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Adapting to the Age of Automation: Navigating AI's Impact on the Workforce

Introduction

In the ever-evolving landscape of employment, the rise of technologies, particularly artificial intelligence, has been a pivotal force in reshaping the job market. As we stand on the cusp of the "fourth industrial revolution" (1), characterized by the integration of digital, physical, and biological systems, the ramifications of AI on employment are profound. According to the World Economic Forum, "We estimate that by 2025, 85 million jobs may be displaced by a shift in the division of labour between humans and machines" (8). This statistic underscores the urgency and complexity of understanding how AI intersects with employment dynamics. The fourth industrial revolution is not merely about the expansion of technology but signifies a fundamental shift in the way we work, interact, and live. It is the combined power of several technological breakthroughs, culminating in unprecedented opportunities and challenges for the workforce. As AI permeates various sectors, ranging from manufacturing to healthcare, from finance to transportation, its impact on the employment landscape is multifaceted. While AI promises increased efficiency, productivity, and innovation, it also raises concerns regarding job displacement. The displacement of human labor by machines raises questions about the future of work and the skill sets demanded in the digital era. In this context, students completing their studies and entering the workforce are tasked with navigating a terrain characterized by uncertainty. Hence, it becomes imperative to critically examine not only the challenges posed by

these shifts but also the potential strategies to ensure a balanced and fulfilling future for the workforce of tomorrow. This paper aims to explore the multifaceted impacts of AI on the employment landscape and set forth strategies aimed at navigating it. By discussing the complexities of AI's impact on employment, we seek to contribute to a deeper understanding of the challenges and opportunities inherent in the fourth industrial revolution and pave a path where technology increases human potential rather than undermines it.

Methods

To investigate the perceptions and experiences of students regarding the impact of AI on future job opportunities and the preparedness of educational institutions to address this issue, a mixed methods approach was utilized. This approach encompassed the use of both qualitative and quantitative data collection methods: a Google Form survey and semi-structured interviews. The respondents of the survey came primarily from the Virginia Tech Class of 2027 Snapchat story, aiming to research students from diverse academic backgrounds. However, to ensure representation across all grade levels, it was also shared among various academic and cultural clubs within the university. A total of 38 respondents participated in the survey. Respondents were given the freedom to answer only the questions they felt comfortable answering. The survey comprised 6 multiple choice, Likert scale, and short answer questions: "On a scale of 1 to 5, how concerned are you about the impact of artificial intelligence on future job opportunities?"; "Do you believe that your school adequately prepares students for careers in fields influenced by artificial intelligence?"; "How familiar are you with current AI-related initiatives and programs offered at your school?"; "Would you be interested in additional educational opportunities or resources focused on preparing for AI-impacted careers at your school?"; "What are your ideas for how colleges can better prepare students for employment, where many careers are bound to

be made easier with AI technologies?" To complement the quantitative data gathered through the survey, semi-structured interviews were conducted to provide qualitative insights into students' perceptions regarding AI. Two interviews were conducted with Virginia Tech freshman-one majoring in Computational Modeling and Data Analytics (CMDA), and the other in Statistics. These majors were chosen because they offer direct insights into the intersection of data analysis and statistical methodologies, essential components in understanding the implications of AI across various fields. By employing a mixed methods approach, this study seeks to enhance the validity of the research outcomes.

Unveiling AI's Influence: Transcending Traditional Domains

Despite the pervasive association of AI with technical disciplines, the impact of AI extends far beyond traditional technology-related fields. The survey data reveals that out of those who responded, only 13, which equates to 35.1%, identified themselves as technical majors, encompassing a range of disciplines from computer science, being the most popular, to civil engineering. Conversely, the majority, accounting for 64.9% of respondents, are studying fields not typically recognized as tech-related. The significant presence of nontechnical majors among survey respondents underscores the widespread relevance of AI across diverse academic domains. While technical majors may have a more direct connection, non-technical disciplines are also susceptible to the effects of AI. This suggests that students across various fields, including but not limited to Agricultural Science and Psychology, are likely to encounter AI-driven changes and innovations within their respective industries. According to an article in the Global Employment Institute Journal, "The additional qualification of an individual employee must be connected to the work in question. Additional qualifications as an accountant will be of little benefit for the individual employee, because – over time – there is a 98 percent probability

that the work of an accountant can be done by intelligent software" (2). This data reflects the disruptive potential of AI in reshaping the landscape of accounting practices. Tasks that involve routine data processes, such as tax return processing, are particularly susceptible to automation through AI technologies. By leveraging AI algorithms, tax returns can eliminate the need for manual review by tax officers. This implies that while AI-driven automation can streamline processes and reduce errors, it also raises concerns about the need for upskilling and reskilling among accounting professionals. This goes to show that while automation offers efficiency gains, it also necessitates continuous learning for some professionals to navigate the evolving demands of their profession. On the other hand, at the Philadelphia College of Osteopathic Medicine, "AI-assisted tasks can make workers more productive and increase their free time to focus on what matters most to them" (6). This underscores that employees who feel empowered to allocate their time towards tasks that align with their interests and values are likely to experience greater fulfillment at work. AI enabled automation can contribute to reducing work related stress and burnout by minimizing repetitive and mundane tasks, allowing employees to allocate their energy towards activities that contribute to their personal and professional growth. In conclusion, as organizations embrace AI technologies, it's crucial to acknowledge both the challenges and opportunities they present in a variety of careers.

