Artificial Intelligence (AI)-Powered Virtual Assistants and their Effect on Human Productivity and Laziness: Study on Students of Delhi-NCR (India) & Fujairah (UAE)

Dr Dhruv Sabharwal
Associate Professor,
School of Media, Sharada University, Greater Noida

Dr Robin Kabha (Corresponding Author)
Assistant professor
College of Communication, University of Fujairah, UAE

Dr Kajal Srivastava
Assistant Professor,
Area of Business Communication, Jaipuria Institute of Management, Lucknow, India
Email: kajal.srivastava@jaipuria.ac.in

ABSTRACT

This study investigates the impact of artificial intelligence (AI) on decision-making, laziness, and privacy concerns among university students of Delhi NCR (India) and Fujairah (UAE). As AI technologies are increasingly adopted in various sectors, including education, to tackle contemporary challenges, there is a growing investment in AI, projected to reach USD 253.82 million between 2021 and 2025. However, while researchers and institutions worldwide praise the positive role of AI, this study sheds light on the concerns associated with its implementation.

This study utilizes a qualitative methodology employing PLS-Smart for data analysis. The primary data was collected from 315 students representing various universities in Delhi NCR (India) and Fujairah (UAE). The sample was drawn using purposive sampling techniques from the population. The findings of the data analysis demonstrate that artificial intelligence (AI) has a significant impact on human decision-making, laziness, and security and privacy concerns. The results indicate that 68.9% of human laziness, 68.6% of personal privacy and security issues, and 27.7% of the loss of decision-making can be attributed to the influence of AI in Delhi and Fujairah. Notably, human laziness emerges as the most affected area due to artificial intelligence..

KEYWORDS: Artificial Intelligence, Virtual Assistance, Automation, Decision Making, University Students, Mental Health.

Artificial intelligence (AI) is a vast and rapidly evolving technology that has found extensive application in the education sector (Nemorin et al., 2022). Various types of AI technologies are utilized in education, including Plagiarism Detection, Exam Integrity (Ade-Ibijola et al., 2022), Chatbots for Enrollment and Retention (Nakitare and Otike, 2022), Learning Management Systems, Transcription of Faculty Lectures, Enhanced Online Discussion Boards, Analyzing Student Success Metrics, and Academic Research (Nakitare and Otike, 2022). In recent times, Education Technology (EdTech) companies have started employing emotional AI to assess social and emotional learning (McStay, 2020). The collective term "emotional AI" encompasses artificial intelligence, affective computing methods, and machine learning (AI).

It is critical to understand the meaning of "ethics" in the context of AI and education. Furthermore, it is critical to identify the potential unintended consequences of using AI in education, as well as the key concerns about AI's role in education and other pertinent factors. In general, ethical issues and concerns about AI include the cost of innovation, consent issues, misuse of personal data, criminal and malicious exploitation, loss of freedom and autonomy, and the diminished role of humans in decision-making (Stahl B.

C., 2021a, 2021b). Nonetheless, technology improves organizational information security (Ahmad et al., 2021), competitive advantage (Sayed and Muhammad, 2015), and customer interactions (Rasheed et al., 2015). Researchers are concerned that by the year 2030, the AI revolution will primarily focus on enhancing benefits and social control; however, it will also give rise to ethical concerns, without a consensus among them. There exists a distinct division regarding the positive impact of AI on human life and its moral implications (Rainie et al., 2021).

First and foremost, it is essential to develop AI technology for education in a manner that does not give rise to ethical issues or concerns (Ayling and Chapman, 2022). The heightened expectations surrounding AI have generated global interest and concern, resulting in the formulation of over 400 policy documents on responsible AI. Extensive discussions on ethical matters serve as valuable groundwork, equipping researchers, managers, policymakers, and educators to engage in constructive dialogues that will ultimately provide clear recommendations for the creation of reliable, safe, and trustworthy systems that can achieve commercial success (Landwehr, 2015). However, the question remains: is it feasible to develop AI technology for education that will never give rise to ethical concerns? It is plausible that the developer or manufacturer of AI technology in education may have ulterior motives or seek dishonest gain from its application.

AI technology raises numerous concerns, as highlighted by Stahl (2021a, 2021b), and the education sector is not exempt from facing its own set of challenges (Hax, 2018). While not all issues directly impact education and learning, the majority have either a direct or indirect influence on the educational process (Ansi 2023). Consequently, determining whether AI has a positive ethical impact on education, a negative one, or falls somewhere in between proves to be a difficult task. The ongoing debate surrounding the ethical concerns of AI technology will persist on a case-by-case basis and within specific contexts (Petousi and Sifaki, 2020).

This research specifically focuses on three moral fears associated with AI in education:

1. **Data Security and Privacy**: AI-powered educational systems often collect and analyze large amounts of student data. Concerns arise regarding the security and privacy of this data, especially if it is mishandled, misused, or falls into the wrong hands.
2. **Erosion of human decision-making**: The increasing reliance on AI in education raises concerns about the potential loss of essential human skills, such as critical thinking, problem-solving, creativity, and social interaction. Overdependence on AI tools may hinder the development of these skills in students.
3. **Encouraging human passivity and laziness**: One of the moral fears associated with AI in education is the concern that it may encourage human passivity and laziness. This fear arises from the idea that when students rely heavily on AI-powered tools or virtual assistants to perform tasks or provide information, they may become passive learners, relying on technology rather than actively engaging in the learning process. This can lead to a decrease in critical thinking skills, motivation, and independent learning abilities.

