Unpacking Optimism versus Concern: Tertiary Students' Multidimensional Views on the Rise of Artificial Intelligence (AI)

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Abstract

This paper examined unpacking optimism versus concern: tertiary students' multidimensional views on the rise of AI. The study was guided by four research questions and hypotheses respectively. Ex-Post-Facto using descriptive survey method was employed in the study. The study population consists of 29,000 undergraduate students of Delta State University, from which a stratified sampling technique was used to sample 398 respondents. The questionnaire titled, "Tertiary Students' Multidimensional Views on the Rise of AI Questionnaire (TSMVRAIQ)" was validated through face and content validity. Data were analysed using means and standard deviations for research questions while hypotheses were tested using a t-test and Analysis of Variance (ANOVA) at a significant level of 0.05. The study found that university students from various disciplines view AI as a significant opportunity to advance educational research, enable personalized learning, and enhance data analysis accuracy. Students believe AI will positively impact society, lead to technological advancements, and benefit all demographics equally. AI literacy significantly influences students' perceptions of AI's social impact, driven by factors such as personal interest and engagement. Also, Students demonstrated proactive thinking and a desire for active university involvement in shaping AI development. It was thus recommended that Universities should create dedicated AI research centers that foster interdisciplinary collaboration. These centers could organize regular workshops, seminars, and hands-on projects that bring together students from various disciplines to work on AI-related challenges.

Keywords: Artificial Intelligence (AI), Multidimensional Views, Tertiary Students, Unpacking Optimism versus Concern.

Introduction

The rapid progress of artificial intelligence (AI) has generated both optimism and concern among the public about its potential impact on society. The next generation that will influence the development and adoption of AI are university students, and they are the group where this debate matters most. According to a 2019 study, 78% of students believe AI will help solve complex problems, while 59% believe it could pose a threat to jobs (1). This tension between students' excitement about AI's problem-solving potential and their concerns about it potentially upending the world of work highlights the diversity of perspectives among them. It is crucial to describe the distinctions between optimism and concern regarding AI. Optimism in this study refers to positive expectations about AI's potential benefits, such as improved efficiency, innovative solutions to complex problems, and enhanced decision-making capabilities. Concern, on the other hand, encompasses caution about potential risks, including job displacement, privacy issues, and ethical dilemmas. This study aims to explore how these contrasting perspectives manifest among tertiary students, considering factors such as AI literacy, academic discipline, and demographic characteristics. University students are a diverse population with different educational backgrounds, knowledge levels and demographic characteristics. Due to their practical experience with AI systems, computer science students could be more optimistic (2). Additionally, the societal impact of AI may be more concerning to humanities students (3). Views may also be influenced by the academic year; seniors may become more logical as they follow AI courses (4).

It is critical to understand the causes of students' continued optimism and concerns about AI. Students are the future, and their viewpoints will depend on how disruptive AI technology is adopted or faced by different industries (5). University administrators need to be aware of the new advantages of AI while also taking proactive measures to lower the risks that impact students. It is crucial to present the diverse perspectives of students, as they represent a significant stakeholder group that will eventually hold leadership and work with AI. This study explores the various perspectives held by students regarding the societal advancement of artificial intelligence. What opportunities do students envision? How do opinions differ across disciplines, demographics, and knowledge levels?

As artificial intelligence (AI) penetrates various sectors, it becomes increasingly important to understand the perspectives of current university students. Because of their varied educational backgrounds, cultural backgrounds, and life experiences, these students hold varying opinions about artificial intelligence. Some people think about the creativity and efficiency of AI, while others think about its potential to cause job dislocation, ethical problems and societal injustices. Students studying science, technology, engineering and mathematics (STEM) often express interest in the technical potential of artificial intelligence (AI), making this disparity between disciplines particularly clear, while those who study the social sciences and humanities focus on the humanities' larger implications. Demographic factors such as gender, age, ethnicity, and socioeconomic status also influence students' opinions, highlighting the importance of comprehensive discussions that include diverse viewpoints. This study is crucial due to the complexity of students' views on AI, which requires a multi-pronged approach from educators, employers, and policymakers.

The following questions were posed. What opportunities do university students of all disciplines see with the increasing introduction of AI systems? What reasons do students perceive for the rise of AI? How does the level of AI literacy influence students' perceptions of its social impact? What recommendations do students give school administrators to shape AI proactively?

The following hypotheses were formulated. University students' gender does not significantly differ in opportunities with the increasing introduction of AI systems. University students' age does not significantly differ on reasons they perceive for the rise of AI. University students' academic discipline does not significantly differ on reasons they perceive for the rise of AI. University students' academic level does not significantly differ on how AI literacy influence their perceptions of the social impact.

This study employs the AI Sensemaking Model proposed by Chandra *et al*. as its theoretical framework to investigate university students' multidimensional perspectives on the rise of artificial intelligence (AI) (6). This model offers a comprehensive framework for understanding how individuals make sense of AI technologies, making it particularly suitable for this research objectives. The AI Sensemaking Model was chosen for its holistic approach to understanding AI perceptions, which aligns closely with this study. Unlike models that focus solely on technological aspects or individual characteristics, this framework integrates multiple factors that shape AI understanding, making it ideal for exploring university students' complex and subtle views. The model posits five key factors influencing an individual's sensemaking of AI which include; background and upbringing, experiences, frame of reference, social exposure and personality traits.

