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Rethinking Higher Education through Multidisciplinary Studies



Abstract: - Knowledge must not restrict or put boundaries in one's thoughts about the discipline or academic approach one must follow. A multidisciplinary approach to education releases one from such boundaries and allows an individual to use all the available resources and put them into practice to solve problems. The problems AI (Artificial Intelligence) and ML (Machine Learning) aim to solve are not limited to a single academic field. So, a multidisciplinary foundation is essential; it also allows students to explore specialized areas within AI and ML. A multidisciplinary approach allows students to connect their education to real-world applications and industries.

Keywords: Artificial Intelligence, Higher Education, Machine Learning, Multidisciplinary research

INTRODUCTION/BACKGROUND

Education in the 21st century aims to solve the world's problems by unlocking technology's full potential. Generally, employers look for candidates who can think critically. Critical thinking is possible when someone is equipped to collaborate across disciplines. The students of the 21st century need to develop a different approach to learning by developing critical thinking, problem-solving skills, and higher-order skills in Bloom's Taxonomy. Dwivedi et al. (2019) mention that AI can overcome humans' creative, intellectual and intensive limitations and open up new application areas within various fields, such as education, marketing, healthcare, finance and manufacturing, impacting productivity and performance. The students must acquire skills and application-based learning to interrelate the concepts to benefit the world. As AI and ML make their space in the workforce, it demands a multidisciplinary approach. This narrative literature review comprises a multidisciplinary approach to higher education through AI and machine learning. The research problem for review is identifying the impact of AI and ML in higher education through a multidisciplinary approach. The information is collected unsystematically in this review of the literature. This review aims to understand how to utilize AI and ML in higher education to adopt a multidisciplinary approach.

KEY THEMES

Three key constructs of the review are Artificial Intelligence, Machine Learning, and Multidisciplinary Approach.

Artificial Intelligence (AI)

AI helps with creating learning opportunities, reducing costs, increasing efficiency and value to organizations, and optimizing the learning experience (Chatterjee, 2018). AI can now deduce the rules from the available data (Van Duuren & de Pous, 2020). Combining knowledge from different fields encourages creativity and innovation. AI can be used to address global challenges, such as climate change, public health, and poverty alleviation.

Machine Learning (ML)

ML is an integral part of educational data mining to understand the educational details and use predictive models to predict the trends and analysis based on the same (Patel et al., 2022). ML is used in supporting activities in higher education to give insights into the processes. We are now in the prime of the second generation of machine learning (Van Duuren & de Pous, 2020). Here, the system does not need any preformulated rules but instead learns from large quantities of sample data what the correct answer, solution or way of doing something is (Van Duuren & de Pous, 2020). At this stage, it is essential to integrate various disciplines to understand and solve the problems. For example, integrating humanities and social sciences to understand law, economics, ethics, and the impact of AI and digital technology (Dignum, 2019). Rubert et al. (2022) mentioned the need for educational institutions to design the curriculum on the scope of creativity and innovation. User preferences have been studied through

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machine learning for a long time (Franklin et al., 2022). A multidisciplinary approach can be useful in explaining how user preferences can be altered through machine learning and AI (Franklin et al., 2022). Education should facilitate scholars to develop cross-sector, multidisciplinary skills and find innovative solutions to the issues faced by the people within society.

Multidisciplinary Approach

A multidisciplinary perspective enables students to recognize problems and opportunities that may not be clear within a single field. Research in AI and ML often benefits from a multidisciplinary approach, where identifying the right problems to solve is often half the battle. Combining knowledge from different fields encourages creativity and innovation (Fartushenko, 2012). Students with diverse backgrounds can develop unique solutions and technologies that may not be possible with a single-discipline approach. Combining expertise from different fields can lead to breakthroughs and advancements that would be challenging within a single discipline. Multidisciplinary approaches require educational programs spanning and intersecting across various disciplines. When combined with the student's learning abilities and learning styles, these unique approaches toward programs result in better performance. This also requires scholars from different disciplines to collaborate to find sustainable solutions to global challenges.