While there are indeed other concerns regarding AI in education, these three stand out as the most prevalent and challenging in the present era. Furthermore, due to the limitations of this study, it is not feasible for researchers to expand their investigation beyond the defined scope.

RESEARCH GAP: While there is a growing body of literature exploring the effects of Artificial Intelligence (AI)-powered virtual assistants on human productivity and laziness, there remains a research gap in understanding these effects specifically among students in the regions of Delhi-NCR, India, and Fujairah, UAE. The literature on the ethics of AI makes it clear that alongside its significant advantages, the development of AI also presents various challenges concerning moral values, behavior, trust, privacy, and more. The education sector encounters numerous ethical dilemmas when implementing or utilizing AI, and researchers are actively investigating this area. In the context of AI in education, it is useful to divide the discussion into three levels: the technology itself, including its

manufacturers and developers; the impact on teachers; and the consequences for learners or students.

This study aims to provide valuable insights into the specific effects of AI-powered virtual assistants on student productivity and laziness in Delhi-NCR, India, and Fujairah, UAE. The research will consider cultural and educational factors that may influence the impact of these virtual assistants and shed light on potential differences between the two regions. The findings will contribute to the existing knowledge on AI in education and provide actionable recommendations for educators, policymakers, and stakeholders in both regions to enhance the integration and utilization of AI-powered virtual assistants in a way that maximizes productivity and minimizes potential negative effects on student motivation and engagement.

THEORETICAL DISCUSSION

The impact of AI on various sectors, including education, cannot be overlooked, and it is evident that it requires time to mature and unfold (Leeming, 2021). From telecommunications to healthcare and education, technology, including AI, plays a significant role in supporting and benefiting humanity (Stahl A., 2021a, 2021b). It's importance and wide-ranging applications provide a strong rationale for its existence and continued development. Among the crucial technological advancements, artificial intelligence (AI) stands out (Ross, 2021). AI finds its applications in several domains, including education, where it facilitates tutoring, educational support, feedback mechanisms, social robots, admissions, grading, analytics, trial and error, virtual reality, and more (Tahiru, 2021).

AI is based on computer programming and computational methodologies, but there are concerns about the data analysis, interpretation, sharing, and processing processes (Holmes et al., 2019). Concerns have also been raised about minimizing biases that may harm student rights, as design biases are thought to accumulate with time, as well as addressing concerns of gender, ethnicity, age, wealth inequality, social standing, and other variables (Tarran, 2018). AI in education, like any other technology, confronts issues that must be addressed. This study focuses on the ethical considerations linked with AI in education, such as privacy concerns, data access, moral obligations, and student records, among other things (Petousi and Sifaki, 2020). Furthermore, the hazards of data hacking and manipulation pose threats to personal privacy and control, emphasizing the importance of clear ethical guidelines (Fjelland, 2020).

Security and Privacy Issues; Stephen Hawking once expressed that the creation of AI would be an immensely impactful event in human history. However, he also warned that it could potentially be our last achievement unless we learn to navigate its risks. Among the prominent concerns associated with AI and learning, security stands out as a major issue (Köbis and Mehner, 2021). The topic of trustworthy artificial intelligence (AI) in education has garnered significant attention, as researchers and experts delve into its promises and challenges (Petousi and Sifaki, 2020; Owoc et al., 2021). Nowadays, numerous educational institutions rely on AI technology in the learning process, making it a subject of extensive research and interest.

Many researchers concur that AI makes substantial contributions to e-learning and education (Nawaz et al., 2020; Ahmed and Nashat, 2020). This claim has been particularly evident during the recent COVID-19 pandemic, as the reliance on AI and machine learning became more pronounced (Torda, 2020; Cavus et al., 2021). However, along with its benefits, AI and machine learning have also brought forth numerous concerns and challenges for the education sector, with security and privacy being the most significant among them.

The utilization of AI in education systems poses a considerable risk and ethical concern in terms of digital security, as malicious actors may hack machines and exploit the obtained data for illicit purposes (Venema, 2021). Our safety and privacy are thereby compromised (Sutton et al., 2018), leading to the pressing question of whether our privacy can truly be safeguarded and when AI systems will be capable of ensuring the preservation of our confidentiality. The answer to this question lies beyond current human knowledge (Kirn, 2007).

Human interactions with AI are steadily increasing, with the integration of various AI applications such as robots and chatbots into e-learning and education. While these AI systems may acquire human-like behaviors over time, certain aspects such as self-awareness and consciousness will likely remain elusive. AI still heavily relies on data for learning patterns and making decisions, which perpetuates privacy concerns (Mhlanga, 2021). On one hand, it is evident that AI systems intersect with various human rights issues, which necessitate case-by-case evaluation. The complex implications of AI on human rights are intertwined with existing societal conditions rather than being implemented on a blank slate. Among the multitude of human rights protected by international law, privacy is particularly impacted by AI (Levin, 2018).

Based on the review, we propose the following hypothesis:
H1: Artificial intelligence significantly impacts security and privacy issues.

Encouraging Human Passivity and Laziness
AI is a transformative technology that has a profound impact on Industry 4.0, revolutionizing various aspects of human life and society (Jones, 2014). The increasing role of AI in organizations and individuals has raised concerns among prominent figures like Elon Musk and Stephen Hawking. They express apprehension about the possibility that once AI reaches an advanced level, it may become uncontrollable for humans (Clark et al., 2018). It is alarming to note that research in the field has grown eightfold compared to other sectors. Many companies and nations are heavily investing in the development and expansion of AI technologies, skills, and education (Oh et al., 2017). However, the primary concern surrounding the adoption of AI lies in the intricate balance it creates between the role of AI in sustainable value creation and the minimization of human control (Noema, 2021).