Backgrounds and Upbringing: This factor allows the researchers to examine how demographic characteristics (e.g., gender) may predispose students to different perspectives on AI's societal impacts. Experiences: By considering students' direct experiences with AI systems, coursework, projects, and internships, the researchers can explore how hands-on exposure shapes understanding. This factor supports expectation of potentially higher AI perspectives among stale students compared to fresh students. Frame of Reference: This central factor, strongly influenced by academic disciplines, enables the researchers to investigate the hypothesized disciplinary gap between STEM and non-STEM majors. For example, computer science students engaged in AI

development may hold more optimistic views about technological potential, while humanities students might emphasize socioethical risks. Social Exposure: This dimension allows the researchers to consider how dominant social narratives, media discussions, and peer influences shape students' AI perceptions, potentially explaining variations in optimism or concern based on exposure to different information sources. Personality Traits: While not a primary focus, this factor acknowledges the potential influence of individual characteristics like risk aversion or openness on AI perspectives. The AI Sensemaking Model informs our research methodology in several ways. For the research design, the questionnaire incorporates items that probe each of the five factors, ensuring a comprehensive assessment of students' AI perspectives. For sampling technique, the model's emphasis on diverse backgrounds and frames of reference guides our stratified sampling approach, ensuring representation across academic disciplines and demographic groups. For data analysis, the analytical framework was structured around the model's five factors, allowing for a systematic examination of how each component contributes to students' overall AI sensemaking. Lastly, for result interpretation, the model provides a theoretical lens through which the researchers can interpret and contextualize findings, offering insights into why certain patterns or differences in AI perspectives may emerge. Analysis of the literature on university students' perceptions of AI systems reveals a diverse view of opportunities associated with the increasing adoption of these technologies. A recurring theme highlighted across disciplines is students' potential to develop essential technological skills and competencies (2). Whether in computer science, engineering, or non-technical areas, students see practical experience with AI tools as an opportunity to expand their knowledge and skills. This exposure not only promotes technical competence but also promotes interdisciplinary collaboration and skill development, which has a broader impact on students' academic and professional development. Furthermore, the literature highlights how AI systems can improve students' learning and research skills. Personalized learning experiences, support in data analysis for research projects and task automation are considered opportunities that AI offers students. By streamlining routine tasks and providing insights through data analysis, AI enables students to focus on higher-order thinking, creativity, and innovation. Such advances in learning environments can have a profound impact on students' academic outcomes and research efforts, positioning them for success in a rapidly evolving digital landscape (7). Beyond academic and research contexts, university students view AI adoption as a path to career advancement and employability (8). Recognizing AI skills as a valuable asset in the job market, particularly in areas such as data science, artificial intelligence and automation, motivates students to seek opportunities to develop relevant skills. By using AI technologies, students want to strengthen their competitiveness and readiness for the labor market and align their academic activities with the requirements of an increasingly AI-driven economy (9). However, alongside these possibilities, critical reflection on the ethical and social implications of introducing AI to university students is essential. Concerns about job relocation, algorithmic bias, privacy risks and ethical considerations persist in the literature, prompting students to grapple with the broader implications of AI technologies (10, 11). Students' understanding of these challenges and their commitment to ethical AI practices is critical to shaping responsible AI adoption and fostering a generation of socially conscious and ethically informed professionals.

Studies show that various factors influence university students' perception of artificial intelligence. Research suggests that demographic characteristics such as gender (12), age (13), field of study (14) and cultural background (10) play an important role in shaping individuals' general views on AI technologies. Gender differences in views toward AI have been a focus in the literature, with studies pointing to differences in levels of optimism and concern between male and female students (15). While some research suggests that male students tend to express higher levels of optimism and confidence in the potential benefits of AI, female students may show greater levels of concern about ethical implications, bias, and societal impacts of AI technologies (12). These gender differences highlight the importance of

incorporating gender considerations in AI education and awareness initiatives to promote a more inclusive and informed dialogue among students. Age-related factors also influence students' attitudes toward AI, with generational differences reflecting different levels of optimism and concern (13). Younger students who grew up in a digitally immersive environment may show higher levels of optimism and curiosity about the capabilities of AI, viewing it as a tool for innovation and progress. In contrast, older students or those from different generational cohorts may have more skepticism and concerns about the potential risks and limitations associated with AI technologies, highlighting the need for tailored interventions to address different age groups and perspectives in the university environment. Furthermore, students' field of study and academic backgrounds can significantly influence their views on AI (14). There are disciplinary differences in perceptions of the opportunities and challenges of AI, with students in technical fields often expressing greater optimism and enthusiasm for the transformative potential of AI, while students in non-technical disciplines may express more caution and ethical considerations. Understanding these disciplinary differences is critical to designing interdisciplinary AI education programs that meet the diverse needs and perspectives of students in different academic fields. Cultural backgrounds and socioeconomic factors also shape students' attitudes toward AI and influence their optimism and concern (10).

