023). AI-Assisted Enhancement of Student Presentation Skills: Challenges and Opportunities. *Sustainability*, *15*(1), 196. https://doi.org/10.3390/su15010196

Chen, Y., Jensen, S., Albert, L. J., Gupta, S., & Lee, T. (2023). Artificial Intelligence (AI) Student Assistants in the Classroom: Designing Chatbots to Support Student Success. *Information Systems Frontiers*, *25*(1), 161–182. ProQuest Central. https://doi.org/10.1007/s10796-022-10291-4

Eccles, J. S., & Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary Educational Psychology*, *61*, 101859. https://doi.org/10.1016/j.cedpsych.2020.101859

EFE, A. (2023). The Future of the Audit Related Professions in the Light of Risk and Benefits of Artificial Intelligence Advancements. *Pamukkale Üniversitesi İşletme Araştırmaları Dergisi*, *10*(2), 424–450. https://doi.org/10.47097/piar.1259538

Goebel, C., Strauss, D., & Tessier, N. (2024). *AI and Academia: Student Perspectives and Ethical Implications*. https://www.artsci.com/studentpoll-volume-17-issue-1

Kuleto, V., Ilic, M., Dumangiu, M., Rankovic, M., Martins, O. M. D., Paun, D., & Mihoreanu, L. (2021). Exploring Opportunities and Challenges of Artificial Intelligence and Machine Learning in Higher Education Institutions. *Sustainability*, *13*(18), 10424. https://doi.org/10.3390/su131810424

Maheshwari, R. (2023). Advantages of artificial intelligence (AI) in 2024. *Forbes*. https://www.forbes.com/advisor/in/business/software/advantages-of-ai/

Mei, B. (2019). Preparing pre-service EFL teachers for CALL normalisation: A technology acceptance perspective. *System (Linköping)*, *83*, 13–24. https://doi.org/10.1016/j.system.2019.02.011

Mertler, C. A., & Vannatta, R. A., (2001). *Advanced and multivariate statistical methods: Practical application and interpretation*. Routledge.

Michel-Villarreal, R., Vilalta-Perdomo, E., Salinas-Navarro, D. E., Thierry-Aguilera, R., & Gerardou, F. S. (2023). Challenges and Opportunities of Generative AI for Higher Education as Explained by ChatGPT. *Education Sciences*, *13*(9), 856. https://doi.org/10.3390/educsci13090856

Miszczak, P. (2023). *AI in Education Statistics 2023: Adoption, benefits, and challenges*. Available online at https://businessolution.org/ai-in-education-statistics/

Niu, W., Zhang, W., Zhang, C., & Chen, X. (2024). The Role of Artificial Intelligence Autonomy in Higher Education: A Uses and Gratification Perspective. *Sustainability*, *16*(3), 1276. https://doi.org/10.3390/su16031276

Ojha, V., Perdriau, C., Lagesse, B., & Lewis, C. M. (2023). *Computing Specializations: Perceptions of AI and Cybersecurity Among CS Students*. 966–972. https://doi.org/10.1145/3545945.3569782

Poon, A. I. F., & Sung, J. J. Y. (2021). Opening the black box of AI-Medicine. *Journal of Gastroenterology and Hepatology*, *36*(3), 581–584. https://doi.org/10.1111/jgh.15384

Rawas, S. (2024). ChatGPT: Empowering lifelong learning in the digital age of higher education. *Education and Information Technologies*, *29*(6), 6895–6908. https://doi.org/10.1007/s10639-023-12114-8

Slimi, Z. & Beatriz Villarejo Carballido. (2023). Systematic Review: AI's Impact on Higher Education—Learning, Teaching, and Career Opportunities. *TEM Journal*, *12*(3), 1627–1637. ProQuest Central. https://doi.org/10.18421/TEM123-44

Soares Dias Portela, A., Saxena, V., Rosenn, E., Wang, S.-H., Masieri, S., Palmieri, J., & Pasinetti, G. M. (2024). Role of Artificial Intelligence in Multinomial Decisions and Preventative Nutrition in Alzheimer's Disease. *Molecular Nutrition & Food Research*, e2300605–e2300605. https://doi.org/10.1002/mnfr.202300605

Surugiu, C., Grădinaru, C., & Surugiu, M.-R. (2024). Artificial intelligence in business education: Benefits and tools. *Amfiteatru Economic*, *26*(65), 241–258. https://doi.org/10.24818/EA/2024/65/241

Wang, F., King, R. B., Chai, C. S., & Zhou, Y. (2023). University students' intentions to learn artificial intelligence: The roles of supportive environments and expectancy–value beliefs. *International Journal of Educational Technology in Higher Education*, *20*(1), 51–21. https://doi.org/10.1186/s41239-023-00417-2