AI is progressively diminishing our autonomous role, supplanting our choices with its own, and fostering laziness across various aspects of life (Danaher, 2018). It is argued that AI undermines human autonomy and responsibilities, which subsequently has a detrimental effect on happiness and fulfillment (C. Eric, 2019). This impact is not limited to a specific group or domain but extends to the education sector as well. Teachers and students may rely on AI applications to complete tasks or assignments, potentially leading to a situation where work is performed automatically. Gradually, an addiction to AI usage may foster laziness and contribute to future challenges. In summary, we propose the following hypothesis:
H2: Artificial intelligence has a significant impact on human laziness.

Erosion of Human Decision-Making
Technology plays a crucial role in decision-making by enabling humans to utilize information and knowledge effectively for organizational advancements and innovations (Ahmad, 2019). As humans generate vast volumes of data, firms are adopting AI to streamline their management, which, in turn, reduces human involvement in data utilization. Humans may perceive benefits and time savings by leveraging AI in decision-making, but it gradually impairs their cognitive abilities by overshadowing their cognitive capabilities (Jarrahi, 2018).

While AI technologies and applications undoubtedly offer numerous benefits, they also have significant negative consequences, one of which is the limitation of human involvement in decision-making processes. Over time, AI progressively restricts and replaces the human role in decision-making. Fundamental human mental capacities such as intuitive analysis, critical thinking, and creative problem-solving become marginalized in the decision-making process (Ghosh et al., 2019). Consequently, this can lead to the erosion of these skills, as the saying goes, "use it or lose it." The rapid adoption of AI technology is evident in strategic decision-making processes, where its usage has surged from 10% to 80% within five years (Sebastian and Sebastian, 2021). Similarly, when it comes to student records and data analysis, the decisions made by the system, either due to trust or the convenience of task automation, determine the outcome. In almost every aspect, teachers and other personnel experience a decline in cognitive abilities when making academic or administrative decisions. Their reliance on AI systems within educational institutions grows daily.

To summarize the review, AI automation in educational organizations leads to the streamlining of operations and reduces staff participation in various tasks and decision-making. Teachers and administrative staff find themselves at the mercy of AI systems, as machines perform many of their functions. Consequently, they lose proficiency in traditional tasks within an educational setting and, consequently, the reasoning capabilities associated with decision-making.

H3: Artificial intelligence significantly impacts the loss of human decision-making.

METHODOLOGY

Research Design

The research philosophy pertains to the set of beliefs and assumptions that guide knowledge development. It encompasses the researcher's approach and expertise in a specific field. In this study, a positivist philosophy of analysis is employed. Positivism emphasizes the study of observable social reality and the formulation of laws and generalizations based on empirical evidence. This philosophy utilizes existing theories to develop hypotheses for the study. Moreover, it is chosen for this research as it deals with measurable and quantifiable data. The quantitative method is employed for data collection and analysis in this study. The quantitative approach focuses on numerical data, providing a systematic means of assessing occurrences and their relationships. Additionally, the author ensured data rigor by evaluating the validity and reliability of measurement tools during the research process. The primary approach is adopted as the data collected for this study is first-hand, obtained directly from the respondents.

Sample and Sampling Techniques:

Sample and Sampling Techniques were utilized in this study to collect primary data. The purposive sampling technique was specifically employed. This technique involves targeting a small number of participants whose feedback is representative of the entire population (Davies and Hughes, 2014). Purposive sampling is a recognized non-probabilistic sampling technique in which participants are selected based on the study's specific objectives. The respondents in this study consisted of students from various universities in Delhi NCR (India) and Fujairah (UAE). In adherence to ethical guidelines, consent was obtained from the participants before they were invited to complete a questionnaire. The study had a total of 285 participants. Data collection took place over a period of approximately two months, from July 4, 2022, to August 31, 2022.

Reliability and Validity of the Data:

Reliability and validity assessment ensure the quality and integrity of the instrument and survey data for further analysis. In structural equation modelling, two tools are utilized to measure reliability: item reliability and construct reliability. Item reliability is evaluated by examining the outer loading of each item, with a threshold value of 0.706. In certain cases, an outer loading of 0.5 can be considered acceptable if it does not violate the basic assumption of convergent validity (Hair and Alamer, 2022). Cronbach's Alpha and composite reliability are commonly used tools to assess construct reliability, with a threshold value of 0.7 (Hair Jr et al., 2021).

Table 1 demonstrates that all items within each construct have outer loading values exceeding 0.7, except for one item in the artificial intelligence construct and one item in the decision-making construct, which are below 0.7 but above the minimum threshold of 0.4. Additionally, both constructs have favourable Average Variance Extracted (AVE) values. The reliability measures, Cronbach's alpha and composite reliability, for each construct are also above 0.7, indicating the establishment of both item and construct reliability.

Table 1: Reliability and validity

Constructs	Items	Loadings	Cronbach alpha	Composite reliability	AVE
AI	A1	0.752	0.732	0.912	0.569
	A2				
	A3	0.721			
	A4				
	A5	0.778			
	A6				
	A7	0.732			
DM	DM1	0.767	0.722	0.803	0.521
	DM2				
	DM3	0.621			
	DM4				
S&P	SP1	0.735	0.768	0.870	0.691
	SP3				
	SP4	0.821			
HL	HL1		0.821	0.911	0.711
	HL2	0.432			
	HL3				
	HL4	0.842			

Items DM5, SP2, and SP5 were removed from the model due to low outer loading values.