Critically reviewing the literature on how students' level of AI knowledge influences their views on the societal impacts of AI demonstrates the critical role of knowledge and understanding in shaping views and perceptions regarding artificial intelligence. Research suggests that individuals' level of AI literacy, which includes their awareness, understanding, and competence of AI concepts and technologies, has a significant impact on how they perceive the societal impact of AI and the possible impacts on various aspects of society (16). Studies have consistently shown that students with higher levels of AI knowledge tend to demonstrate a more comprehensive and informed perspective on the societal impacts of AI (17). These individuals are better able to critically assess the ethical, economic, and social impacts of AI technologies and to recognize both the transformative potential and potential risks associated with the adoption of AI (18, 19). Their understanding of AI principles, algorithms, and applications enables them to engage in more sophisticated discussions on complex topics such as algorithmic bias, privacy concerns, and job automation, thereby promoting a more sophisticated and insightful approach to the societal impacts of AI (20). Conversely, students with less AI knowledge may hold a simplistic or uninformed view of the societal impacts of AI, influenced by mainstream media portrayals, misconceptions, or limited exposure to AI concepts (21). These individuals may be susceptible to misinformation, fear-mongering narratives, or overestimating the capabilities of AI without a comprehensive understanding of the underlying technologies and their societal impacts (22). As a result, their views on AI may be more polarized, oscillating between extreme optimism and unwarranted concerns, highlighting the critical role of AI education and literacy programs in promoting a more balanced and informed discourse about the societal impacts of AI (23). Additionally, literature highlights the importance of experiential learning and hands-on engagement with AI technologies in improving students' skills and shaping their perspectives on the societal impacts of AI (24, 25). By actively participating in AI projects, programming workshops, or AI ethics simulations, students can gain practical insights into the real-world applications and impacts of AI and foster a deeper understanding of the ethical considerations, biases, and unintended consequences associated with AI technologies (26). By immersing students in AI-driven scenarios and equipping them with the tools to analyze and critique AI systems, educators can enable them to develop more comprehensive and informed perspectives on the societal impacts of AI (27).

Research shows that students, as key stakeholders in the AI ecosystem, provide actionable recommendations for academic institutions to promote ethical AI practices, advance AI literacy, and influence the societal impact of AI technologies through targeted educational initiatives and policy interventions (28, 29). A recurring recommendation from students is to integrate ethics and responsible AI curricula across academic disciplines (30, 31). Students emphasize

the importance of incorporating ethical considerations, bias reduction strategies, and societal impacts of AI technologies into existing courses and programs. By embedding ethics training, AI competency modules, and interdisciplinary projects that promote critical reflection on the impact of AI, academic institutions can equip students to navigate ethical dilemmas, promote transparency, and advocate for responsible AI development practices in their organization's future careers and ventures (32, 26). Additionally, students advocate for experiential learning opportunities that enable them to engage with AI technologies in real-world contexts and collaborate on AI projects that address pressing societal challenges (33). By promoting practical experiences, hackathons and industry partnerships, academic institutions can provide students with practical insights into the application of AI for social good, sustainability and innovation (34). Such initiatives not only improve students' technical skills, but also instil a sense of social responsibility and commitment to using AI for positive societal impact, which is consistent with the growing importance of AI for social initiatives in academic settings (35). Additionally, students emphasize the importance of creating inclusive and diverse AI communities within academic institutions to ensure that all voices are heard and represented in discussions surrounding AI development and governance. Recommendations include establishing AI ethics committees, diversity initiatives, and inclusive AI education programs that promote equity, diversity, and inclusion in AI research, education, and decision-making processes. By fostering a culture of inclusivity and diversity, academic institutions can cultivate a more ethical, accessible, and equitable AI ecosystem that reflects the diverse perspectives and values of all stakeholders (36). Students are calling for increased collaboration and interdisciplinary engagement within academic institutions to address the multidimensional challenges posed by AI technologies (37). By fostering interdisciplinary dialogue, partnerships with industry, government and civil society, and multidisciplinary research initiatives, academic institutions can bridge the gap between theory and practice, catalyze innovation, and drive positive societal change

through AI-driven solutions (38, 39). Students advocate for a holistic and collaborative approach to AI governance that emphasizes transparency, accountability, and ethical considerations in charting AI's course toward a more inclusive, sustainable, and beneficial future for all (40).

Methodology

Research Design

This study employs an ex-post-facto design using a descriptive survey method to investigate tertiary students' multidimensional views on the rise of AI. This non-experimental approach was chosen for its suitability in examining existing perspectives without manipulating variables, aligning with our research objectives of describing and analysing students' views as they naturally occur. The ex-post-facto design allows the researchers to explore variables that have already occurred, making it ideal for studying the complex interplay of factors influencing AI perceptions as outlined in our theoretical framework. The descriptive survey method complements this by enabling the collection of rich, multifaceted data from a large sample, crucial for capturing the nuanced views across different student demographics and academic disciplines. However, the researchers acknowledge that this design cannot establish causal relationships and may be subject to recall bias. To mitigate these limitations, rigorous sampling techniques were employed and sophisticated statistical analyses to uncover meaningful patterns and associations.

