



(RESEARCH ARTICLE)



Impact of AI on continuous learning and skill development in the workplace: A comparative study with traditional methods

Samuel Omokhafa Yusuf ^{1,*}, Justina Eweala Abubakar ², Remilekun Lilian Durodola ³, Godbless Ocran ³, Adedamola Hadassah Paul-Adeleye ⁴ and Prosper Onagie Yusuf ⁵

¹ *Independent Researcher, Massachusetts, USA.*

² *Independent Researcher, Federal Capital Territory, Nigeria.*

³ *The Business School, Worcester Polytechnic Institute, Massachusetts, USA.*

⁴ *Alimosho General Hospital, Lagos, Nigeria.*

⁵ *Faculty of Computing, Air Force Institute of Technology, Kaduna, Nigeria.*

World Journal of Advanced Research and Reviews, 2024, 23(02), 1129–1140

Publication history: Received on 03 July 2024; revised on 11 August 2024; accepted on 13 August 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.23.2.2439>

Abstract

This study explores the impact of AI-based learning versus traditional methods on continuous learning and skill development in the workplace. It aims to understand how these approaches affect employee training and development, considering both their strengths and weaknesses. AI-based learning, characterized by its personalized and scalable nature, provides on-demand access to tailored educational content, which enhances engagement and allows for continuous learning. However, it also faces challenges related to content quality, and limited focus on soft skills development. In contrast, traditional methods offer valuable benefits such as structured learning paths, hands-on training, and social interaction, which are crucial for developing practical and interpersonal skills. Despite their advantages, traditional methods struggle with flexibility, personalization, and scalability. The findings suggest a hybrid approach that integrates AI's personalization and accessibility with the interactive and practical aspects of traditional methods. This blended strategy can address the diverse learning needs of employees and ensure comprehensive skill development. Recommendations include implementing hybrid learning models, ensuring content quality, providing continuous feedback, and maintaining flexibility in training delivery. The study provides insights into optimizing learning strategies by combining the strengths of both AI-based and traditional learning approaches to enhance overall effectiveness in employee training and continuous development.

Keywords: AI-based learning; Traditional methods; Continuous learning; Skill development; Workplace training

1. Introduction

In recent years, Artificial Intelligence (AI) has become a key player in technological innovation, transforming industries worldwide (Brem et al., 2021). Its influence is rapidly expanding across various sectors, including healthcare, finance, manufacturing, and education (Espina-Romero et al., 2023). This technological revolution is changing not only business operations but also redefining the workplace landscape (Mossavar-Rahmani and Zohuri, 2024). As industries evolve at an unprecedented pace, the ability to continuously learn and adapt to new challenges has become essential for both individual and organizational success. In this context, AI-driven approaches are being increasingly utilized to enhance and streamline learning processes, offering new opportunities for personalized education and skill acquisition (Kamalov et al., 2023). By harnessing the power of AI, organizations can provide tailored learning experiences, fostering a more agile and capable workforce that is well-equipped to meet the demands of the modern world.

* Corresponding author: Samuel Omokhafa Yusuf

Continuous learning is crucial in today's workforce, where rapid technological advancements constantly reshape job roles and skill requirements (Moffett, 2024). Employees must continuously acquire new skills and knowledge to stay competitive in this ever-evolving landscape. Traditionally, professional development has relied heavily on classroom training and workshops, which have been foundational to skill enhancement (Wang, 2022). However, these conventional methods often fall short in meeting the fast-paced work environment's demands (Haleem et al., 2022). They can be inflexible, time-consuming, and may not cater to individual learning preferences or specific needs (Abah, 2020). Consequently, organizations are now exploring more agile and effective approaches to fostering a culture of lifelong learning among employees. This shift towards continuous learning aims to ensure that workers are not only equipped with current skills but are also adaptable to future changes, thereby enhancing both individual and organizational success in the modern economy.

AI presents a promising solution to the challenges of modern workforce learning by offering a flexible, efficient, and personalized approach to development. AI-driven platforms can analyze large data sets to identify skill gaps, predict learning needs, and provide tailored content that matches an individual's career goals and job requirements (Gilgorea et al., 2023). By utilizing machine learning algorithms and natural language processing, these platforms can adjust to various learning styles and paces, thus enhancing engagement and retention. Additionally, AI facilitates real-time feedback and assessment, allowing learners to track their progress and make informed decisions about their learning paths (Hooda et al., 2022). This personalized and adaptive learning experience ensures that employees are equipped with the right skills, ultimately leading to increased productivity and satisfaction within the workplace.

While AI-driven methods offer numerous advantages, it is crucial to evaluate their effectiveness compared to traditional approaches. This paper explores the impact of AI on continuous learning and skill development in the workplace by comparing AI-driven methods with conventional approaches. Through an analysis of case studies, industry trends, and empirical research, the paper aims to understand how AI is reshaping the learning landscape and its role in enhancing employees' professional growth. By critically examining these factors, we seek to determine AI's effectiveness in supporting ongoing skill development and whether it truly offers a superior alternative to traditional learning methods. This comprehensive examination will provide insights into the strengths and limitations of AI-driven learning within the modern workforce.

