Journal of Engineering Education Transformations, Volume 39, February 2026, Special Issue 3, eISSN 2394-1707

10.16920/jeet/2026/v39is3/26092

The Role of AI-Driven Learning in the Comprehensive Development of Higher Education Professionals: An Empirical Analysis

[1] Dr Asokan Vasudevan, [2] Dr. Chandra Bhooshan Singh [3] Dr. Satvik Jain

[1] Professor, Faculty of Business and Communications, INTI International University, Persiaran Perdana, BBN Putra Nilai, 71800 Nilai, Negeri Sembilan, Malaysia
Research Fellow, Wekerle Business School, Budapest, Jázmin u. 10, 1083 Hungary (0000-0002-9866-4045)

[2] Assistant Professor, Faculty of Commerce & Management, Kalinga University, Raipur, Chhattisgarh (0009-0001-4455-1782)

[3] Assistant Professor, Faculty of Commerce & Management, Kalinga University, Raipur, Chhattisgarh (0009-0006-3563-8401)

[1] asokan.vasudevan@newinti.edu.my [2] cbsingh631995@gmail.com
[3] satvik.jain@kalingauniversity.ac.in

Abstract **- Although artificial intelligence (AI) is not a new concept in the field, it is becoming a more significant influence on the educational industry, particularly in the area of training specialized professionals in higher education. This kind of AI-based tools is assisting the teachers to come up with new teaching methods where teaching experiences are tailored to the individual and there is instant feedback. Through these tools, teachers are able to modify their practices to suit many types of learners besides helping themselves to grow professionally. Daily practices, such as grading and administration, can be automated and moved aside, leaving educators with additional time to interact with students and enhance instruction. The paper provides an argument that in spite of the challenges posed by AI, its potential to enhance professional growth and transform the education industry is worth incorporating it in higher education. We consider the potential opportunities and challenges AI gives to higher education and comment on its possibilities to improve comprehensive education of teachers. Once AI is optimized (with a closer understanding), the institutions can remain on the top in the strongly competitive world and educators will provide good education. This quantitative study that was done based on responses of 219 higher education practitioners and teachers. Among the major aspects that have been found in the role of AI-driven learning to holistic development, it is necessary to mention personalized learning experiences, data-driven insights, predictive analytics to make informed decisions, and collaborative learning platforms.**

Keywords: **Artificial Intelligence; Higher Education; Holistic Development; Personalized Learning; Data-Driven Insights; Educational Technology**

I. INTRODUCTION

Artificial Intelligence (AI) is a rather crucial tool in various industries, and education is not an exception. The AI-based tutoring systems, automated grading and chatbots to assist students are being used to improve the learning processes and also the efficiency of institutions. The use of AI in higher education has experienced a boom over the past few years; as a case in point, the use of AI tools by faculty and staff in higher education institutions has increased more than twice in the last one year. With the changing of educational systems according to the technological progresses, AI-based learning is also a chance to enhance the professional growth of teachers. Faculty members and administrators are the key players in ensuring quality of education in colleges and universities. Nevertheless, the fact that the technological environment changes quickly requires these professionals to constantly acquire new skills and embrace contemporary pedagogical practices and instructional approaches to teaching and learning. The personalization of learning and automation of processes through AI itself is one of the facilitators of this professional development. AI is widely referred to as the imitation of human brain intelligence on the machines, especially in problem-solving, learning, and decision-making.

AI has started to replace both administrative and teaching functions in education. Intelligent tutoring systems, adaptive learning platforms, collaborative learning environments, and virtual assistants are the AI-driven tools that can be used to enhance the quality of education. As a higher education professional, AI provides new methods of teaching, enhances student engagement, and simplifies the administrative workload that will enable professionals to concentrate more on pedagogical creativity and with less mundane work.