DISCUSSION AND CONCLUSION

AI and ML can aid in identifying connections between various fields and subjects. They can personalize learning experiences, adapting to individual student needs and goals. AI-driven analytics can provide real-time feedback and assessment, facilitating continuous improvement. Student engagement and motivation gets boosted as students' knowledge can be tested in real-time with personalized learning application using AI (Enis, 2023). Students with diverse backgrounds can develop unique solutions and technologies that may not be possible with a single-discipline approach. An interdisciplinary approach may suppress individual creativity since all the students in a given group may not be able to contribute to the creativity equally (Fartushenko, 2012). This is a drawback of an interdisciplinary approach. A multidisciplinary approach, on the other hand, better equips students to adapt to these changes and acquire new skills as needed.

Discussion

This section highlights some of the key findings related to the research question. A multidisciplinary approach allows students to develop a broad skill set and the ability to tackle multifaceted challenges effectively providing faster feedback to students. Jiminez and Boser (2021) explain the use of AI in education today, from online open education courses, tests and assessments, and grading written essays using natural language processing. When a high quality of education is imparted to the students and faculty use AI tools to check the assessments, they can give faster feedback regarding the student's performance (Jiminez & Boser, 2021). Similarly, Sun et al. (2021) found that AI in education helps with improving students' efficiency and makes learning content more relevant and George and Wooden (2023) stated that AI can be used for enhancing learning outcomes; however, responsible use of AI is a key factor.

The views of researchers Bates et al. (2020) differed when they identified that while AI is a sleeping giant and this work in progress will need multidisciplinary expertise, breakthrough applications may not arise from mainstream post-secondary education. Results of the research by Xieling Chen et al. (2023) showed that although AI has been widely used in the form of AI robots and chatbots; however, to develop an all-round understanding, human-centred Artificial Intelligence (HCAI) is required, which should have a multidisciplinary approach. However, it will be through formal post-secondary systems that offer learning opportunities, such as LinkedIn Learning, Amazon, etc. AI is integrated with learning management system (LMS) platforms for auto-grading, and to meet these research trends, researchers must collaborate across disciplines and leverage new technologies to integrate diverse data sources and methodologies. Evaluating the biases, AI could disseminate and the ethical implications of relying on AI for grading and decision-making in education (Slimi & Carballido, 2023).

Conclusion

In conclusion, a multidisciplinary approach in post-secondary education is essential in AI and ML because it equips students with the skills, mindset, and adaptability required to excel in this rapidly evolving field. It encourages collaboration, innovation, and ethical considerations, ultimately preparing individuals to address complex AI and ML technologies' challenges and opportunities. The research identified that while AI and ML are useful for putting data together and providing learners with skills, there are several gaps. Three major communities affected by this research's results are the academicians, higher education administrators, and researchers. Multidisciplinary education, combined with AI and machine learning, can revolutionize higher education, preparing students to tackle the complex problems of the 21st century. Continued investigation into the pedagogical impact of AI and machine learning in multidisciplinary education will provide deeper insight into the connection. Future researchers can connect AI with student assessments and the ethical implications. Future researchers can also plan long-term studies to assess the career outcomes and adaptability of graduates from multidisciplinary programs. Some of the limitations of this study are: (1) assessment of the data through quantitative analysis may provide further insight; (2) the author is from the business management field, so the technical application of AI is limited; however, it is within the scope of the research question. It is recommended that educators weigh the positive impact of AI with the negative implications and determine the right use of AI based on the needs of the course or program of study.