Hence, the research objectives for the study include the following:

- To examine the strengths of AI-based learning in the workplace compared with traditional methods
- To examine AI technologies and traditional methods of learning in terms of skill acquisition
- Impact of AI-based learning and traditional methods of learning on continuous learning culture

2. Importance of Continuous Learning and Skill Development in the Workplace

In today's fast-paced business environment, for an organization to succeed, skill development and continuous learning are essential (Ulari, 2024). Continuous learning involves ongoing efforts by both employees and organizations to acquire new skills, knowledge, and competencies crucial for remaining competitive and relevant (Dennison, 2023). This approach supports the enhancement of individual capabilities throughout one's career, aligning with the evolving needs of organizations and personal development goals.

The importance of continuous learning in the workplace cannot be overstated. First, it addresses the rapidly changing nature of modern industries (Jain and Martindale, 2012). With technological advancements and shifting market conditions, businesses must adapt quickly. Employees with up-to-date skills are better equipped to drive innovation and maintain adaptability, which is vital for keeping the organization competitive (Li, 2022). Continuous learning helps employees manage these changes effectively, fostering a culture of innovation and agility within the organization.

Moreover, continuous learning is crucial for maintaining high levels of employee engagement and retention (Bhakuni & Saxena, 2023). Studies show that employees who have opportunities for growth and development are more likely to stay with their employer. Learning initiatives create a sense of value and belonging among employees, enhancing job satisfaction and reducing turnover rates (Mampuru et al., 2024). Organizations that invest in employee development demonstrate their commitment to their workforce, fostering loyalty and motivation.

Another significant benefit of continuous learning is its role in bridging skill gaps (Rinaily, 2024). As industries evolve, some skills become outdated while new ones emerge (Ra et al., 2019). Without ongoing development efforts, employees may struggle to keep pace with these changes. Continuous learning ensures employees remain proficient in their roles

and are better prepared for future challenges (Walters and Rodriguez, 2017). This proactive approach not only benefits individuals but also enhances the overall performance of the organization.

Fostering a culture of lifelong learning within organizations offers additional advantages. Encouraging employees to view learning as an ongoing process nurtures curiosity, adaptability, and resilience (Huttangadi, 2023). It empowers employees to take charge of their own development and seek self-directed learning opportunities (Abou Said and Abdallah, 2024). This mindset is particularly beneficial in sectors with rapid technological advancements, as it helps employees stay open to change and continuously pursue new knowledge.

By prioritizing continuous learning, organizations can effectively address the challenges posed by evolving industries, improve employee satisfaction and retention, and build a culture that values lifelong learning. As the business landscape continues to change, continuous learning will remain a strategic imperative for organizations striving to thrive in an ever-evolving world.

2.1. Traditional Methods for Training and Skill Enhancement

Traditional methods of training and skill enhancement have long been the backbone of workforce development. These include Classroom training, workshops, and on-the-job training (OJT), with each presenting unique advantages and limitations. However, all contribute significantly to employee growth and skill acquisition.

Classroom training stands as one of the most established approaches in employee education. This method involves face-to-face instruction within a formal setting, typically led by an expert or trainer. The primary benefit of classroom training is the opportunity for direct interaction between instructors and participants, which facilitates immediate feedback and the clarification of doubts (Wut and Xu, 2021). This setting is particularly effective for conveying foundational knowledge and theoretical concepts. It also promotes group discussions, where employees from diverse backgrounds can share experiences and insights, thereby enriching the learning process (Eden, 2024). Classroom environments often foster networking and collaborative learning, making them ideal for building a strong foundational understanding of various subjects.

Workshops, another form of classroom training, offer a more interactive approach. Designed to teach specific skills or techniques, workshops are generally hands-on and practical. They allow participants to apply what they have learned in real-time, which enhances the learning experience through active participation (Fatumo, 2014). This method is particularly effective for skills that benefit from practice and experimentation. Workshops frequently involve group activities, role-playing exercises and case studies, creating a dynamic learning environment that promotes problem-solving and creativity (Mukurunge et al., 2021). The interactive nature of workshops makes them excellent for team-building and improving interpersonal skills, as they encourage engagement and collaboration among participants.

On-the-job training (OJT) provides a third traditional approach, wherein employees learn by performing their job duties under the guidance of experienced colleagues or supervisors. This method is highly practical because it focuses on the specific tasks and responsibilities relevant to the employee's role (Timsal et al., 2016). OJT allows employees to gain hands-on experience and learn at their own pace, dealing with real-world scenarios and challenges (Basariya et al., 2019). This approach fosters a sense of responsibility and confidence among employees as they become more adept at their roles. However, OJT can sometimes suffer from a lack of structured guidance and may vary in quality depending on the mentor's expertise (Agufana, 2022).

Despite their effectiveness, traditional training methods do present certain limitations. Classroom training, while valuable, can be time-consuming and costly due to the need for physical attendance and associated resources (Andersen, 2016). Workshops, despite their interactive nature, may be limited by their duration and often do not provide the in-depth engagement of more extended courses (Rezaei, 2021). On-the-job training, although practical, may lack formal structure and consistency, which can affect the overall quality of the training received.

However, traditional training methods continue to be relevant in today's workplace. They offer essential benefits such as direct human interaction, immediate feedback, and the development of interpersonal skills that digital platforms may struggle to fully replicate. Furthermore, these traditional approaches can be enhanced through the integration of modern technologies. For example, incorporating digital tools into classroom training can make it more engaging, while supplementing on-the-job training with online resources can provide additional support and structure. By blending traditional methods with contemporary innovations, organizations can create more comprehensive and effective learning experiences for their employees.