Training and skill-building of educators are one of the main ranks of AI contribution to the professional development. Different personalized learning pathways that allow teachers to upskill in particular areas based on their needs and professional objectives can be generated with the assistance of AI based apps. These avenues offer specific learning opportunities that are aligned to the needs of individual educators and hence keep them up-to-date in their profession. To illustrate, AI can assist the educators in enhancing their technical and instructional capabilities through providing the educators with real-time feedback and with resources that are tailored to their teaching styles. The other area where AI will decrease administrative workload is through automating the hearing of assignments, responding to commonly posed questions, and logistical tasks in the classroom. Time spent on these routine tasks can be used by educators on high impact activities such as student interaction and curriculum development when automated by AI. Evidence-based teaching strategies are supported by AI-based systems as Mollick and Mollick (2023) posit that it provides instructors with tools that can be used in practices that are proven to positively impact learning outcomes. Among them, it is the generation of various examples to students, regular low-stakes examination, and the provision of diagnostic questions, which may be quite time-consuming to conduct manually. As AI takes care of these tasks, teachers will have the opportunity to concentrate more on a student, meet an individual need, and create a more interactive learning process. The analysis of student information by AI can also assist the teacher in modifying the lesson based on the needs of the individual student, so that teaching methods become immediately improved to advance their professional development. Also, AI promotes collaboration because it gives educators a chance to exchange materials and ideas across the world. Nevertheless, the issue of privacy and fear of AI taking over the role of the teachers should be addressed. Although AI is capable of automation, it cannot take up the relationship between teachers and students. To have the most advantages of AI, providers of education should employ it to facilitate, not eliminate the role of instructors which is crucial. Yet, additional empirical studies with regard to the contribution made by AI-based learning to the professional development of the educators are required. Thus, the current research investigates a place of AI-driven learning in the overall evolution of higher education specialists by providing an empirical research.

OBJECTIVES OF THE STUDY

The primary objectives of this research are:

1. To identify the key ways in which AI-driven learning contributes to the holistic development of higher education professionals.
2. To assess the relative importance of these AI-driven learning factors in professional development and their implications for teaching practice.

SIGNIFICANCE OF THE STUDY

This study will add to the existing literature on the implementation of AI in education because this study will concentrate on teachers, which is less explored than the results of students. It has a lot of potential to inform higher learning institutions and policy- makers by offering empirical data on the ways AI tools can be beneficial to the development of a teacher. The findings can be used in professional development initiatives so that the teaching fraternity can be prepared to utilize AI. Additionally, the knowledge of these dynamics helps to complement the larger agenda of enhancing the quality and innovativeness of education in accordance with the international agenda like the Education 2030 Agenda.

II. LITERATURE REVIEW

With the aid of AI, educators are able to reduce administrative load, such as assessment of students, and find additional time on lesson planning and working with students. According to Chen et al. (2020), the use of AI tools simplifies all these tasks, and teachers can devote their efforts to other activities that can promote learning. As an example, automated scheduling software can organize lessons or conferences, and AI-based grading programs can assess assignments and quizzes, and this will even more liberate the time of the instructors to design the curriculum and mentor students. Furthermore, having less time devoted to routine tasks, teachers will be able to devote more efforts to the methods of innovative teaching. The efficiency of administrative processes made with the help of AI also helps teachers draw more attention to classroom instruction, which leads to better student-teacher communication.

The personalized learning offered by AI is

beneficial to learners and teachers. Bucea-Manea-Țoniș et al. (2022) state that AI-based teaching facilitation tools generate personalized resources and provide instant feedback. These tools can be adaptive learning systems that adjust the difficulty of content dynamically to each learner, intelligent tutoring systems, which provide a learner with customized hints or materials when they are having some trouble, to enable a teacher to tailor their instruction to the learners. Such flexibility enables teachers to optimize on their plans and address various classroom needs. The process does not only facilitate student learning, but it also helps teachers to constantly enhance their teaching methods on the basis of information-driven understanding.

The benefits of AI in transforming teacher training in the development of adaptive learning environments were discussed by Jamal (2023). These programs are adaptable to the distincts of the teacher in terms of learning and furnish the teacher with instances to further cultivate new abilities in an effective manner. To give an example, an AI-based training simulator can place a teacher in a virtual classroom environment and provide feedback on her teaching method, including in real time, to increase skill development faster. Nevertheless, Jamal cautions that AI implementation should also deal with such ethical issues as privacy and possible prejudices. Although AI has major advantages in the area of professional development, the institutions must use AI conscientiously. It is important to minimize the risks and maximize benefits by making both sides of the equation balanced between the benefits of AI in the field of teacher education and the necessity to maintain ethics.