Population and Sample Size

At the time of conducting this study, Delta State University, Abraka had approximately 29,000 undergraduate students enrolled, making it a sizeable student body. This number represents the active student community at the university from different levels, faculties, and backgrounds. Intellectual research, creativity, and education are what Delta State University is known for. The university's modern facilities, attentive faculty, and hard-working staff demonstrate its commitment to academic excellence and students' accomplishments. Thus, it offers students an opportunity to engage in academic and non-academic activities. As one of the premier institutions in South-South Nigeria, Delta State

University is vital in influencing the educational environment and socio-economic development. This study employed both purposeful and stratified random sampling techniques to ensure representativeness across academic disciplines, study levels, and demographic characteristics. This approach aligns with the AI Sensemaking Model's emphasis on diverse backgrounds and frames of reference. The sample was stratified based on academic discipline, study level, and gender. This stratification ensures proportional representation and allows for meaningful comparisons across these key variables. While the sample is representative of Delta State University, the researchers acknowledged that findings may not be generalizable to all tertiary institutions. To address this, detailed demographic information to contextualize the results and discuss potential regional or institutional biases was provided.

Sample Size for the study was calculated using the formula $N / (1 + N*e^2)$

Where N = Population size (29,000)

e = Margin of error (e.g. 0.05 for 95% confidence level)

Calculated Sample Size = $29,000 / (1 + 29,000*0.05^2)$

$$= 29,000 / (1 + 362.5)$$
$$= 29,000 / 363.5$$
$$= 398 \text{ (Approximately)}$$

Therefore, a sample size of approximately 398 students was considered sufficient to represent the population of 29,000 tertiary students with a confidence level of 95% and a margin of error of 5%.

Data Collection Instrument

The questionnaire titled, "Tertiary Students' Multidimensional Views on the Rise of AI Questionnaire (TSMVRAIQ)" was developed and administered. The instrument was structured in a four-point scale where: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree. Students were encouraged to answer each question based on their personal views and experiences. The instrument contained thirty-four items which measured the objectives of the study. This questionnaire was designed to measure both optimism and concern regarding AI. Items assessing optimism focused on perceived benefits and positive expectations (e.g., "AI will create new job opportunities across various industries"), while items measuring caution addressed potential risks and concerns (e.g., "I am concerned about the potential job displacement caused by AI"). A 4-point Likert scale was used to quantify responses, allowing a clear analysis of these constructs.

Instrument Validation

The "Tertiary Students' Multidimensional Views on the Rise of AI Questionnaire (TSMVRAIQ)" validation process was comprehensive and multi-faceted, ensuring robust face and content validity. Initially, a panel of five experts in artificial intelligence, education psychology, and psychometrics rigorously reviewed the questionnaire. This interdisciplinary panel included two AI researchers, two education psychologists specializing in technology integration, and one psychometrician. Each expert independently evaluated all 34 items for clarity, relevance, and alignment with the study's objectives and the AI Sensemaking Model dimensions. The experts rated each item on a 4-point scale (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree) and provided qualitative feedback. To further ensure face validity, a cognitive interview was conducted using 15 students (5 each from STEM, social sciences, and humanities). These interviews used think-aloud protocols as students completed the questionnaire, providing insights into their interpretation of items and response processes. This step led to minor wording adjustments in 7 items to enhance clarity and relevance across disciplines.

Reliability

To assess the reliability of the instrument, Cronbach's alpha coefficient, a widely accepted measure in psychometric research, was used. The coefficient value obtained was 0.78, which is within the range considered acceptable for internal consistency and reliability. This means that the questionnaire items consistently measure the same underlying construct, demonstrating a high level of reliability in capturing the intended study dimensions. Because Cronbach's alpha indicates a robust level of internal consistency, researchers can be confident in the reliability of the questionnaire as a tool for collecting accurate

and consistent data related to the objectives of the study.

Data Analysis

Data collected from survey responses were analysed using descriptive statistics, consistent with the descriptive nature of the study. Demographic variables were analysed using frequencies and percentages. To answer the research questions, descriptive statistics such as means and standard deviations were calculated to summarize and describe the multidimensional views and perspectives of the sample of tertiary students. Hypotheses were tested using t-test and Analysis of Variance (ANOVA) at a significant level of 0.05.

Results

Demographic Variables

Table 1 revealed demographic variables used in the study. The table shows that 145(36.5%) were male, and 253(63.5%) were female. Also, the table shows that 345(86.5%) were between 18 and 25 years, and 53(13.5%) were 26 years and above. 8(1.9%) were in 100 level, 160 (40.4%) were in 200 level, 138(34.6%) were in 300 level, 92(23.1%) were in 400l and above. Furthermore, 191(48.1%) were from faculty of education, 8(1.9%) were from medical science, 23(5.8%) were in sciences, 8(1.9%) were in management science and 168 were in engineering.

Research 1: What opportunities do university students of all disciplines see with the increasing introduction of AI systems?

Table 1: Demographic Variables Used in the Study

Variables	Frequency	Percentage
Gender		
Male	145	36.5
Female	253	63.5
Total	398	100.0
Age		
18-25	345	86.5
26 and above	53	13.5
Total	398	100.0
Academic levels		
100L	8	1.9
200L	160	40.4
300L	138	34.6
400L and above	92	23.1
Total	398	100.0
Faculties		
Education	191	48.1
Medical Science	8	1.9
Sciences	23	5.8
Management Science	8	1.9
Engineering	168	42.3
Total	398	100.0

Table 2: Mean and SD Analysis on Opportunities University Students of All Disciplines See with the Increasing Introduction of AI Systems