AI- Artificial Intelligence, DM – Decision Making, S&P – Safety & Privacy, HL- Human Laziness

To assess data validity, two measures are employed: convergent validity and discriminant validity. Convergent validity is evaluated using AVE values, with a threshold of 0.5 (Hair and Alamer, 2022). Based on the reliability and validity table, all constructs have AVE values exceeding 0.5, indicating convergent validity.

Discriminant validity is assessed using three measures in Smart-PLS: The Farnell Larker criteria, HTMT ratios, and the cross-loadings of items. The Farnell Larker criteria require diagonal values to be greater than the corresponding values of rows and columns. Table 4 reveals that all diagonal values of the square root of the AVE satisfy this criterion. The HTMT values should be equal to or less than 0.85 (Joe F. Hair Jr et al., 2020), and Table 2 indicates that all values are below this threshold. Moreover, self-loading values should be greater than cross-loading values for discriminant validity. Table 6 demonstrates that all self-loadings exceed the cross-loadings. These three measures collectively confirm the discriminant validity of the data.

Table 2: HTMT values

	Artificial intelligence	Decision making	Human laziness
Decision making	0.311		
Human laziness	0.787	0.338	
Safety & privacy	0.831	0.309	0.596

Results and Discussion

Demographic profile of the respondents

Table 3 displays the demographic characteristics of the respondents, consisting of 315 participants. Among them, 164 individuals (52.1%) identify as male, while 151 (47.9%) identify as female. The data was collected from various universities in Delhi and Fujairah. The table reveals that 173 students (54.9%) are from Delhi, whereas 142 (45.1%) are from Fujairah.

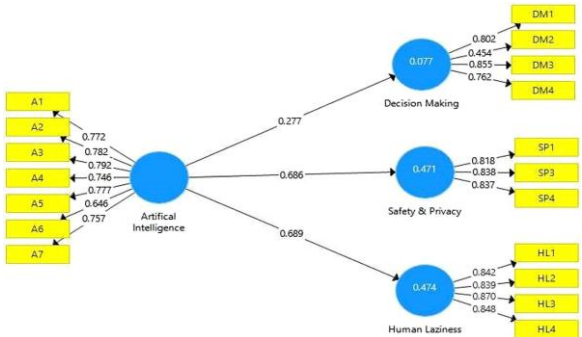
Regarding age distribution, the students are categorized into three groups: <20 years, 20–25 years, and 26 years and above. Most students, 134 (47.1%), fall into the 20–25 years age group, while 71 students (22.3%) are below 20 years old, and 110 students (38.6%) are 26 years and above.

The final section of the table presents the academic programs of the students. It indicates that 164 students (52.2%) are pursuing undergraduate studies, 106 students (41.8%) are enrolled in graduate programs, and 45 students (14%) are pursuing post-graduate studies.

Table 3: Demographic distribution of respondents

	No.	Percentage
Gender		
Male	164	52.1
Female	151	47.9
Total	315	100
Cities		
Delhi	173	54.9
Fujairah	142	45.1
Total	315	100
Age group		
<20 years	71	22.3
20–25 years	134	47.1
26 years and above	110	38.6
Total	315	100
Program of study		
Undergraduate	164	52.2
Graduate	106	41.8
Post-Graduate	45	14.0
Total	315	100
The above is the demographic distribution of the data collected by students from different Delhi and Fujairah universities.		

Structural model. The structural model explains the relationships among study variables. The proposed structural model is exhibited in Fig. 1.



Regression analysis: Table 4 presents the results of the regression analysis, indicating the direct relationships within the model.

Table 4: Regression analysis

Relationships	*t* values	*P*-values	Remarks
Artificial intelligence → Decision making	5.056	0.000	Supported
Artificial intelligence → Human laziness	23.275	0.000	Supported
Artificial intelligence → Safety & privacy	17.169	0.000	Supported
All three relationships in this table are based on the hypothesis of this study and all are statistically significant.			

The first direct relationship is between artificial intelligence and the loss in human decision-making, with a beta value of 0.256. This means that a one-unit increase in artificial intelligence results in a 0.256-unit decrease in human decision-making among university students in Delhi and Fujairah. The t-value for this relationship is 5.056, exceeding the threshold value of 1.89, and the p-value is 0.000, which is less than 0.05, indicating statistical significance.

The second relationship is between artificial intelligence and human laziness. The beta value for this relationship is 0.689, indicating that a one-unit increase in artificial intelligence leads to a 0.689-unit increase in laziness among students from universities in Delhi and Fujairah. The t-value for this relationship is 23.275, surpassing the threshold value of 1.89, and the p-value is 0.000, lower than 0.05, demonstrating statistical significance.

The third and final relationship is from artificial intelligence to the security and privacy issues of Delhi and Fujairah University students. The beta value for this relationship is 0.680, suggesting that a one-unit increase in artificial intelligence results in a 0.656-unit increase in security and privacy issues. The t-value for this relationship is 17.169, exceeding the threshold value of 1.89, and the p-value is 0.000, smaller than 0.05, indicating statistical significance.

IMPLICATIONS

Theoretical Implications: There are various potential effects of AI in education that must be considered. One such implication is the risk of human decision-making capacity deterioration. AI systems can process massive amounts of data and provide exact predictions, which can lead to a situation in which humans rely too heavily on AI for decision-making. This overreliance on AI may result in a decline in critical thinking and innovation for both students and teachers, potentially diminishing overall educational quality. Educators should be aware of the impact of AI on decision-making processes and attempt to strike a balance between the advantages of AI and the value of human intuition and creativity.