The AI enhances decision-making by educators by means of accurate assessment tools. Hooda et al. (2022) note that AI algorithms (including enhanced fuzzy cognitive map model) can give an appropriate evaluation of students, beating conventional approaches. As an example, grading systems with machine learning capabilities can mark essays or coursework in a short amount of time and specify the mistakes that are frequent, whereas predictive analytics dashboard can detect learning gaps so that an instructor could take immediate actions. By use of these tools, teachers can easily change their approaches to suit the needs of the students more effectively, depending on the real time information. With instantaneous information, corrective changes in teaching can be done right in time and result in improved learning. Therefore, AI can assist a teacher to improve their instruction with the help of information-based feedback.

Artificial intelligence can also foster cognitive development in teachers by stimulating innovativeness and innovation. They give teachers the ability to test new approaches to teaching and their results, forcing them to be critical thinkers and change strategies in the changing environment of education. These technologies compel the teachers to be innovative so that they can keep pace with the current demands in education. Indicatively, AI-based suggestion systems will be able to introduce new teaching materials and methods used in other parts of the world, and as a result, they will have some incentive to explore new methods. Zabelina and Spiryagina (2021) have discovered that AI tools could help in promoting creative thinking, which challenges educators to evolve to new pedagogical design. The ability of AI to allow such experimentation is beneficial to educators since they can keep abreast with global educational trends.

Moreover, AI helps improve leadership and curriculum development, as it gives the educators the data-driven information. Automation of routine tasks enables teachers to easily assume leadership positions to focus on instructional leadership. Ghamrawi et al. (2023) comment that this independence enables teachers to work on creating individually tailored learning experiences and decide strategically regarding the curriculum. Automation coupled with actionable insights enables the teachers with the ability to guide the classroom and build improved learning environments. Relieved of part of the regular workload, teachers can also spend more time in mentoring young teachers or leading the way school curriculum change, which again will result in a higher quality of education.

The use of AI also has the potential to increase ethos and reflection in educators. AI tools promote self-reflection, which is an important aspect of professional development, by assisting the teachers in improving their personal reactions and establishing positive relationships with students. The intelligent tutoring systems are able to offer customized learning paths that encourage reflections. Verna et al. (2019) outline the way AI promotes continuous self-reflection that results in enhanced teaching practices. Educators can use such AI-based real-time feedback systems to evaluate their performance and see where they can improve. This unending progression of reflexivity enhances their teaching practices and improves self-awareness when dealing with students. This has seen teachers be empowered professionally and emotionally and thus better placed to develop a favorable learning environment. As Celik (2023) explains, the Intelligent-TPACK model emphasizes the importance of balancing technological, pedagogical, and ethical skills when integrating AI into them. The abilities help teachers consider AI as an assistant and not a substitute of human teaching.

Although there are advantages, the implementation of AI in higher education is associated with a number of challenges, such as ethical concerns, technical obstacles, and institutional transformations. The ethical aspect of AI in education, especially decision-making and personalized learning, is one of the primary issues of concern. Among the problems that were highlighted by Zawacki-Richter et al. (2019) were data privacy, algorithmic bias, and loss of human autonomy in using AI. To prevent all these pitfalls, institutions have to make sure that the use of AI is carried out in a responsible and educational manner. The issue of privacy and the safety of the data is of particular ethical concern when AI-based tools such as facial recognition and chatbots are introduced to the educational context. Al-Zahrani and Alasmari (2024) emphasize that when such tools are not handled effectively, they may interfere with sensitive information.

Strong protections (e.g., data encryption and access controls) should be used by institutions to keep sensitive data safe, and broad ethical guidelines should be set to weigh the advantages and the drawbacks of AI so as to offer safe and responsible AI usage in education.

The other problem with the introduction of AI in education is the difference in opinion that exists between learners and teachers. Although students tend to value the fact that AI enables the personalization of learning and quick feedback, several educators are still hesitant. There are those teachers who fear the effects of AI on critical thinking and the fact that AI-generated data may not be true whereas, others worry that they may lose the human touch with their students. Its results discovered that students generally feel more positive about AI than other teachers who tend to be more skeptical (Olawale and Mutongoza 2024). These different perceptions underscore the importance of continuous communication and education. Removing the obstacles between the student euphoria and the educator scepticism will contribute to the effective use of the AI. Survey data present in the last two years captures these ambivalent views: the share of higher-ed employees worried about AI bias increased by nearly half in 2023 - 36 percent to 49 percent, and the share of employees worried about data security and privacy went up by almost a quarter - 50 percent to 59 percent. The teachers will not be able to get the full benefits of AI in the classroom without adequate knowledge and encouragement.