S/N	Opportunities students see with the increasing introduction of AI system	Mean	SD	Rank	remark
1	AI will create new job opportunities across various industries.	2.55	.99	8th	+
2	AI will enhance productivity in workplace tasks.	3.09	.72	3rd	+
3	AI will facilitate advancements in educational research.	3.13	.81	1st	+
4	AI will enable personalized learning experiences	3.11	.85	2nd	+
5	AI will lead to innovative solutions for environmental sustainability.	2.98	.77	5th	+

6	AI will improve the accuracy of data analysis.	3.09	.87	3rd	+
7	AI will contribute to the development of autonomous smart cities.	2.94	.84	6th	+
8	AI will promote inclusivity by providing accessibility solutions for individuals with disabilities.	2.86	.79	7th	+

Keys: + Agree, - Disagree

Result in Table 2 shows Mean and SD analysis on opportunities university students of all disciplines see with the increasing introduction of AI systems. The result revealed that AI will facilitate advancements in educational research with 3.13, SD=.81 and ranked 1st, AI will enable personalized learning experiences with 3.11, SD=.85 and ranked 2nd, AI will improve the accuracy of data analysis with 3.09, SD=.87, AI will enhance productivity in workplace tasks with 3.09, SD=.72 and ranked 3rd respectively, AI will lead to innovative solutions for environmental sustainability with 2.98, SD=.77 and ranked 5th, AI will contribute to the development of autonomous smart cities with 2.94, SD=.84 and ranked 6th, AI will promote inclusivity by providing accessibility solutions for individuals with disabilities with 2.86, SD=.79 and ranked 7th, lastly, AI will create new job opportunities across various industries with 2.55, SD=.99 and ranked 8th. Thus, opportunities university students of all disciplines see with the increasing introduction of AI systems were AI will facilitate advancements in educational research, enable personalized learning experiences, improve the accuracy of data analysis, enhance productivity in workplace tasks, lead to innovative solutions for environmental sustainability, contribute to the development of autonomous smart cities, promote inclusivity by providing accessibility solutions for individuals with disabilities and create new job opportunities across various industries.

Research 2: What reasons do students perceive for the rise of AI?

Table 3: Mean and SD Analysis on Reasons Students Perceived for the Rise of AI

S/N	Reasons students perceived for the rise of AI	Mean	SD	Rank	remark
1	I believe AI will have a positive impact on society.	3.23	.70	1st	+
2	I am confident that AI will lead to technological advancements that improve quality of life.	3.12	.68	2nd	+
3	I think AI will benefit individuals from all demographic backgrounds equally.	3.10	.65	3rd	+
4	I perceive AI as a tool for innovation rather than a threat to human autonomy.	3.08	.77	4th	+
5	I am concerned about the potential job displacement caused by AI.	2.92	.75	5th	+
6	I feel optimistic about the ethical considerations surrounding AI.	2.90	.81	6th	+
7	I believe AI will prioritize the protection of personal privacy.	2.84	.84	7th	+
8	I am uncertain about the long-term consequences of widespread AI adoption.	2.76	.84	8th	+
9	I worry that AI will worsen existing social inequalities.	2.48	.95	9th	-

Keys: + Agree, - Disagree

Table 3 shows Mean and SD analysis on reasons students perceived for the rise of AI. Result from respondents shows that they agree on all items with mean above 2.50 benchmark except item 9 which is below the mean benchmark of 2.50. However, I believe AI will have a positive impact on society ranked 1st, I am confident that AI will lead to technological advancements that improve quality of life ranked 2nd, I think AI will benefit individuals from all demographic backgrounds equally ranked 3rd, I perceive AI as a tool for innovation rather than a threat to human autonomy ranked 4th, I am concerned about the potential job displacement caused by AI ranked 5th, I feel optimistic about the ethical considerations surrounding AI ranked 6th, I believe AI will prioritize the protection of personal privacy ranked 7th, and I am uncertain about the long-term

consequences of widespread AI adoption ranked 8th. Thus, reasons students perceive for the rise of AI were AI will have a positive impact on society, lead to technological advancements that improve quality of life, benefit individuals from all demographic backgrounds equally, is a tool for innovation rather than a threat to human autonomy, potential job displacement, optimistic about the ethical considerations, prioritize the protection of personal privacy and uncertain about the long-term consequences of widespread AI adoption.

Research 3: How does the level of AI literacy influence students' perceptions of its social impact?

Table 4: Mean and SD Analysis on How AI Literacy Influence Students' Perceptions of its Social Impact

S/N	How AI literacy influences students' perception of its social impact.	Mean	SD	Rank	remark
1	I feel more confident discussing AI-related topics after increasing my AI literacy.	3.02	.66	1st	+
2	I believe individuals with higher AI literacy are better equipped to deal with AI-related challenges.	3.02	.63	1st	+
3	AI literacy enhances my understanding of the ethical considerations in AI development.	2.95	.74	3rd	+
4	I have become more critical of AI technologies/their implications.	2.91	.70	4th	+
5	AI literacy has empowered me to contribute to discussions on AI policy.	2.89	.72	5th	+
6	My level of AI literacy influences my perceptions of AI's potential risks.	2.87	.63	6th	+
7	I have a greater understanding of the applications of AI in various industries.	2.81	.73	7th	+
	Average mean	**2.92**	**.69**		**+**

Keys: + High, - Low

Result in Table 4 shows Mean and SD analysis on how AI literacy influence students' perceptions of its social impact. Result from respondents shows that they agree on all items with mean above 2.50 benchmark. In specific, I feel more confident discussing AI-related topics after increasing my AI literacy and I believe individuals with higher AI literacy are better equipped to deal with AI-related challenges ranked 1st, AI literacy enhances my understanding of the ethical considerations in AI development ranked 3rd, I have become more critical of AI technologies/their implications ranked 4th, AI literacy has empowered me to contribute to discussions on AI policy ranked 5th, My level of AI literacy influences my perceptions of AI's potential risks ranked 6th, and I have a greater understanding of the applications of AI in various industries ranked 7th. An average mean score of 2.92 with SD of .69 revealed that the level of AI literacy influence students' perceptions of its social impact.