Another big concern is the possible impact of artificial intelligence on school safety. AI systems can monitor student behavior, identify potential hazards, and indicate circumstances in which children may require further support. However, there is a valid concern that AI will be abused to unjustly target specific student groups or to breach students' privacy. Educators must be aware of the ethical implications of AI and develop AI systems that prioritize security and privacy for both users and educational institutions.

Managerial Implications: Individuals participating in the development and deployment of AI technology in education must carefully weigh the advantages and disadvantages of its use. It is critical to establish a balance between the benefits of AI, such as enhanced efficiency and effectiveness, and the possible obstacles associated with issues such as laziness, decision-making, and privacy and security concerns. In doing so, it is critical to safeguard and foster human creativity and intuition.

A fundamental part of management accountability is ensuring that AI systems are created transparently and ethically. To avoid opacity and potential biases, the inner workings of AI algorithms and decision-making processes should be made plain and intelligible. Furthermore, ethical considerations should drive the design and implementation of AI in education to safeguard the rights and privacy of individuals involved.

AI technology should be viewed by educational organisations as a tool to support and enhance instructors' work, rather than as a replacement for human educators. AI technologies can help instructors with typical chores like administration and data analysis, freeing up time and resources for more

personalised education and mentoring. Educational institutions may establish a collaborative environment that combines the strengths of AI technology and human skills by employing AI in this manner.

In conclusion, administrators and stakeholders interested in AI technology in education must carefully consider the benefits and problems that it provides. They should strive for a balanced approach that protects and fosters human creativity and innovation while avoiding potential pitfalls relating to laziness, decision-making, and privacy or security concerns intuition. Transparent and ethical design principles should guide the development of AI systems, and educational organizations should embrace AI as a supportive tool for teachers rather than a replacement for their roles.

DISCUSSION

AI has grown increasingly important in our lives, influencing many facets of daily life. However, as with any technical innovation, it has both advantages and disadvantages. The purpose of this study was to investigate the relationship between AI and human loss in decision-making, laziness, and safety and privacy concerns. The findings in Tables 1 and 2 show a substantial positive relationship between AI and these variables. These findings are consistent with other studies that found comparable outcomes (Bartoletti, 2019; Saura et al., 2022; Bartneck et al., 2021).

Artificial intelligence (AI) technology in educational organizations has the potential to pose security and privacy concerns for students, teachers, and institutions. Security and privacy are essential concerns in the use of AI technology in educational settings in the current digital age (Kamenskih, 2022). To be used effectively, AI technology necessitates specialist skills and knowledge. Inadequate comprehension of its implementation might lead to security and privacy issues (Vazhayil and Shetty, 2019). Educational institutions generally lack the AI technical skills needed to run these systems, leaving them open to security and privacy issues. Even with skilled AI administrators and trained users, it is vital to recognize that errors may occur, potentially leading to major security and privacy risks. Furthermore, inside educational organizations, contact between staff with varying degrees of competence and competency raises the danger of hacking or unauthorized access to personal and institutional data (Kamenskih, 2022). AI relies on algorithms and large datasets to automate tasks, but faults in these algorithms can have catastrophic implications. In contrast to people, AI systems can make the same mistakes over and over again when making decisions, jeopardizing institutional and student data security and privacy. Students may be exposed because they may lack thorough AI training (Asaro, 2019). As the number of users increases and skill levels vary, safety and privacy issues arise (Lv and Singh, 2020). The consequences of such incidents are dictated by the type of attack and the severity of the attack and the extent to which the leaked or compromised data is utilized by the attackers (Vassileva, 2008).

The findings of this study further support the notion that the increasing reliance on AI can gradually diminish human decision-making abilities. The results confirm that AI is indeed a significant factor contributing to the erosion of human decision-making power. Previous research by various scholars has also highlighted AI as a major cause behind the gradual decline in people's decision-making capabilities (Pomerol, 1997; Duan et al., 2019; Cukurova et al., 2019). AI systems excel at performing repetitive tasks in an automated manner, reducing the need for humans to engage in analytical thinking, cognitive processes, and memory utilization. Consequently, individuals may experience a decline in their decision-making skills (Nikita, 2023).

While online educational environments are a viable choice (VanLangen, 2021), face-to-face interactions are prioritized in traditional classroom settings (Dib and Adamo, 2014). Physical classrooms promote extensive teacher-student engagement, which helps children build their character and civic foundations. Students can learn from their classmates, ask questions of their teachers, and immerse themselves in the educational environment in such settings (Quinlan et al., 2014). They can improve their cognitive ability and make more informed decisions. Unfortunately, the deployment of AI technology reduces real-time physical interaction and the actual educational

environment shared by students and teachers (Mantello et al., 2021). This has a profound impact on kids' educational experiences, character formation, civic responsibility, and ability to make cognition-based decisions. AI technology decreases cognitive capability and reduces the cognitive power of individuals in making independent decisions (Hassani and Unger, 2020).

CONCLUSION

The importance of AI in education cannot be overstated. While technology provides multiple benefits and assists in a variety of academic and administrative chores, it also raises concerns about the loss of decision-making abilities, laziness, and security problems. AI technology aids decision-making assists teachers and students in completing tasks and streamlines various activities. However, these difficulties are being exacerbated by the increased acceptance and dependence on AI in the education sector.

This study's findings show that using AI in education accelerates the deterioration of human decision-making abilities, encourages user sloth through task automation, and contributes to greater security and privacy problems. Addressing these problems and striking a balance between utilizing the potential of AI in education while mitigating its potential drawbacks.