AI is also slowed down by technical issues in education. A number of teachers do not have the competencies or knowledge to apply AI resources in their instructions. According to Zawacki-Richter et al. (2019), a significant portion of AI studies is focused on the computer science and STEM disciplines, other disciplines have fallen behind. This knowledge deficit causes teachers to be reluctant to adopt AI because they lack the knowledge to do so. I started by giving a case of faculty with non-technical degrees who simply have not been exposed to AI tools in their field and therefore there is a need to be intentional in offering inclusive, broad based AI literacy education to teachers. The ability to make informative decisions about the implementation of AI requires professional growth to create ethical know-how and technical expertise.

In other developing economies, (such as India) AI-driven applications (such as customized and group learning in personalized and adaptive assessments) are starting to assist teachers to provide personalized learning through offering profound analysis of student achievement. Indicatively, AI- based learning apps have started being used in some Indian universities with the aim of delivering personalized education to learners in remote settings. Nevertheless, a great number of sophisticated AI tools are not used. The education sector can immensely benefit by the integration of technologies such as facial recognition and natural language processing. Innovation and AI implementation should be part of the continuous effort to ensure the development of more productive learning settings in developing nations as it is an aspect that will yield better educational results. However, challenges such as limited resources and infrastructure needs should be mitigated to ensure that the benefits of AI are achieved in the fullest in the world.

The latest statistics indicate that the use of AI in higher education is rapidly increasing, and the topic of research leadership in the domain is no longer dominated by the U.S., but China, due to the amount of money it invests in research in the educational domain of AI. According to Crompton and Burke (2023), assessment, predicting student outcomes, providing student assistance, intelligent tutoring, and managing learning processes are five important applications of AI in education. Such applications have enhanced learning and administration automated people. Simultaneously, the long-term performance of AI tools (including the recent emergence of massive language models like the ChatGPT of OpenAI) in teaching remains the topic of limited research. Further research is required to learn how these tools could be more effectively utilized in various situations and how teachers can utilize AI to improve learning processes and results in students in particular fields, such as science education, AI has already demonstrated the ability to increase student engagement and learning. Almasri (2024) observed that AI can create quizzes, aid the process of assessment of students, and forecast their performance, all of which are positively accepted by teachers and students alike. Nevertheless, the problem of irregular AI results with various subjects

has not been resolved yet - certain AI models fail to work well with some complicated subjects, which complicates their application in these directions. Realizing AI devices to particular settings and constantly assessing their efficiency is among the essential points in making them address the various needs of learners and educators, particularly science.

All in all, AI is introducing a lot of transformation to higher education and presents opportunities as well as challenges. It makes the learning process more personal, it enhances administration efficiency and innovation as well, hence changing the mode of running the learning institutions. However, there are still challenges to guarantee consistency, context-appropriateness, ethical application of AI. With the further progress of AI technology, school institutions will have to invest in research and development, structures, and training of teaching staff. This will enable teachers to apply AI in a more useful way to advantage students and teachers, which will eventually enhance the quality of education to all the people.

III. METHODOLOGY

Objective: To identify the role of AI-based learning in the holistic development of higher education professionals.

The data which was availed in this study comprised of 219 respondents, including higher education institute professionals and teachers. The data were collected by a random sampling approach. The respondents completed a questionnaire in the form of structured questions about the effect of AI-based learning on professional development, and a Likert scale was used. The data gathered were analyzed thereafter through the Exploratory Factor Analysis (EFA) though varimax rotation.

Sampling adequacy was 0.764 according to Kaiser-Meyer-Olkin (KMO) measure and the test of the sphericity was significant (2 = 3642.387, dv = 91, p = 0.001), which means that sampling was appropriate to perform factor analysis. (A KMO over 0.6 implies sufficient sample adequacy and the significant Bartletts test confirms that there are sufficient correlations between the items to perform a factor analysis.) The EFA indicated four factors, which have a greater eigenvalue (larger than 1.0), and the total percentage of the variance it can explain is 87.14%. Remarkably, Data-Driven Insights and Personalized Learning Experiences were the most significant (with almost the same impact, with nearly 26.3 and 26.9 percent contribution to the overall variance, respectively). The factors of Predictive Analytics of Decision-Making and Collaborative Learning Platforms also described relatively smaller amounts of variance but were nonetheless significant. .