Research 4: What recommendations do students give school administrators to shape AI proactively?

Table 5: Mean and SD Analysis on Recommendations Students Give School Administrators to Shape AI Proactively

S/N	Recommendations students give school administrators to shape AI proactively	Mean	SD	Rank	Remark
1	Institutions should encourage students to participate in AI competitions.	3.22	.79	1st	+
2	Universities should establish AI research centres to foster collaboration.	3.18	.69	2nd	+
3	Academic departments should provide resources for students to explore AI applications in their respective fields.	3.16	.79	3rd	+
4	Academic programmes should emphasize the importance of lifelong learning in the field of AI.	3.16	.65	3rd	+

5	Institutions should engage students in AI-related community outreach projects.	3.14	.73	5th	+
6	Universities should promote diversity in AI education.	3.12	.71	6th	+
7	Academic institutions should integrate AI education across various disciplines.	3.08	.83	7th	+
8	Universities should offer interdisciplinary courses on the societal impacts of AI.	3.08	.64	7th	+
9	Institutions should prioritize experiential learning opportunities related to AI development.	3.04	.78	9th	+
10	Academic programmes should incorporate ethics training into AI curriculum.	3.00	.79	10th	+

Keys: + Agree, - Disagree

Table 5 shows Mean and SD analysis on recommendations students give school administrators to shape AI proactively. Result from respondents shows that they agree on all items with mean above 2.50 benchmark. In specific, institutions should encourage students to participate in AI competitions ranked 1st, universities should establish AI research centres to foster collaboration ranked 2nd, academic departments should provide resources for students to explore AI applications in their respective fields and academic programmes should emphasize the importance of lifelong learning in the field of AI ranked 3rd, institutions should engage students in AI-related community outreach projects ranked 5th, universities should promote diversity in AI education ranked 6th, academic institutions should integrate AI education across various disciplines and universities should offer interdisciplinary courses on the societal impacts of AI ranked 7th, institutions should prioritize experiential learning opportunities related to AI development ranked 9th and academic programmes should incorporate ethics training into AI curriculum ranked 10th. It can therefore be stated that recommendations students give school administrators to shape AI proactively include; encouraging students to participate in AI competitions, establish AI research centres to foster collaboration, provide resources for students to explore AI applications in their respective fields, emphasize the importance of lifelong learning in the field of AI, engage students in AI-related community outreach projects, promote diversity in AI education, integrate AI education across various disciplines, offer interdisciplinary courses on the societal impacts of AI, prioritize experiential learning opportunities related to AI development and incorporate ethics training into AI curriculum.

Hypothesis 1: University students' gender does not significantly differ on opportunities with the increasing introduction of AI systems.

Table 6: t-Test Analysis on University Students' Gender and Opportunities with the Increasing Introduction of AI Systems

Variables	Number	Mean	SD	t-cal.	t-crit.	Decision
Male	145	2.83	.76	-1.33	$\pm$1.96	Not Significant
Female	253	3.05	.43			

Table 6 shows t-test analysis on university students' gender and opportunities with the increasing introduction of AI systems. The result of the table shows that male respondents were 145 with an average mean of 2.83, SD=.76 and female respondents were 253 with an average mean of 3.05, SD=.43. t-cal. of -1.33 is less than t-crit. of $\pm$1.96 at a significance level of 0.05. Thus, hypothesis which states that university students' gender does not significantly differ on opportunities with the increasing introduction of AI systems was retained.

Hypothesis 2: University students' ages do not significantly differ on reasons they perceive for the rise of AI.

Table 7: ANOVA of University Students' Ages on Reasons they Perceive for the Rise of AI."

	Sum of Squares	Df	Mean Square	F	P.
Between Groups	.471	2	.235	.693	.505
Within Groups	99.148	394	.222		
Total	99.619	396			

Table 7 shows ANOVA of university students' ages on reasons they perceive for the rise of AI. The table shows an F value of .693 and a p value of .505 testing at an alpha level of .05 the p value is higher than the alpha level, so the null hypothesis which states that university students' ages do not significantly differ on reasons they perceive for the rise of AI was retained.

Hypothesis 3: University students' academic discipline does not significantly differ on reasons they perceive for the rise of AI.

Table 8: ANOVA of University Students' Academic Discipline on Reasons they Perceive for the Rise of AI

	Sum of Squares	Df	Mean Square	F	P
Between Groups	1.175	3	.392	1.955	.134
Within Groups	99.419	393	.200		
Total	110.594	396			

"Table 8 shows ANOVA of university students' academic discipline on reasons they perceive for the rise of AI. The table shows an F value of 1.955 and a p value of .134 testing at an alpha level of .05 the p value is higher than the alpha level, so the null hypothesis which states that university students' academic discipline does not significantly differ on reasons they perceive for the rise of AI was retained.