RECOMMENDATIONS

1. The fundamental priority for designers should be that AI in education does not raise ethical concerns. While it may be hard to eliminate all ethical concerns, efforts should be made during the development process to minimize serious ethical issues, both on an individual and societal level.
2. AI technology and educational apps should be based on robust and safe algorithms that prioritize user security, privacy, and well-being.
3. Steps must be done to reduce biased behaviour in AI systems and address issues such as the loss of human decision-making power and potential laziness because of over-reliance on AI.
4. It is critical to minimize decision-making reliance on AI technology to an acceptable degree to safeguard and preserve human cognitive abilities and critical thinking.
5. Teachers and students should receive training prior to utilizing AI technology, enabling them to understand its functionalities and potential implications effectively. This will help them make the most of AI while also being aware of its limitations and potential challenges.

REFERENCES

Ade-Ibijola A, Young K, Sivparsad N, Seforo M, Ally S, Olowolafe A, Frahm-Arp M(2022) Teaching Students About Plagiarism Using a Serious Game (Plagi-Warfare): Design and Evaluation Study. JMIR Serious Games 10(1):e33459. https://doi.org/10.2196/33459

Ahmad SF, Shahid MK (2015) Factors influencing the process of decision making in the telecommunication sector. Eur J Bus Manag 7(1):106–114

Ahmad SF, Shahid MK (2015) Role of knowledge management in achieving customer relationship and its strategic outcomes. Inf Knowl Manag 5(1):79–87 Ahmad SF, Ibrahim M, Nadeem AH (2021) Impact of ethics, stress and trust on change management in public sector organizations. Gomal Univ J Res37(1):43–54

Ahmed S, Nashat N (2020) Model for utilizing distance learning post COVID-19 using (PACT)™ a cross sectional qualitative study. Research Square, pp. 1–25. https://doi.org/10.21203/rs.3.rs-31027/v1

Aiken R, Epstein R (2000) Ethical guidelines for AI in education: starting a conversation. Int J Artif Intell Educ 11:163–176

Akram H, Yingxiu Y, Al-Adwan AS, Alkhalifah A (2021) Technology Integration in Higher Education During COVID-19: An Assessment of Online Teaching Competencies Through Technological Pedagogical Content Knowledge Model. Frontiers in Psychol, 12.https://doi.org/10.3389/fpsyg.2021.736522

Al-Ansi A (2022) Investigating Characteristics of Learning Environments During the COVID-19 Pandemic: A Systematic Review. Canadian Journal of Learning

and Technology, 48(1). https://doi.org/10.21432/cjlt28051

Al-Ansi AM, Al-Ansi A-A (2023) An Overview of Artificial Intelligence (AI) in 6G: Types, Advantages, Challenges and Recent Applications. Buletin Ilmiah Sarjana Teknik Elektro, 5(1)

Andreotta AJ, Kirkham N (2021) AI, big data, and the future of consent. AI Soc. https://doi.org/10.1007/s00146-021-01262-5

Araujo T, Helberger N, Kruikemeier S, Vreese C (2020) In AI we trust? Perceptions about automated decision-making by artificial intelligence. AI Soc 35(6). https://doi.org/10.1007/s00146-019-00931-w

Asaro PM (2019) AI ethics in predictive policing: from models of threat to an ethics of care. IEEE Technol Soc Mag 38(2):40–53. https://doi.org/10.1109/MTS.2019.2915154

Ayling J, Chapman A (2022) Putting AI ethics to work: are the tools fit for pur- pose? AI Eth 2:405–429. https://doi.org/10.1007/s43681-021-00084-x

Bartneck C, Lütge C, Wagner A, Welsh S (2021) Privacy issues of AI. In: An introduction to ethics in robotics and AI. Springer International Publishing, pp. 61–70

Bartoletti I (2019) AI in healthcare: ethical and privacy challenges. In: Artificial Intelligence in Medicine: 17th Conference on Artificial Intelligence in Medicine, AIME 2019. Springer International Publishing, Poznan, Poland, pp. 7–10

Bhbosale S, Pujari V, Multani Z (2020) Advantages and disadvantages of artificial intelligence. Aayushi Int Interdiscip Res J 77:227–230

Calif P (2021) Education industry at higher risk for IT security issues due to lack of remote and hybrid work policies. CISION

Cavus N, Mohammed YB, Yakubu MN (2021) Determinants of learning man- agement systems during COVID-19 pandemic for sustainable education. Sustain Educ Approaches 13(9):5189. https://doi.org/10.3390/su13095189

Chan L, Morgan I, Simon H, Alshabanat F, Ober D, Gentry J, ... & Cao R (2019) Survey of AI in cybersecurity for information technology management. In: 2019 IEEE technology & engineering management conference (TEMSCON). IEEE, Atlanta, pp. 1–8

Clark J, Shoham Y, Perrault R, Erik Brynjolfsson, Manyika J, Niebles JC, Lyons T, Etchemendy J, Grosz B and Bauer Z (2018) The AI Index 2018 Annual Report, AI Index Steering Committee, Human-Centered AI Initiative, Stan- ford University, Stanford, CA

Cukurova M, Kent C, Luckin R (2019) Artificial intelligence and multimodal data in the service of human decision-making: a case study in debate tutoring. Br J Educ Technol 50(6):3032–3046. https://doi.org/10.1111/bjet.12829

Danaher J (2018) Toward an ethics of AI assistants: an initial framework. Philos Technol 31(3):1–15. https://doi.org/10.1007/s13347-018-0317-3