2.2. Emergence and Evolution of AI Technologies in the Realm of Workplace Learning

The rise and evolution of AI technologies in workplace learning have dramatically transformed how organizations approach employee development. AI has become essential for enhancing learning experiences, personalizing training, and improving skill acquisition (Ou, 2024). This integration aligns with the broader trend of digital transformation, where technology reshapes traditional practices to meet modern organizational needs (Cascio and Montealegre, 2016).

Over the past decade, AI's role in workplace learning has expanded significantly. It is no longer limited to data analysis but now includes the development of advanced learning management systems (LMS) and intelligent tutoring systems (Aldahwan and Alsaeed, 2020; Kamalov et al., 2023). These AI-driven platforms leverage machine learning algorithms, natural language processing, and data analytics to deliver personalized and adaptive learning experiences (Saladi, 2024). By analyzing individual learning patterns and performance data, AI algorithms create tailored training programs that cater to each employee's specific needs. This personalization increases engagement and motivation by providing content aligned with the learner's goals, resulting in a more efficient and effective learning experience (Gilgorea et al., 2023).

AI technologies have also paved the way for microlearning, delivering bite-sized content that fits seamlessly into employees' busy schedules (Salama et al., 2023). AI platforms curate and distribute these modules, following just-in-time learning principles. This approach allows employees to acquire skills precisely when needed, enhancing productivity and performance.

Additionally, AI augments the capabilities of virtual reality (VR) and augmented reality (AR) in workplace learning (Nur, 2023). AI-powered VR and AR simulations offer immersive experiences that replicate real-world scenarios, particularly useful for training in complex environments (Ravichandran and Mahapatra, 2023). These simulations adapt based on learner input and provide real-time feedback, enabling employees to hone their skills in a safe environment.

However, integrating AI into workplace learning is not without its challenges. Concerns regarding data privacy, ethical considerations, and potential biases in AI algorithms must be addressed to ensure equitable learning experiences (Babu et al., 2024). Organizations must also strike a balance between AI use and maintaining human interaction, as interpersonal skills remain vital in the workplace (Heyder et al., 2023). Despite these challenges, AI's role in workplace learning represents a significant advancement in employee development, offering unprecedented opportunities for growth and innovation.

3. Methodology

A systematic literature review was conducted, involving a structured analysis of existing research and studies on continuous learning and skill development. This approach systematically collects, evaluates, and synthesizes available literature to draw meaningful conclusions and identify research gaps, providing a comprehensive understanding of the subject matter (Shaheen et., 2023).

3.1. Search Strategy and Data Sources

A well-defined search strategy is crucial for identifying relevant literature that aligns with the research objectives. First, the search terms were determined using the PCC framework, by focusing on the Population (workplace employees), the Concept (impact of AI on continuous learning and skill development), and the Context (organizational settings). The framework is relevant as it ensures that the keywords are directly relevant to the group being studied (Peters et al., 2019).

A list of keywords and phrases were then developed, including terms like 'Artificial intelligence', 'Workplace', 'Traditional training methods', 'Skill development', 'Continuous learning'. These keywords were combined using Boolean operators such as 'AND' and 'OR' to refine and filter search results effectively. For example, using AND to combine terms like 'AI AND workplace learning' help identify studies that include both concepts, while OR allow for the inclusion of synonyms or related terms. This strategic approach ensures the identification of studies directly relevant to the research objectives and facilitates a comprehensive understanding of the subject matter.

Secondly, the search process utilized several resources. First, major academic databases such as Google Scholar, Google search engine, Web of science were accessed to find a wide range of peer-reviewed journals, articles, and conference proceedings. These databases offer comprehensive coverage of literature across multiple disciplines, ensuring a broad scope of relevant studies. Additionally, industry-specific databases like IEEE Xplore will be explored for technology-focused research, crucial for accessing specialized studies on AI technologies in workplace settings. This approach was

supplemented by library catalogs and online repositories to ensure comprehensive coverage and to capture diverse perspectives and findings.

3.2. Study Selection and Screening

Once the search process was completed, the next step involved screening and selecting studies based on the following inclusion and exclusion criteria.

3.2.1. Inclusion Criteria include

- Studies must explicitly address AI's role or traditional method of learning in the workplace
- Research should be conducted within organizational or corporate settings.
- Articles published within the last ten years to ensure relevance.
- Studies must be available in English.

3.2.2. Exclusion Criteria

- Studies that focus on AI or traditional method of learning in non-workplace environments.
- Articles published more than ten years ago.
- Studies not peer-reviewed for academic rigor
- Theoretical papers without empirical evidence or case studies.

PRISMA 2020 Statement was used to guide the search of literature to ensure a systematic, transparent, and comprehensive review process. It helps minimize bias by standardizing search methods, inclusion criteria, and data extraction, ultimately enhancing the credibility and reproducibility of the study's findings and conclusions (Page, 2021).

This process then began with an initial screening, where the titles and abstracts of identified studies are reviewed to determine their relevance to the research objectives. This initial review helps narrow down the pool of studies to those most pertinent to the study objectives, allowing for a more focused analysis. Studies that do not meet the inclusion criteria, particularly those that do not directly address AI or traditional learning methods in workplace settings, was excluded at this stage.

Following the initial screening, a full-text review of shortlisted articles was conducted. This involves obtaining the full texts of selected studies to evaluate their relevance, quality, and methodological rigor. The full-text review ensures that only studies providing sufficient data, insights, and valid conclusions are included in the systematic review. This step is critical for maintaining the credibility and reliability of the review's findings, as it ensures that the analysis is based on robust and well-conducted research.