FINDINGS

Demographics: The demographic data of the sample indicate that the proportion of males and females is rather balanced (51.14 and 48.86 respectively). Talking of the age, 35.16% of the participants were aged between 30 and 35 years, 28.77% were aged between 35 and 40 years, and 36.07% were aged above 40 years. Interms of institutional affiliation 46.12% of the participants were of government institutes, 26.03% of institutions were of private institutions and 27.85 institutions were of foreign institutions (or the rest 72.15 are Indian institutions). This shows a heterogeneous sample of different type of institutions and age groups making the analysis wide-ranged. The vast majority of respondents (about 72 percent) were based in India where about 28 percent of respondents are based in institutions outside India contributing to a global picture of the sample.

Factor Analysis Results: The Exploratory Factor Analysis was carried out in order to gain insight into the determinant factors behind the role of AI-driven learning in the overall growth of the higher education professionals. The four distinct factors that were identified by the EFA (as mentioned above) accounted almost 87.14 percent of the overall variance of the data. The proportion of the factors explaining the variance was as below: Personalized Learning Experiences (26.867%), Data-Driven Insights (26.259%), Predictive Analytics towards Decision-Making (17.538%), and Collaborative Learning Platforms (16.477%). It means that among respondents, PLEs were the most significant dimension that can be used to explain positive changes (almost 26.9% of the variance), and Data-Driven Insights is close to it (almost 26.3%). Although also important, Predictive Analytics and Collaborative Platforms explained relatively lower proportions of variance in their proportion.

The items that are grouped by these four factors were attested by the rotated component matrix. In the case of Personalized Learning Experiences, the elements that were listed were; the capacity of AI to analyze individual learning patterns and performance to personalize the learning experiences, a customized approach that assists teachers in pinpointing which areas of learning required improvement, and the role of AI in the overall development through improving competence on a multifaceted basis. Factor loadings in these items were very high (all of them were above 0.85), which meant that they contributed significantly to this factor.

In relation to Data-Driven Insights, the items were the ability of AI to process a large quantity of data in order to give actionable knowledge about learning outcomes and provide educators with an opportunity to adjust their teaching methods and enhance teaching

techniques. They also indicated high factor loadings (average 0.90), which also testifies to their importance.

The Predictive Analytics for Decision-Making component involved an aspect that touched upon AI capacity to enable institutions of higher learning to predict future trends and make informed choices that would increase educational achievement.

The factor of Collaborative Learning Platforms included the items of AI-facilitated online classes, knowledge sharing and professional problem solving.

The four factors represented high internal-consistency. Analysis of reliability resulted in Cronbach alpha of 0.894 of the 14 items included in all the factors indicating that the survey instrument has good internal consistency.

IV. DISCUSSION

The results of this research support some of the main themes of the literature and underline their practical values. The four factors derived include Personalized Learning Experiences, Data-Driven Insights, Predictive Analytics for Decision-Making, and Collaborative Learning Platforms which are consistent with trends reported by the past researchers. An example is that the prevalence of the personalized learning and instant feedback in our findings resembles the focus of Bucea-Manea-Țoniș et al. (2022) on customized learning resources and the real-time reporting systems. In the same vein, the relevance of data-driven insights and predictive analytics aligns with findings by Chen et al. (2020) and Hooda et al. (2022) regarding the role of AI in increasing the accuracy of the assessment and making instructional choices. Collaborative learning platforms can be identified as one of the most important factors, a fact that corresponds to the increased attention given to the idea of AI helping conduct knowledge sharing and virtual teamwork among educators and learners, a fact that is indirectly suggested by Jaiswal and Arun (2021) through the application of new teaching tools.

To the teachers, the change can slowly replace them with the role of information bearers with facilitators and mentors. As the monotonous data transmission and grading are performed by AI, educators will be able to make more time to more valuable tasks that are rather difficult to automate and optimize: instruct students in complex problem-solving, teach critical thinking, and supply the learners with some socio-emotional assistance that cannot be completely imitated by AI. In this regard, AI can be used to enhance teacher functions as opposed to devaluing them. The educational role of educators will grow because they will utilize AI to gain efficiency and discoveries and concentrate on the human dimension of the teaching process.