Dastin J (2018) Amazon scraps secret AI recruiting tool that showed bias against women. (Reuters) Retrieved from https://www.reuters.com/article/us-amazon-com-jobs-automation-insight-idUSKCN1MK08G

Dautov D (2020) Procrastination and laziness rates among students with different academic performance as an organizational problem. In: E3S web of con- ferences, pp. 1–10

Davies MB, Hughes N (eds) (2014) Doing a Successful Research Project: Using Qualitative or Quantitative Methods, 2nd edn. Palgrave MacMillan, Basing- stoke, Hampshire, p 288

Di Vaio A, Palladino R, Hassan R, Escobar O (2020) Artificial intelligence and business models in the sustainable development goals perspective: a sys- tematic literature review. J Bus Res 121:283–314. https://doi.org/10.1016/j.jbusres.2020.08.019

Dib H, Adamo N (2014) An interactive virtual environment to improve under- graduate students' competence in surveying mathematics. In: 2014 Interna- tional

conference on computing in civil and building engineering

Duan Y, Edwards JS, Dwivedi YK (2019) Artificial intelligence for decision making in the era of Big Data—evolution, challenges and research agenda. Int J Inf Manag 48:63–71. https://doi.org/10.1016/j.ijinfomgt.2019.01.021

ELever K, Kifayat K (2020) Identifying and mitigating security risks for secure and robust NGI networks. Sustain Cities Soc 59.https://doi.org/10.1016/j.scs.2020.102098

Eric C (2019) What AI-driven decision making looks like. Harv Bus Rev. https://hbr.org/2019/07/what-ai-driven-decision-making-looks-like

Farrow E (2022) Determining the human to AI workforce ratio—exploring future organisational scenarios and the implications for anticipatory workforce planning. Technol Soc 68(101879):101879. https://doi.org/10.1016/j.techsoc.2022.101879

Fjelland R (2020) Why general artificial intelligence will not be realized. Humanit Soc Sci Commun 7(10):1–9. https://doi.org/10.1057/s41599-020-0494-4

Ghosh B, Daugherty PR, Wilson HJ (2019) Taking a systems approach to adopting AI. Harv Bus Rev. https://hbr.org/2019/05/taking-a-systems-approach-to- adopting-ai

Gocen A, Aydemir F (2020) Artificial intelligence in education and schools. Res Educ Media 12(1):13–21. https://doi.org/10.2478/rem-2020-0003

Hair J, Alamer A (2022) Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: guidelines using an applied example. Res Methods Appl Linguist 1(3):100027. https://doi.org/10.1016/j.rmal.2022.100027

Hair Jr JF, Ringle CM, Sarstedt M (2013) Partial least squares structural equation modeling: rigorous applications, better results and higher acceptance. Long Range Plan 46(1–2):1–12. https://doi.org/10.1016/j.lrp.2013.01.001

Hair Jr JF, Howard MC, Nitzl C (2020) Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. J Bus Res 109:101–110. https://doi.org/10.1016/j.jbusres.2019.11.069

Hassani H, Unger S (2020) Artificial intelligence (AI) or intelligence augmentation (IA): what is the future? AI 1(2). https://doi.org/10.3390/ai1020008

Hax C (2018) Carolyn Hax live chat transcripts from 2018. Washington, Columbia, USA. Retrieved from https://www.washingtonpost.com/advice/2018/12/31/ carolyn-hax-chat-transcripts-2018/

Ho M-T, Mantello P, Ghotbi N, Nguyen M-H, Nguyen H-KT, Vuong Q-H (2022) Rethinking technological acceptance in the age of emotional AI: surveying Gen Z (Zoomer) attitudes toward non-conscious data collection. Technol Soc 70(102011):102011. https://doi.org/10.1016/j.techsoc.2022.102011

Holmes W, Bialik M, Fadel C (2019) Artificial intelligence in education. Promise and implications for teaching and learning. Center for Curriculum Redesign

Hu L-T, Bentler PM (1998) Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. Psychol Methods 3(4):424–453. https://doi.org/10.1037/1082-989x.3.4.424

Hübner D (2021) Two kinds of discrimination in AI-based penal decision-making. ACM SIGKDD Explor Newsl 23:4–13. https://doi.org/10.1145/3468507.3468510

Huls A (2021) Artificial intelligence and machine learning play a role in endpoint security. N Y Times. Retrieved from https://www.nastel.com/artificial-intelligence-and-machine-learning-play-a-role-in-endpoint-security/

Jarrahi MH (2018) Artificial intelligence and the future of work: human–AI symbiosis in organizational decision making. Bus Horiz 61(4):1–15. https://doi.org/10.1016/j.bushor.2018.03.007

Jordan P, Troth A (2020) Common method bias in applied settings: the dilemma of researching in organizations. Aust J

Manag 45(1):2–14. 10.1177% 2F0312896219871976

Justin R, Mizuko I (2017) From good intentions to real outcomes: equity by design in. Digital Media and Learning Research Hub, Irvine, https://clalliance.org/ wp-content/uploads/2017/11/GIROreport_ 1031.pdf

Kamenskih A(2022) The analysis of security and privacy risks in smart education environments. J Smart Cities Soc 1(1):17–29. https://doi.org/10.3233/SCS- 210114

Karandish D (2021) 7 Benefits of AI in education. The Journal. https:// thejournal. com/Articles/2021/06/23/7-Benefits-of-AI-in-Education.aspx

Khan GA, Shahid MK, Ahmad SF (2014) Convergence of broadcasting and tele-communication technology regulatory framework in Pakistan. Int J Manag Commer Innov 2(1):35–43