3.3. Data Extraction and Synthesis

Data extraction involves systematically collecting relevant information from the selected studies. To facilitate this process, a standardized data extraction form was developed. This form recorded essential information from each study, including the author(s), publication year, research design, sample size, methodologies, and key findings. Consistent recording of data is crucial for facilitating comparison and synthesis across studies, allowing for a comprehensive analysis of the collected literature (Xiao and Watson, 2019). Following data extraction, a thematic analysis was conducted to identify common themes, trends, and patterns across the selected studies. This involves grouping findings based on similarities and differences in AI-driven and traditional learning methods. The result was then categorized into to provide a comprehensive analysis of the impact of AI on continuous learning and skill development in the workplace.

4. Results: Comparison of AI and Traditional Methods

The systematic search of the selected databases produced over 1000 journals and articles on the topic of interest. However, only few were selected based on inclusion and exclusion criteria, as shown in the table below. Based on the selected literatures, the unique strengths and benefits of each method to skill acquisition and development were reported.

4.1. Theme 1: Strengths of AI-based learning

One of the most significant strengths of AI-based learning is its ability to provide highly personalized and customized learning experiences (Chen, 2022). Unlike traditional learning methods that apply a one-size-fits-all approach, AI

leverages data to tailor educational content to the individual needs of employees. By analyzing user interactions, learning history, and performance data, AI algorithms can create customized learning paths that address specific strengths and weaknesses (Golgorea et al., 2023). This level of personalization ensures that employees receive relevant content aligned with their current skill levels and career goals, ultimately leading to more effective learning outcomes.

Also, AI-based learning platforms offer unparalleled flexibility and accessibility, which are crucial components of continuous learning (Golgorea et al., 2023). Employees can access learning materials anytime, anywhere, enabling them to integrate education seamlessly into their work schedules. This on-demand access is particularly valuable for remote workers or employees in different time zones, allowing for uninterrupted skill development regardless of geographical constraints. Additionally, AI-driven platforms can deliver bite-sized content or micro-learning modules, making it easier for employees to fit learning into their daily routines without needing to block off significant amounts of time for training sessions (Chen, 2022).

In addition to this, the ability to provide real-time feedback is another critical strength of AI-based learning (Laat et al., 2020). As employees engage with AI-powered platforms, they receive immediate insights into their performance, allowing them to understand their strengths and areas for improvement quickly (Chen, 2022). This instant feedback supports active learning and helps employees track their progress, keeping them motivated and engaged. Furthermore, AI analytics offer valuable insights into learning patterns and skill gaps, enabling organizations to design targeted training programs that align with business objectives (Morandini et al., 2023). By understanding which skills are lacking, companies can allocate resources more effectively and tailor learning initiatives to meet specific needs.

AI-based learning solutions are also highly scalable, making them ideal for organizations with large or globally dispersed workforces (Kamalov, 2023). AI platforms can simultaneously accommodate thousands of employees, ensuring consistent training across the organization. This scalability eliminates the logistical challenges associated with coordinating in-person training sessions and allows companies to reach a broader audience without significant additional costs. As a result, AI-based learning can drive continuous skill development on a large scale, promoting a culture of lifelong learning across the organization.

4.2. Theme 2: Weaknesses of AI-based learning

Despite these strengths, several weaknesses were identified. First, the cost of implementing AI systems can be prohibitive (Chen, 2022). This includes not only the initial investment but also ongoing maintenance and upgrades. Secondly, AI systems pose significant security risks (Chen, 2022). As they often require access to sensitive company data, they can become targets for cyber-attacks, potentially leading to data breaches (Humphreys et al., 2024). Another issue is privacy because AI systems frequently need access to personal data, raising ethical issues around consent and data protection (Devineni, 2024).

Lastly, implementing AI-based learning solutions can face resistance from employees accustomed to traditional training methods (Chen, 2022). Change management is critical, as some employees may be reluctant to adopt new technologies or feel uncomfortable with self-directed learning models.

4.3. Theme 3: Strengths of Traditional Method of Learning

One of the most significant strengths of traditional learning methods is the emphasis on human interaction and social learning. Face-to-face training sessions, workshops, and seminars provide opportunities for employees to engage directly with instructors and peers (Forsetlund et al., 2021). This direct engagement fosters a sense of community and collaboration, allowing employees to learn from one another's experiences and insights. Instructors can offer real-time feedback, adapt their teaching styles based on learners' responses, and provide personalized support. This interpersonal connection can enhance motivation, as learners benefit from the enthusiasm and expertise of their instructors.

Social learning also encourages collaborative problem-solving, where employees work together on group projects or participate in discussions that simulate real-world scenarios (Wang, 2022). This collaborative approach helps employees develop critical soft skills, such as communication, leadership, and teamwork which are often more challenging to cultivate through digital platforms (Labros et al., 2013). The ability to observe and emulate the behaviors of experienced colleagues further reinforces these skills, promoting a more holistic approach to learning.

In addition to this, traditional learning methods typically follow **structured learning paths** with predefined curricula, offering learners a clear roadmap for skill development (Setkouth and Serkouth, 2022). This structured approach provides employees with a sense of direction, helping them understand what is expected and how to progress through

various learning stages. For many employees, a well-organized curriculum fosters a sense of security and consistency, which can be particularly beneficial for those who thrive in environments with clear guidelines and expectations.