Such alignments hint at the fact that the introduction of AI to higher education is caring about rather similar opportunities and challenges in a wide range of contexts. The teachers in our sample see AI as a complicated kind of tool, both as helping them in providing personalized instruction and administrative effectiveness but also in influencing their own personal evolution and leadership abilities. It means that a prosperous introduction of AI may result in a vicious cycle: the more teachers employ AI to enhance the performance of their students, the more they acquire new competencies and confidence and, therefore, the more their teaching practice becomes innovative.

However, the positive outlook is accompanied by a number of limitations and considerations that should be taken into account. To begin with, the sample of the study is heterogeneous in age and the type of institutions considered; thus, a broader variety of cultural or regional distinctions might be omitted. They were recruited in institutions of higher learning with different levels of technological infrastructure that may lead participants to have different experiences with AI. The scope of the future research may be further extended to cover educators in more geographical areas (and perhaps to include K-12 educators, too), to determine how the role of AI may vary across the educational settings. Second, we depend on self-reported perceptions of the impact of AI; we did not directly assess actual outcomes (i.e. improved teaching performance or student learning). To have a stronger evidence of the impact of AI on the professional development, longitudinal research that follows the performance and success indicators of the educators as well as the performance and success of the students prior to and after the implementation of AI would be more concrete.

The other use of these findings is an institutional support and training which is considered one of the practical conclusions. As the evidence of our findings and our research shows, it is not enough to release AI tools; the educators should be guided to use the tools appropriately and in an ethical way. Workshops or ongoing professional development initiatives on AI literacy (both technical and ethical) should be considered by the institutions (as stated by Celik (2023) on the Intelligent-TPACK framework). In this way, they would be able to make teachers overcome a root skepticism or technical hindrances and achieve maximum benefits of AI in practice. The promotion of successful and sustainable AI-based initiatives within the education sphere is likely to increase the success of educators as active stakeholders (to address the gap in the studies, as identified by Zawacki-Richter et al. (2019)).

To conclude, it is possible to state that the role of AI in improving educator development is complex and, generally, positive though it needs to be implemented with consideration. The insights gained in the course of this study can be added to an increasing amount of evidence that AI interpretation can empower an educator to be more responsive to the needs of the students, innovative, and more productive. Meanwhile, it highlights the value of overcoming the challenge of concern, namely, by properly training the student, employing ethical safeguards, and conducting further research, which can help to make sure that AI becomes a beneficial addition to the teaching profession, not to mention that it will reduce it to the ground.

CONCLUSION

These findings show that AI should be thoughtfully implemented in the development of faculty by education policymakers and institutional leaders. The coordination in the process of AI implementation with other wider education progress programs (e.g., the UNESCO Education 2030 Agenda on quality education) could be used to reap the most advantages of AI application to teaching and learning.

To conclude, this paper has found that AI-based learning is characterized by four important aspects, which are Personalized Learning Experiences, Data-Driven Insights, Decision-Making Predictive Analytics, and Collaborative Learning Platforms. Through these aspects, it is faster through which educational institutions and stakeholders could utilize AI technologies to enhance educator development and enhance the quality of higher education. Artificial intelligences are emerging as an unavoidable component of professional learning in higher education. It does not just automate things and individualize the lessons it also contributes to the development of the teachers not only in terms of skills and thinking but also in emotional intelligence. Nevertheless, in order to maximize the advantages of AI in education, the institutions need to actively go into the problem that is associated with it. Teachers have to be equipped and properly trained to operate AI tools in a responsible manner so that they do not substitute the human relationships in the teaching and learning process. Although AI can significantly enhance the efficiency and the ways of teaching, it should never substitute instructors, but rather collaborate with them. AI is capable of being highly useful in education; however, the real potential of AI in education can only be unlocked when it is considered as a part and parcel of the educational practices. Careful adoption of AI by institutions can positively transform the learning environment and enable students and teachers to thrive in the digital era. Going forward, schools ought to think about the application of specific AI training in teaching professionalization in order to respond to the technical and ethical skills deficiencies. The research could also investigate the implications of AI on teaching and the results of students over the long-term in adverse educational settings in the future.