Hypothesis 4: University students' academic level does not significantly differ on how AI literacy influences their perceptions of social impact perceptions.

Table 9: ANOVA of University Students' Academic Level on How AI Literacy Influences their Perceptions of Social Impact

	Sum of Squares	Df	Mean Square	F	P
Between Groups	1.115	4	.279	1.102	.368
Within Groups	111.134	392	.253		
Total	112.249	396			

Table 9 shows ANOVA on university students' academic level and how AI literacy influences their perceptions of social impact. The table shows an F value of 1.102 and a p value of .368 testing at an alpha level of .05 the p value is higher than the alpha level, so the null hypothesis which states that University students' academic level does not significantly differ on how AI literacy influences their perceptions of social impact perceptions was retained.

Discussion

Finding revealed that opportunities university students of all disciplines see with the increasing introduction of AI systems include; AI will facilitate advancements in educational research, enable personalized learning experiences, improve the accuracy of data analysis, enhance productivity in workplace tasks, lead to innovative solutions for environmental sustainability, contribute to the development of autonomous smart cities, promote inclusivity by providing accessibility solutions for individuals with disabilities and create new job opportunities across various industries. Hypothesis tested revealed that university students' gender does not significantly differ on opportunities with the increasing introduction of AI systems. The reason for this result shows that the wide range of opportunities identified by students across different disciplines suggests a general optimism and recognition of the potential of AI to have a positive impact on various areas, from education and research to Sustainability and accessibility. The lack of significant gender differences in perceived opportunities suggests that both male and female students are equally aware of the transformative potential of AI, which may be due to increasing exposure to AI technologies and discussions in academic environments. Based on the findings, it appears that university students across various disciplines

recognize the potential opportunities and benefits that AI systems can bring. This perspective aligns with the research that highlight the transformative potential of AI in revolutionizing higher education, personalizing learning experiences, and creating new opportunities for learning and research, particularly among computer science students who have hands-on experience with AI. However, it is important to note that this optimistic view is not universally shared (2). Also, the finding agrees with the suggestion that students in the humanities may have more concerns about the societal implications of AI, while pointing out the potential issues of job displacement and the need for reskilling (3).

Finding revealed that reasons students perceive for the rise of AI were AI will have a positive impact on society, lead to technological advancements that improve quality of life, benefit individuals from all demographic backgrounds equally, is a tool for innovation rather than a threat to human autonomy, potential job displacement, optimistic about the ethical considerations, prioritize the protection of personal privacy and uncertain about the long-term consequences of widespread AI adoption. Hypothesis tested revealed that university students' ages and academic discipline do not significantly differ on reasons they perceive for the rise of AI. The outcome of this finding may be related to students' belief in the positive social impact and potential of AI to improve quality of life. This suggests a prevailing optimism, likely influenced by the promising applications and advances they have seen or learned about. The idea that AI will benefit people of all demographic backgrounds equally may be based on the idea that AI is an objective, data-driven technology. However, it is important to note that AI systems can inherit biases from their training data and developers, which is an area that requires ongoing attention and remediation. The lack of significant differences across age groups and academic disciplines in perceived reasons for the rise of AI suggests that these optimistic views are widespread among students, perhaps due to the ubiquitous nature of AI discussions and the emphasis on its potential benefits in various fields. The finding that students believe in the positive societal impact of AI is consistent with study (5), which emphasizes that students' views will shape

the adoption and impact of AI across industries. Another study also highlights the potential for AI to enhance decision-making and efficiency in various areas. Nevertheless, it is crucial to consider the concerns raised regarding job displacement and the ethical implications of AI systems (41). Further research stresses the importance of addressing the social and ethical implications of AI beyond its technological capabilities (42). Finding revealed that the level of AI literacy influence students' perceptions of its social impact. Hypothesis tested revealed that University students' academic level does not significantly differ on how AI literacy influences their perceptions of social impact perceptions. The finding that the level of AI competence influences students' perceptions of the social impact of AI highlights the importance of education and knowledge in forming informed opinions about the impact of AI. The lack of significant differences between academic levels suggests that AI competence depends not only on the number of years spent at university, but also on factors such as personal interest, exposure to AI-related content, and engagement in AI-related activities. This finding corresponds with the significance of AI literacy in shaping individuals' perceptions of AI's societal implications, supporting the finding that AI literacy influences students' perceptions (16). Also, the importance of AI literacy in enabling students to critically engage with AI technologies and understand their societal implications have been established (43). Furthermore, the positive role of AI education in shaping students' perceptions and attitudes have been highlighted (44). Although, there is a disagreement with the finding when the authors found significant differences across academic levels in AI literacy's influence may be questioned by authors who emphasize the role of AI coursework and hands-on experience in shaping informed perspectives (24). Finding revealed that recommendations students give school administrators to shape AI proactively include; encouraging students to participate in AI competitions, establish AI research centres to foster collaboration, provide resources for students to explore AI applications in their respective fields, emphasizing the importance of lifelong learning in the field of AI, engage students in AI-related community outreach projects,