Kirn W (2007) Here, there and everywhere. NY Times. https://www.nytimes.com/ 2007/02/11/magazine/11wwlnlede.t.html

Kock N (2015) Common method bias in PLS-SEM: a full collinearity assessment approach. Int J e-Collab 11(4):1–10. https://doi.org/10.4018/ijec.2015100101

Krakauer D (2016) Will AI harm us? Better to ask how we'll reckon with our hybrid nature. Nautilus. http://nautil.us/ blog/will-ai-harm-us-better-to-ask-how-well-reckon-withour-hybrid-nature. Accessed 29 Nov 2016

Landwehr C (2015) We need a building code for building code. Commun ACM 58(2):24–26. https://doi.org/10.1145/2700341

Leeming J (2021) How AI is helping the natural sciences. Nature 598. https://www. nature.com/articles/ d41586-021-02762-6

Levin K (2018) Artificial intelligence & human rights: opportunities & risks. Berkman Klein Center for Internet & Society Research Publication. https:// dash.harvard.edu/handle/1/38021439

Libert B, Beck M, Bonchek M (2017) AI in the boardroom: the next realm of corporate governance. MIT Sloan Manag Rev. 5. https://sloanreview.mit.edu/ article/ai-in-the-boardroom-the-next-realm-of-corporate-governance/

Lv Z, Singh AK (2020) Trustworthiness in industrial IoT systems based on artificial intelligence. IEEE Trans Ind Inform 1–1. https://doi.org/10.1109/TII.2020. 2994747

Mantelero A (2018) AI and Big Data: a blueprint for a human rights, social and ethical impact assessment. Comput Law Secur Rep 34(4):754–772. https://doi. org/10.1016/j.clsr.2018.05.017

Mantello P, Ho M-T, Nguyen M-H, Vuong Q-H (2021) Bosses without a heart: socio-demographic and cross-cultural determinants of attitude toward Emotional AI in the workplace. AI Soc 1–23. https://doi.org/10.1007/s00146- 021-01290-1

McStay A (2020) Emotional AI and EdTech: serving the public good? Learn Media Technol 45(3):270–283. https://doi.org/ 10.1080/17439884.2020.1686016

Meissner P, Keding C (2021) The human factor in AI-based decision-making. MIT Sloan Rev 63(1):1–5

Mengidis N, Tsikrika T, Vrochidis S, Kompatsiaris I (2019) Blockchain and AI for the next generation energy grids: cybersecurity challenges and opportunities. Inf Secur 43(1):21–33. https://doi.org/10.11610/isij.4302

Mhlanga D (2021) Artificial intelligence in the industry 4.0, and its impact on poverty, innovation, infrastructure development, and the sustainable devel- opment goals: lessons from emerging economies? Sustainability 13(11):57–88. https:// doi.org/10.3390/su13115788

Nadir K, Ahmed SF, Ibrahim M, Shahid MK (2012) Impact of on-job training on performance of telecommunication industry. J Soc Dev Sci 3(2):47–58

Nakitare J, Otike F (2022). Plagiarism conundrum in Kenyan universities: an impediment to quality research. Digit Libr Perspect. https://doi.org/10.1108/ dlp-08-2022-0058

Nawaz N, Gomes AM, Saldeen AM (2020) Artificial intelligence (AI) applications for library services and resources in COVID-19 pandemic. J Crit Rev 7(18):1951–1955

Nemorin S, Vlachidis A, Ayerakwa HM, Andriotis P (2022) AI hyped? A horizon scan of discourse on artificial intelligence in education (AIED) and devel- opment. Learn Media Technol 1–14. https://doi.org/10.1080/17439884.2022.2095568

Niese B (2019) Making good decisions: an attribution model of decision quality in decision tasks. Kennesaw State University. https://digitalcommons.kennesaw. edu/cgi/viewcontent.cgi?article=1013&context=phdba_etd

Nikita (2023) Advantages and Disadvantages of Artificial Intelligence. Simplilearn. https://www.simplilearn.com/advantages-and-disadvantages-of-artificial-intelligence-article

Noema (2021) AI makes us less intelligent and more artificial. https://www.noemamag.com/Ai-Makes-Us-Less-Intelligent-And-More-Artificial/

Oh C, Lee T, Kim Y (2017) Us vs. them: understanding artificial intelligence technophobia over the Google DeepMind challenge match. Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems, pp. 2523–2534

Pomerol J-C (1997) Artificial intelligence and human decision making. Eur J Oper Res 99(1):3–25. https://doi.org/10.1016/s0377-2217(96)00378-5

Posner T, Fei-Fei L (2020) AI will change the world, so it's time to change A. Nature S118–S118. https://doi.org/10.1038/d41586-020-03412-z

Rainie L, Anderson J, Vogels EA (2021) Experts doubt ethical AI design will be broadly adopted as the norm within the next decade. Pew Research Center, Haley Nolan

Sutton S, Arnold V, Holt M (2018) How much automation is too much? Keeping the human relevant in knowledge work. J Emerg Technol Account 15(2). https://doi.org/10.2308/jeta-52311

Taddeo M, McCutcheon T, Floridi L (2019) Trusting artificial intelligence in cybersecurity is a double-edged sword. Nat Mach Intell 1(12). https://doi.org/10.1038/s42256-019-0109-1

Tahiru F (2021) AI in education: a systematic literature review. J Cases Inf Technol 23(1):1–20. https://doi.org/10.4018/JCIT.2021010101

Tarran B (2018) What can we learn from the Facebook–Cambridge Analytica scandal? Significance 15(3):4–5. https://doi.org/10.1111/j.1740-9713.2018. 01139.x

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