REFERENCES

Al-Zahrani, A. M., & Alasmari, T. M. (2024). Exploring the impact of artificial intelligence on higher education: The dynamics of ethical, social, and educational implications. Humanities & Social Sciences Communications, 11(1). https://doi.org/10.1057/s41599-024-03432-4

Al-Zyoud, H. M. M. (2020). The Role of Artificial Intelligence in Teacher Professional Development. Universal Journal of Educational Research, 8(11B), 6263–6272. https://doi.org/10.13189/ujer. 2020.082265

Almasri, F. (2024). Exploring the Impact of Artificial Intelligence in Teaching and Learning of Science: A Systematic Review of Empirical Research. Research in Science Education, 54. https://doi.org/10.1007/ s11165-024-10176-3

Bucea-Manea-Țoniș, R., Kuleto, V., Gudei, S. C. D., Lianu, C., Lianu, C., Ilić, M. P., & Păun, D. (2022). Artificial Intelligence Potential in Higher Education Institutions: Enhanced Learning Environment in Romania and Serbia. Sustainability, 14(10), 5842. https://doi.org/10.3390/su14105842

Celik, I. (2023). Towards Intelligent-TPACK: An empirical study on teachers' professional knowledge to ethically integrate artificial intelligence (AI)-based tools into education. Computers in Human Behavior, 138, 107468. https://doi.org/10.1016/j.chb.2022.107468

Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: A Review. IEEE Access, 8, 75264– 75278. https://doi.org/10.1109/ACCESS.2020.2988510

Crompton, H., & Burke, D. (2023). Artificial Intelligence in Higher Education: The State of the Field. International Journal of Educational Technology in Higher Education, 20(1), 1–22. https://doi.org/ 10.1186/s41239-023-00392-8

Ghamrawi, N., Shal, T., & Ghamrawi, N. A. R. (2023). Exploring the impact of AI on teacher leadership: regressing or expanding? Education and Information Technologies, 28(1). https://doi.org/10.1007/ s10639-023-12174-w

Hooda, M., Rana, C., Dahiya, O., Rizwan, A., & Hossain, M. S. (2022). Artificial Intelligence for Assessment and Feedback to Enhance Student Success in Higher Education. Mathematical Problems in Engineering, 2022, Article ID 5215722, 1–19. https://doi.org/10.1155/2022/5215722

Jaiswal, A., & Arun, C. (2021). Potential of Artificial Intelligence for transformation of the education system in India. International Journal of Education and Development using Information and Communication Technology (IJEDICT), 17(1), 142–158.

Jamal, A. (2023). The Role of Artificial Intelligence (AI) in Teacher Education: Opportunities & Challenges. International Journal of Research and Analytical Reviews, 10(1), 139–146.

Mollick, E. R., & Mollick, L. (2023). Using AI to Implement Effective Teaching Strategies in Classrooms: Five Strategies, Including Prompts. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4391243

Olawale, B. E., & Mutongoza, B. H. (2024). Artificial intelligence: An empirical survey of student and staff perspectives. Interdisciplinary Journal of Education Research, 6(s1), 1–14. https://doi.org/ 10.38140/ijer-2024.vol6.s1.04

Verna, I., Antonucci, G., & Venditti, M. (2019). Holistic approach to higher education and artificial intelligence: Social implications. Ratio Sociologica, 12(1), 17–36.

Zabelina, T., & Spiryagina, E. (2021). Teachers' professional growth as a condition for improving the quality of higher education in the context of global and Bologna dimensions. SHS Web of Conferences, 99, 01039. https://doi.org/10.1051/shsconf/20219901039

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? International Journal of Educational Technology in Higher Education, 16(1), 1–27. https://doi.org/10.1186/s41239-019-0171-0

Ellucian. (2024). Ellucian's AI Survey of Higher Education Professionals Reveals Surge in AI Adoption Despite Concerns Around Privacy and Bias. [Press release]. Ellucian.

UNESCO. (2023). Artificial intelligence in education. Retrieved from UNESCO Digital Education Portal.

Ellucian's AI Survey of Higher Education Professionals Reveals Surge in AI Adoption Despite Concerns Around Privacy and Bias | Ellucian
https://www.ellucian.com/news/ellucians-ai-survey-higher-education-professionals-reveals-surge-ai-adoption-despite-concerns

jier.org
https://jier.org/index.php/journal/article/download/1617/1352/2789

Artificial intelligence in education - UNESCO
https://en.unesco.org/artificial-intelligence/education