promote diversity in AI education, integrate AI education across various disciplines, offer interdisciplinary courses on the societal impacts of AI, prioritize experiential learning opportunities related to AI development and incorporate ethics training into AI curriculum. The students' diverse recommendations demonstrate their proactive thinking and desire for universities to take an active role in shaping the development and integration of AI. The emphasis on AI competitions, research centres, and experiential learning opportunities suggests that students' value hands-on engagement and practical applications of AI knowledge. The call to integrate AI education across disciplines and include ethics training underscores students' recognition of the importance of interdisciplinary collaboration and ethical considerations in AI development. The focus on diversity and outreach shows that students are aware of the need for inclusive AI education and the potential of AI to address societal challenges. This finding agrees with the importance of incorporating ethics into AI education and is consistent with students' recommendations for ethics training in AI curricula (29). The finding supports the need for interdisciplinary collaboration and research initiatives to address the multidimensional challenges of AI and supported students' calls for cross-disciplinary integration of AI education (37). Study has also shown that AI integration into education across disciplines have prepared students for the challenges and opportunities of an AI-driven future (45). Furthermore, the importance of interdisciplinary collaboration and integrating AI ethics into curricula, thus, higher education institutions should proactively engage students with AI and develop strategies for its effective integration has been established (46). Research has shown that university curricula play a significant role in shaping students' perceptions of AI, particularly through courses on ethics, technology, and digital literacy. For instance, study found that exposure to AI-related content in academic programs significantly influences students' understanding and attitudes toward AI (47). Similarly, another study emphasized that ethics courses foster a more balanced view of AI, encouraging students to critically engage with both the potentials and risks of AI technologies

(48). Further research supported this notion, highlighting that integrating AI into higher education curricula helps students develop a broader awareness of AI's societal impact (49). Additionally, it has been demonstrated that increased digital literacy, often fostered through university coursework, enhances students' understanding and critical thinking about AI (50). While this study did not directly measure curricular influence, these findings suggest that future research should explore how different academic programs and course offerings may affect the balance between optimism and caution in students' AI perceptions. Although the primary focus of this study was student perspectives, it is important to take into account how university administration shapes these opinions. Although we did not speak with administrators directly, research to date indicates that institutional policies and programs have a big impact on how students view new technologies like artificial intelligence (51). Universities may encourage more favorable student attitudes toward AI, for example, if they actively support AI research centers, incorporate AI into interdisciplinary curricula, or organize AI-focused events (52). On the other hand, organizations that take their time implementing AI technology or addressing associated ethical issues may unintentionally increase students' anxiety (53). Student opinions at Delta State University are probably greatly influenced by the administration's approach to AI integration and instruction. Future studies could examine this relationship in greater detail by analyzing institutional policies and conducting administrator interviews. Such research could show how administrative choices about curriculum design, resource allocation, and ethical standards pertaining to AI affect students' optimism or hesitancy about the technology. Furthermore, analyzing how administrators strike a balance between resolving student concerns and the possible advantages of adopting AI could offer insightful information to other institutions navigating the integration of AI in higher education. While this study focused on students at Delta State University, Abraka, its findings may have broader implications. The diverse sample across disciplines and academic levels suggests that the results could be indicative of trends in

other Nigerian universities, particularly those with similar demographic compositions and academic offerings. However, caution should be exercised in generalizing these findings to institutions in significantly different cultural or economic contexts. Factors such as regional AI adoption rates, cultural attitudes towards technology, and the specific AI-related curricula offered by institutions could influence student perceptions. Future research could explore these factors to determine the extent to which these findings are generalizable across different educational settings.

Conclusion

Conclusively, university students, regardless of gender, age, or academic discipline, perceive numerous opportunities and benefits from the rise of AI, including advancements in education, personalized learning, workplace productivity, environmental sustainability, and inclusivity. They view AI positively, recognizing its potential for societal improvement and innovation, while also expressing concerns about ethical considerations and long-term impacts. Students' AI literacy significantly influences their perceptions of AI's social impact. To proactively shape AI education, students recommended that school administrators should establish research centres, provide resources for exploration, and incorporate ethics training. Arising from the findings and conclusion, it was recommended however, that; Universities should create dedicated AI research centres that foster interdisciplinary collaboration. These centres could organize regular workshops, seminars, and hands-on projects that bring together students from various disciplines to work on AI-related challenges; develop and implement an "AI for All" curriculum that introduces basic AI concepts in courses across all faculties. This could include modules on AI ethics, practical applications of AI in different fields, and discussions on the societal impacts of AI; organize AI literacy campaigns, including guest lectures, tech talks, and AI demonstration days. These events could showcase real-world AI applications and invite industry experts to share insights; and incorporate mandatory ethics modules in all AI-related courses. These modules should cover topics such as bias in AI, privacy concerns, and the societal implications of AI deployment. Establish

partnerships with local industries to provide AI-related internships and project opportunities for students. This hands-on experience will help students understand the practical applications and challenges of AI in real-world settings.

Abbreviation

AI: Artificial Intelligence.

Author Contributions

"NKEDISHU, Victor Chukwubueze: Methodology, Analysis and Editing, OKONTA, Vinella: Conceptualization and Editing.

Conflict of Interest

The authors declare no conflict of interest.

Ethics Approval

The Ethical Committee of the Department of Educational Management and Foundations, Faculty of Education, Delta State University, Abraka, Nigeria has granted approval for this study on 14th December 2023 (Ref. No. DEL/FOE/EMF/0128).

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