Another strength identified is that traditional methods often emphasize practical application and hands-on training, which are essential for developing certain skills, especially those requiring physical manipulation or direct interaction with tools and equipment (Forsetlund et al., 2021) In-person workshops, labs, and simulations provide employees with the opportunity to practice skills in controlled environments, where they can experiment, make mistakes, and learn from them without real-world consequences (Simons et al., 2015) This hands-on approach is particularly effective for technical roles, where employees must become proficient in using specific machinery or software. It also benefits roles that require customer interaction, as employees can engage in role-playing exercises that simulate real customer service scenarios. By participating in these immersive experiences, employees develop confidence in applying their skills in real-world situations, leading to greater competency and job performance.

However, a significant weakness of traditional learning methods is their tendency to apply a one-size-fits-all approach, which may not accommodate the diverse learning styles and paces of individual employees. In a typical classroom setting, instructors may find it challenging to tailor content to meet the specific needs of each learner, leading to potential disengagement among those who find the material either too difficult or too simplistic (Wang, 2022). This lack of personalization can result in learning gaps, as employees may not receive the targeted support they need to overcome specific challenges. Additionally, traditional methods may not effectively address the varying degrees of prior knowledge among learners, which can lead to frustration or boredom (Hu, 2024). As a result, some employees may struggle to stay motivated, while others may not feel adequately challenged.

Secondly, traditional learning methods often lack the **flexibility and accessibility** that modern workplaces require (). Scheduled training sessions and in-person workshops may not align with employees' busy work schedules, leading to potential conflicts between learning and job responsibilities. This rigidity can hinder employees from engaging in continuous learning, as they may find it challenging to dedicate time to attend training sessions.

Moreover, traditional methods can be less accessible for remote workers or those located in different geographic regions (). Physical presence requirements can create logistical challenges, limiting opportunities for employees who cannot easily travel to training locations. This limitation can be particularly problematic for global organizations, where consistency in training across regions is essential for maintaining a cohesive workforce.

Organizing traditional training sessions can also be resource-intensive, requiring significant investments in time, money, and logistical coordination (Sung and Choi, 2014). Companies must allocate resources for venue rental, travel expenses, and instructor fees, all of which can be costly, especially for large-scale training programs. Additionally, coordinating schedules to accommodate multiple employees can be a complex task, potentially leading to delays and inefficiencies. The high costs associated with traditional training can also make it less feasible for frequent updates or continuous skill development initiatives (Walters and Rodriguez, 2017). In industries where rapid technological advancements necessitate regular skill updates, traditional methods may struggle to keep pace, resulting in outdated content that does not align with current industry standards.

5. Discussion of findings

The comparison between AI-based and traditional learning methods reveals several insights that align with and challenge existing literature on workplace training and continuous learning. The findings highlight both the transformative potential of AI and the enduring value of traditional methods, providing a nuanced understanding of how these approaches can be leveraged for optimal learning outcomes.

The strengths and weaknesses identified in AI-based and traditional learning methods reflect a broader dialogue in educational research. Existing literature often emphasizes AI's capability to personalize learning and provide on-demand access, which aligns with our findings (Igbokwe, 2023). Studies have consistently shown that AI-driven platforms offer tailored learning experiences, improving engagement and efficiency by adapting content to individual needs (Xu, 2024). This personalization supports continuous learning by allowing employees to address specific skill gaps at their own pace.

Conversely, traditional methods' strengths in fostering interpersonal skills and providing structured learning paths also echo established research. Literature underscores the importance of face-to-face interaction and hands-on experiences for developing complex skills and soft skills (Stalph and Hill, 2019). These methods remain valuable for certain types of learning that require practical application and social learning environments.

5.1. Implications for Workplace Training and Continuous Learning Strategies

The findings suggest several implications for workplace training and continuous learning strategies. First, the effectiveness of AI-based learning in providing personalized and scalable solutions indicates a need for organizations to incorporate these technologies into their training programs. AI can enhance the reach and relevance of training initiatives, ensuring that employees receive content tailored to their specific needs and career paths.

However, the limitations of AI-based learning, such as the potential for content quality issues and overreliance on technology, highlight the necessity for a balanced approach. Traditional methods' strengths in delivering structured and interactive training remain crucial. Integrating face-to-face interactions and hands-on experiences with AI-driven personalization can create a comprehensive training strategy that maximizes learning effectiveness.

AI presents both challenges and opportunities in enhancing learning effectiveness. A major challenge is ensuring the quality and accuracy of content provided by AI platforms. As AI systems rely heavily on data, the effectiveness of the learning experience is contingent upon the quality of this data. Inaccurate or biased data can lead to suboptimal learning outcomes, as evidenced by the literature (O'Reilly & Munro, 2020). Ensuring rigorous content curation and validation is essential to mitigate this risk.

On the other hand, AI offers significant opportunities for enhancing learning effectiveness. The ability to provide real-time feedback and track learning progress allows for a more responsive and adaptive learning environment. AI can also facilitate continuous learning by offering access to a wide range of resources and up-to-date information, supporting employees in keeping pace with industry advancements.

Recommendations

- To achieve optimal learning outcomes, organizations should consider a hybrid approach that integrates AI with traditional methods. This blended strategy can combine the strengths of both approaches, leveraging AI's personalization and flexibility while retaining the interpersonal and practical benefits of traditional methods.
- Implement hybrid learning models that use AI to deliver personalized content and assessments, supplemented by in-person workshops and interactive sessions. This approach can address the diverse learning preferences of employees and ensure that both technical skills and soft skills are developed effectively.
- Quality Assurance: Establish quality assurance processes for AI-generated content to ensure its relevance and accuracy. Regularly review and update content to reflect current industry standards and validate AI recommendations through expert input.
- Continuous Feedback and Support: Use AI to provide continuous feedback and track employee progress but complement this with human support. Offer mentorship and coaching to address complex challenges and provide personalized guidance that AI may not fully capture.