References

- [1] Bates, T., Cobo, C., Mariño, O., & Wheeler, S. (2020). Can Artificial Intelligence transform Higher Education? *International Journal of Educational Technology in Higher Education*, 17(1), 1-12.– DOAJ. <https://doaj.org/article/ff3c2ee5dbc0417287b0a2de416d77f3>.
- [2] Chatterjee, P. (2018). *Artificial Intelligence and Higher Education and Scientific Research*. Silicon India, 21(6), 20–21. <https://link.springer.com/book/10.1007/978-981-19-8641-3>.
- [3] Dignum, V. (2020). AI is multidisciplinary. *AI Matters*, ACM Digital Library 5(4), 18-21. <https://dl.acm.org/doi/10.1145/3375637.3375644>.
- [4] Dwivedi, Y. K., et al. (2019). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*. <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>
- [5] Enis, M. (2023). Perspectives on AI in Higher Ed. *Library Journal*, 148(5), 11–12. <https://library.bathspa.ac.uk/items/eds/lkh/163404909?query=2023&resultsUri=items%3Fquery%3D2023%26facet%25B0%25D%3DJournal%253Alibrary%2Bjournal%26sort%3Drelevance%26target%3Deds%26offset%3D10&facet%5B0%5D=Journal%3Alibrary+journal>.
- [6] Fartushenko, L. (2012). *An Interdisciplinary Approach to Promote Creativity*. *Designedasia*, 3(1), 1-8. <https://www.designedasia.com/2011/final/AN%20INTERDISCIPLINARY%20APPROACH%20.pdf>.
- [7] Franklin, M., Ashton, H., Gorman, R., & Armstrong, S. (2022). *Recognising the importance of preference change: A call for a coordinated multidisciplinary research effort in the age of AI*. <https://arxiv.org/pdf/2203.10525.pdf>
- [8] Jimenez, L. & Boser, U. (2021, September 16). *Future of testing in education: Artificial intelligence*. Center for American Progress. <https://www.americanprogress.org/article/future-testing-education-artificial-intelligence/>
- [9] George, B., & Wooden, O. (2023). Managing the Strategic Transformation of Higher Education through Artificial Intelligence. *Administrative Sciences* (2076-3387), 13(9), 196. <https://doi.org/10.3390/admsci13090196>
- [10] Patel, K., Agrahari, S., & Srivastava, S. (2020, June). Survey on fake profile detection on social sites by using machine learning algorithm. In *2020 8th international conference on reliability, infocom technologies and optimization (trends and future directions)(ICRITO)* (pp. 1236-1240). IEEE. https://www.researchgate.net/profile/Saijshree-Srivastava/publication/344983018_Survey_on_Fake_Profile_Detection_on_Social_Sites_by_Using_Machine_Learning_Algorithm/links/63ef9d4b19130a1a4a8964f7/Survey-on-Fake-Profile-Detection-on-Social-Sites-by-Using-Machine-Learning-Algorithm.pdf.
- [11] Rubert, E. J., Baglari, N., Thahira, K. K., & Meenachi, P. (18 Aug. 2022) -"Shodhgodavari: Recent Trends in Multidisciplinary Research". https://www.researchgate.net/publication/362762327_SHODHGODAVARI_RECENT_TRENDS_IN_MULTIDISCIPLINARY_RESEARCH.
- [12] Slimi, Z., & Carballido, B. V. (2023). Systematic Review: AI's Impact on Higher Education - Learning, Teaching, and Career Opportunities. *TEM Journal*, 12(3), 1627–1637. <https://doi.org/10.18421/TEM123-44>

- [13] Sun, Z., Anbarasan, M., & Praveen Kumar, D. (2021). Design of online intelligent English teaching platform based on artificial intelligence techniques. *Computational Intelligence*, 37(3), 1166–1180. <https://doi.org/10.1111/coin.12351>
- [14] Van Duuren, N., & de Pous, V. (2020). Multidisciplinary aspects of artificial intelligence. <https://inria.hal.science/hal-03547315>
- [15] Xieling Chen, Cheng, G., Di Zou, Baichang Zhong, & Haoran Xie. (2023). Artificial Intelligent Robots for Precision Education: A Topic Modeling-Based Bibliometric Analysis. *Journal of Educational Technology & Society*, 26(1), 171–186. [https://doi.org/10.30191/ETS.202301_26\(1\).0013](https://doi.org/10.30191/ETS.202301_26(1).0013)