<p style="text-align:center">Crafting Tomorrow's Educational Landscape</p>

"Carnegie Mellon University (CMU) launched an interdisciplinary initiative aimed at developing new technologies to measure and analyze the brain….University of Colorado Boulder's Institute of Cognitive Science aims to modernize the study of human cognition…Stanford University's Computational Psychology and Well-Being Lab uses social-media data and machine learning to examine health and psychological issues" (5). As fascinating

as these innovations sound, awareness among students about them is crucial for their engagement and potential involvement. Thus, it's integral for higher education institutions to prioritize communication. The findings from the survey shed light on the current state of awareness and interest among students regarding AI-related initiatives and programs offered at Virginia Tech, as well as their receptiveness to additional educational opportunities focused on preparing for AI-impacted careers. Among the respondents, none indicated being "very familiar" with current AI-related initiatives and programs offered at Virginia Tech. Most respondents expressed limited familiarity with these initiatives, with the highest proportion of 56.8%, equating to 21 respondents, indicating "not familiar at all". This distribution is represented in *Figure 1* below. This data suggests a gap in awareness regarding existing AI-related offerings within the university. The lack of awareness among AI-related initiatives at Virginia Tech may reflect a need for great visibility and promotion of existing programs. While the university may offer resources and opportunities related to AI, their dissemination and accessibility to students may be insufficient. This highlights the importance of enhancing outreach efforts to ensure that students are informed about available opportunities for engagement with AI-related activities and resources.

Despite low levels of familiarity with current AI-related initiatives, a significant portion of respondents expressed interest in additional educational opportunities or resources focused on preparing for AI-impacted careers at Virginia Tech. Specifically, 44.4% of students indicated their interest in such offerings, as shown in *Figure 2*. The high level of interest among students in additional educational opportunities related to AI underscores the perceived importance and relevance of AI in their academic and career trajectories. This suggests a growing recognition among students of the significance of AI in shaping future job opportunities and the need for

educational institutions to adequately prepare them. This indicates a readiness to engage with

educational initiatives aimed at addressing the evolving demands of the workforce. This is also

reflected in the short answer question. When asked to provide ideas for how colleges can better

prepare students for employment, responses included, "offer more available classes for students

to take on AI and computer science" and "require more leadership classes and more diversity and

inclusion for all majors". According to an article written by LanguageMagazine, "Teaching

students about AI is essential for developing digital literacy, critical thinking skills, and

preparing students for future academic and career success. A basic understanding of AI systems

enables students to engage and ideate with AI technologies safely, responsibly and ethically. "

(3). This highlights how AI education fosters a culture of innovation, enabling students to

leverage AI technologies to address real-world challenges creatively. By addressing these needs,

universities can better prepare students for AI-impacted careers and equip them with the skills

needed to navigate the complexities of the future workforce landscape.

How familiar are you with current AI-related initiatives and programs offered at your school?
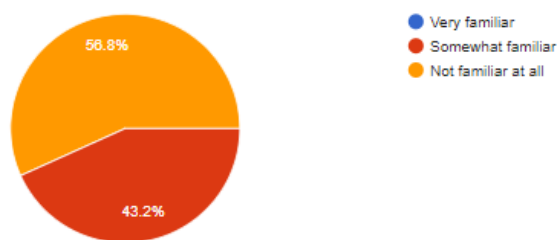
37 responses

● Very familiar
● Somewhat familiar
● Not familiar at all

56.8%

43.2%

Figure 1. Pie chart of respondents' answers to Question 4

Would you be interested in additional educational opportunities or resources focused
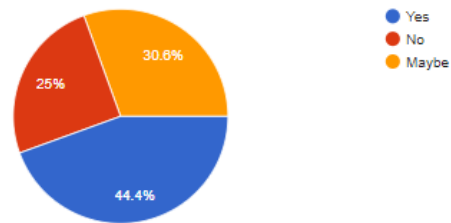on preparing for AI-impacted careers at your school?

36 responses

Figure 2. Pie chart of respondents' answers to Question 5

To Major or Not To Major?