Flexibility and Accessibility: Leverage AI to offer flexible and on-demand learning opportunities while maintaining traditional training methods that provide structured and hands-on experiences. This combination can enhance accessibility and ensure that employees can engage in learning at their convenience.

6. Conclusion

The integration of AI and traditional learning methods offers a promising pathway for transforming workplace training and continuous learning. By harnessing the unique strengths of both approaches, organizations can create a robust and effective learning ecosystem that not only enhances employee development but also drives overall organizational success.

AI-based learning methods bring personalization and scalability to the forefront. AI technologies, such as machine learning algorithms and adaptive learning platforms, can tailor content to meet individual learners' needs, learning styles, and paces. This personalization helps employees engage more deeply with the material, fostering a culture of continuous learning. Moreover, AI-driven platforms provide on-demand access to educational resources, enabling employees to learn at their convenience and integrate learning into their daily routines. This flexibility ensures that employees can stay updated with the latest industry trends and skills, which is crucial in today's rapidly evolving job market.

On the other hand, traditional learning methods emphasize human interaction, structured learning paths, and hands-on experiences. These elements are essential for developing complex skills and soft skills, such as communication, teamwork, and leadership. Face-to-face interactions in classroom settings allow for real-time feedback and personalized

support, while practical exercises provide opportunities for employees to apply knowledge in real-world scenarios. Such interactions foster a sense of community and collaboration among employees, which is vital for creating a supportive learning environment.

However, both approaches have their limitations. AI-based learning may struggle with content quality and a lack of focus on soft skills, while traditional methods can be inflexible and resource-intensive. To overcome these challenges, organizations should implement a hybrid learning strategy that combines AI's technological advantages with the interpersonal benefits of traditional methods. This approach can ensure that learning programs are not only efficient and flexible but also comprehensive and engaging, ultimately supporting continuous skill development and driving organizational success.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Abah, J. A. (2020) An Appeal in the Case involving Conventional Teaching: Emphasizing the Transformation to Enhanced Conventional Teaching in Mathematics Education. *VillageMath Educational Review (VER)*, 1 (1), pp.1-10. [ff10.5281/zenodo.3860320](https://doi.org/10.5281/zenodo.3860320). [ffhal-02771716f](https://doi.org/10.5281/zenodo.3860320)
- [2] Abou Said, S., & Abdallah, W. (2024). Enhancing lifelong learning and professional growth: Exploring the role of self-directed learning for university educators. *Journal of Adult and Continuing Education*, 0(0). <https://doi.org/10.1177/14779714241236282>
- [3] Agufana, P. B. (2022). Effects of On-the-Job Training Techniques on Job Performance at Murang'a University of Technology in Kenya. *International Journal of Economics and Business Management*, Vol.8(3). Available at: <https://www.iiardjournals.org/get/IJEBM/VOL.%208%20NO.%203%202022/Effect%20of%20on-the-job.pdf>. [Accessed: 1st of August 2024].
- [4] Aldahwan, Nouf & Alsaheed, Norah. (2020). Use of Artificial Intelligent in Learning Management System (LMS): A Systematic Literature Review. *International Journal of Computer Applications*. 175. 975-8887.
- [5] Andersen, S. C., Humlun, M. K. & Nandrup, A. B. (2016). 'Increasing Instruction time in School does Increase Learning', *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, 113(270), pg. 7481-7484. Available at: <https://www.pnas.org/doi/full/10.1073/pnas.1516686113>. [Accessed: 1st August 2024]
- [6] Babu, Nirupama & Marda, Keshav & Mishra, Abhishek & Bhattar, Saahil & Ahluwalia, Anshika & Services, Edupub. (2024). The Impact of Artificial Intelligence in the Workplace and its Effect on the Digital Wellbeing of Employees. *Journal for Studies in Management and Planning*. 10. 1-32. [10.5281/zenodo.10936348](https://doi.org/10.5281/zenodo.10936348).
- [7] Basariya, s. Rabiyaathul & Sree, Vasanthi. (2019). Pros and Cons of On the Job training versus Off the Job Training. *International Journal of Scientific & Technology Research*. 8. 671-674. [Accessed: 30th July 2024]
- [8] Bhakuni, S. & Saxena, S. (2023). Exploring the link between Training and Development, Employee Engagement and Employee Retention. *Journal of Business and Management studies*, 5(1), pg. 173-180. Available at: <https://doi.org/10.32996/jbms.2023.5.1.17>
- [9] Brem, A., Giones, F. & Werle, M. (2021). The AI Digital Revolution in Innovation: A Conceptual Framework of Artificial Intelligence Technologies for the Management of Innovation. *IEEE Transactions on Engineering Management*. 1-7. [10.1109/TEM.2021.3109983](https://doi.org/10.1109/TEM.2021.3109983).
- [10] Cascio, Wayne & Montealegre, Ramiro. (2016). How Technology Is Changing Work and Organizations. *Annual Review of Organizational Psychology and Organizational Behavior*. 3. 349-375. [10.1146/annurev-orgpsych-041015-062352](https://doi.org/10.1146/annurev-orgpsych-041015-062352).
- [11] Chen Z. (2022) Artificial Intelligence-Virtual Trainer: Innovative Didactics Aimed at Personalized Training Needs. *J Knowl Econ*. 2022 Feb 24:1–19. doi: [10.1007/s13132-022-00985-0](https://doi.org/10.1007/s13132-022-00985-0). Epub ahead of print. PMID: PMC8865945.

- [12] Cui, P (2017) Research on Training and Developing Employe'es', *Advances in Social Science, Education and Humanities Research (ASSEHR)*, International Conference on Economic Development and Education Management, Vol. 107.
- [13] Dennison, K. (2023). The Importance of Upskilling and Continuous Learning in 2023. *Forbes*. Available at: <https://www.forbes.com/sites/karadennison/2023/04/13/the-importance-of-upskilling-and-continuous-learning-in-2023/>
- [14] Devineni, Siva Karthik. (2024). AI in Data Privacy and Security. *International Journal of Artificial Intelligence and Machine Learning*. 3. 35-49.
- [15] Dimitrios, B., Labros, S., Nikolaos, K. et al. (2013). Traditional Teaching method vs teaching methods thorough the application of Information communication Technologies, *European scientific Journal*, Vol. 9. Available at: <https://core.ac.uk/download/pdf/328023853.pdf>
- [16] Eden, C. A. (2024) 'Online learning and community engagement: Strategies for promoting inclusivity and Collaboration in Education , *World Journal of Advanced Research and Reviews*, 2024, 21(03), 232–239
- [17] Espina-Romero, L. & Noroño Sánchez, J. & Hurtado, H. et al. (2023). Which Industrial Sectors Are Affected by Artificial Intelligence? A Bibliometric Analysis of Trends and Perspectives. *Sustainability*. 15. 12176. 10.3390/su151612176.
- [18] Fatumo S, Shome S, Macintyre G. Workshops: a great way to enhance and supplement a degree. *PLoS Comput Biol*. 2014 Feb 27;10(2):e1003497. doi: 10.1371/journal.pcbi.1003497. PMID: 24586140; PMCID: PMC3937119. [Accessed: 30th July
- [19] Forsetlund L, O'Brien MA, Forsén L, Reinar LM, Okwen MP, Horsley T, Rose CJ. Continuing education meetings and workshops: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2021 Sep 15;9(9):CD003030. doi: 10.1002/14651858.CD003030.pub3. PMID: 34523128; PMCID: PMC8441047.
- [20] Forsetlund L, O'Brien MA, Forsén L, Reinar LM, Okwen MP, Horsley T, Rose CJ. Continuing education meetings and workshops: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2021 Sep 15;9(9):CD003030. doi: 10.1002/14651858.CD003030.pub3. PMID: 34523128; PMCID: PMC8441047.
- [21] Gligorea I, Cioca M, Oancea R, Gorski A-T, Gorski H, Tudorache P. Adaptive Learning Using Artificial Intelligence in e-Learning: A Literature Review. *Education Sciences*. 2023; 13(12):1216. <https://doi.org/10.3390/educsci13121216>
- [22] Haleem, A., Javaid, M., Qadri, MA. & Rajiv Suman (2022). 'Understanding the role of digital technologies in education: A review, *Sustainable Operations and Computers*', Volume 3, Pages 275-285. Available at: <https://doi.org/10.1016/j.susoc.2022.05.004>.
- [23] Hooda, Monika, Rana, Chhavi, Dahiya, Omdev, Rizwan, Ali, Hossain, Md Shamim, *Artificial Intelligence for Assessment and Feedback to Enhance Student Success in Higher Education, Mathematical Problems in Engineering*, 2022, 5215722, 19 pages, 2022. <https://doi.org/10.1155/2022/5215722>
- [24] Hu, J. (2024). The Challenge of Traditional Teaching Approach: A Study on the Path to Improve Classroom Teaching Effectiveness Based on Secondary School Students' Psychology. *Lecture Notes in Education Psychology and Public Media*. 50. 213-219. 10.54254/2753-7048/50/20240945.
- [25] Humphreys, D., Koay, A., Desmond, D. et al. AI hype as a cyber security risk: the moral responsibility of implementing generative AI in business. *AI Ethics* (2024). <https://doi.org/10.1007/s43681-024-00443-4>
- [26] Huttangadi, S. (2023). Unlocking Success: the Power of continuous Learning. *LinkedIn*. Available at: <https://www.linkedin.com/pulse/unlocking-success-power-continuous-learning-sunitha-hattangadi/>
- [27] Igbokwe, Innocent. (2023). Application of Artificial Intelligence (AI) in Educational Management. *International Journal of Scientific and Research Publications (IJSRP)*. 13. 300. 10.29322/IJSRP.13.03.2023.p13536.
- [28] Jain S. & Martindale, E.T. (2012). Facilitating Continuous Learning: A review of Research and practice on Individual Earning Capabilities and Organizational Learning environment. Available at: https://members.aect.org/pdf/Proceedings/proceedings12/2012i/12_09.pdf
- [29] Jevana, R. J. (2017). Research on Effective Training Method in Organizations: A Millenials Needs. Available at: https://www.ijiras.com/2017/Vol_4-Issue_5/paper_62.pdf
- [30] Kamalov, F.; Santandreu Calonge, D.; Gurrib, I. (2023) 'New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution. *Sustainability* 2023, 15, 12451. <https://doi.org/10.3390/su151612451>