The findings from the survey and interviews suggest that AI is significantly impacting students' perceptions and decisions regarding their academic majors and future career paths. Out of the 36 surveyed, 24 respondents, accounting for 66.6%, expressed a moderate to high level of concern about the impact of AI on future job opportunities. This high level of concern reflects the apprehension among students about the potential disruption that AI technologies may bring to the job market. This sentiment is furthered by insights from an interview with a CMDA major, who stated, "I love CMDA and I would go down the generic path, but I choose the Biological Sciences path that the major has because there is no telling if stable tech jobs will be around anymore. It is better to be safe than sorry". This decision underscores the influence of AI-related considerations on students' academic and career choices, as they navigate uncertainties surrounding the future employment landscape. Moreover, insights from a quantitative study conducted among medical students in Riyadh, Saudi Arabia, provide additional context, highlighting that this is not just a national phenomenon. The paper reads, "Approximately 50% believed they had a good understanding of AI; however, when knowledge of AI was tested using five questions, on average, only 22% of the questions were answered correctly. Among the respondents who ranked radiology as their first choice, 58.8% were anxious about the uncertain

impact of AI on radiology" (4). The findings from the medical student body underscore the widespread concern among students across disciplines about the implications of AI in their chosen fields. Despite varying levels of perceived understanding of AI, the prevalence of anxiety about AI's impact on specific professions such as radiology reflects the pervasive uncertainty surrounding AI's role in shaping career trajectories. The intersection of AI and career decision-making highlights the importance of fostering AI literacy and awareness among students across disciplines.

Conclusion

In conclusion, the research conducted underscores the profound impact of AI on the employment landscape and how college students can be better prepared for it. The findings reveal a pressing need for proactive measures to address the challenges and opportunities presented by AI technologies. As evidenced by the survey data, students across diverse academic disciplines are acutely aware of AI's influence on future job opportunities and express varying levels of concern. Additionally, insights from interviews highlight the intersection of AI with students' academic and career choices, emphasizing the importance of AI literacy. Considering these findings, it is imperative for stakeholders, including policymakers, educators, and industry leaders, to collaborate in developing comprehensive strategies to harness the potential of AI while mitigating its potential pitfalls. By embracing AI education, promoting lifelong learning, and fostering a culture of adaptability and innovation, society can effectively navigate whatever AI brings.

Works Cited

(1)   Casey, Cindy L. *Artificial Intelligence Curricula in Post-Secondary Education: Are Programs Adequately Preparing Students for Future Technologies? A Model for Developing Artificial Intelligence Curriculum*, Capitol Technology University, United States -- Maryland, 2022. *ProQuest*,

http://login.ezproxy.lib.vt.edu/login?url=https://www.proquest.com/dissertations-theses/artificial-intelligence-curricula-post-secondary/docview/2818635149/se-2.

(2)   *Artificial Intelligence and Robotics and Their Impact on The ...*,

www.researchgate.net/profile/Mohamed-Mourad-Lafifi/post/What_are_the_social_and_economic_effects_of_computers_in_automation_and_robotics/attachment/5fd34ec9d6d02900019d1a1d/AS%3A967510073565185%401607683785826/download/Artificial+Intelligence+and+Robotics+and+Their+Impact+on+the+Workplace.pdf. Accessed 10 Apr. 2024.

(3)   George, Ashley. "The Importance of Artificial Intelligence in Education for All Students." *Language Magazine*, 13 June 2023, www.languagemagazine.com/2023/05/31/the-importance-of-artificial-intelligence-in-education-for-all-students/. Accessed 10 Apr. 2024.

(4)   Bin Dahmash, Abdulmajeed, et al. "Artificial Intelligence in Radiology: Does It Impact Medical Students Preference for Radiology as Their Future Career?" *BJR Open*, U.S. National Library of Medicine, 11 Dec. 2020, www.ncbi.nlm.nih.gov/pmc/articles/PMC7748985/. Accessed 10 Apr. 2024.

(5)   Sleek, Scott. "How Machine Learning Is Transforming Psychological Science." *Association for Psychological Science - APS*, 3 Jan. 2023, www.psychologicalscience.org/observer/machine-learning-transforming-psychological-science. Accessed 10 Apr. 2024.

(6) "Is Artificial Intelligence Good for Society? Potential Impacts of Ai." *Is Artificial Intelligence Good for Society? Potential Impacts of AI*, Philadelphia College of Osteopathic Medicine, 31 May 2023, www.pcom.edu/academics/programs-and-degrees/positive-psychology/news/is-artificial-intelligence-good-for-society.html. Accessed 10 Apr. 2024.

(7) *The Future of Jobs in the Era of Ai*, web-assets.bcg.com/f5/e7/9aa9f81a446198ac5402aaf97a87/bcg-the-future-of-jobs-in-the-era-of-ai-mar-2021-r-r.pdf. Accessed 10 Apr. 2024.

(8) *The Future of Jobs Report 2020 | Weforum.Org*, www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf. Accessed 10 Apr. 2024.