- [31] Laat, Maarten & Joksimovic, Srecko & Ifenthaler, Dirk. (2020). Artificial intelligence, real-time feedback and workplace learning analytics to support in situ complex problem-solving: a commentary. *The International Journal of Information and Learning Technology*. 37. 267-277. 10.1108/IJILT-03-2020-0026.
- [32] Li L. (2022). Reskilling and Upskilling the Future-ready Workforce for Industry 4.0 and Beyond. *Inf Syst Front*. 2022 Jul 13:1-16. doi: 10.1007/s10796-022-10308-y. Epub ahead of print. PMID: 35855776; PMCID: PMC9278314.
- [33] Mampuru, M, Mokoena, B. & Isabirye, A. (2024). Training and development impact on job satisfaction, loyalty and retention among academics. *SA Journal of Human Resource Management*. 22. 10.4102/sajhrm.v22i0.2420.
- [34] Moffett, E. (2024). Mastering the Balancing Act: Navigating Continuous Learning for Career Development, University of Cambridge. Available at: <https://advanceonline.cam.ac.uk/blog/advance-your-career-with-continuous-and-lifelong-learning>
- [35] Morandini, S., Fraboni, F., De Angelis, M., Puzzo, G., Giusino, D., & Pietrantonio, L. (2023). The impact of artificial intelligence on workers' skills: Upskilling and reskilling in organisations. *Informing Science: The International Journal of an Emerging Transdiscipline*, 26, 39-68. <https://doi.org/10.28945/507>
- [36] Morandini, Sofia & Fraboni, Federico & De Angelis, Marco & Puzzo, Gabriele & Giusino, Davide & Pietrantonio, Luca. (2023). The Impact of Artificial Intelligence on Workers' Skills: Upskilling and Reskilling in Organisations. *Informing Science*. 26. 39-68. 10.28945/5078.
- [37] Mossavar-Rahmani, Farhang & Zohuri, Bahman. (2024). Artificial Intelligence at Work: Transforming Industries and Redefining the Workforce Landscape. 5. 1-4. 10.47363/JESMR/2024(5)213.
- [38] Mukurunge E, Reid M, Fichardt A, Nel M. (2021). Interactive workshops as a learning and teaching method for primary healthcare nurses. *Health SA*. 2021 Dec 10;26:1643. doi: 10.4102/hsag.v26i0.1643. [Accessed: 30th July 2024]
- [39] Nur Fitria, Tira. (2023). Augmented Reality (AR) and Virtual Reality (VR) Technology in Education: Media of Teaching and Learning: A Review. 4. 14-25. 10.29040/ijcis.v4i1.102.
- [40] Ou, Shiyun. (2024). Transforming Education: The Evolving Role of Artificial Intelligence in The Students Academic Performance. *International Journal of Education and Humanities*. 13. 163-173. 10.54097/cc1x7r95.
- [41] Page, M., Moher, D., Bussuyt, P. et al. (2021). PRISMA 2020 explanation and elaboration: Updated guidance and exemplar for reporting systematic reviews., 372.:n160 Available at: doi: <https://doi.org/10.1136/bmj.n160>
- [42] Peters MDJ, Godfrey C, McInerney P. JBI Reviewer's manual. In: wiki.joannabriggs.org [Internet], 2019. Available: <https://wiki.joannabriggs.org/display/MANUAL/Chapter+11%3A+Scoping+reviews>
- [43] Ravichandran, R. & Mahapatra, Jayashree. (2023). Virtual Reality in Vocational Education and Training: Challenges and Possibilities. *Journal of Digital Learning and Education*. 3. 25-31. 10.52562/jdle.v3i1.602.
- [44] Rezaei M. A (2021). Critique of How Workshops Are Held. *Educ Res Med Sci*. 2021;10(1):e119461. <https://doi.org/10.5812/erms.119461>.
- [45] Rinaily, B. (2024). The Skill Gaps challenge: Understanding and Overcoming it. *Shiftbase*. Available at: <https://www.shiftbase.com/glossary/skills-gap>
- [46] Saladi, M. V. (2024). Positive uses of AI in Education -Part 2 (24062024) Submitted AI-Driven Educational Personalization. 10.13140/RG.2.2.30736.83204.
- [47] Samala, Agariadne & Bojic, Ljubisa & Bekiroğlu, Derya & Watrianthos, Ronal & Hendriyani, Yeka. (2023). Microlearning: Transforming Education with Bite-Sized Learning on the Go—Insights and Applications. *International Journal of Interactive Mobile Technologies (ijIM)*. 17. 4-24. 10.3991/ijim.v17i21.42951.
- [48] Serroukh, Semo & Serroukh, Ibrahim. (2022). Traditional teaching method Vs Modern teaching method Traditional teaching method Vs Modern teaching method The traditional way of teaching and learning. Forsetlund L, O'Brien MA, Forsén L, Reinart LM, Okwen MP, Horsley T, Rose CJ. Continuing education meetings and workshops: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2021 Sep 15;9(9):CD003030. doi: 10.1002/14651858.CD003030.pub3. PMID: 34523128; PMCID: PMC8441047.
- [49] Shaheen N, Shaheen A, Ramadan A, Hefnawy MT, Ramadan A, Ibrahim IA, Hassanein ME, Ashour ME, Flouty O. Appraising systematic reviews: a comprehensive guide to ensuring validity and reliability. *Front Res Metr Anal*. 2023 Dec 21;8:1268045. doi: 10.3389/frma.2023.1268045. PMID: 38179256; PMCID: PMC10764628.

- [50] Simons, Pascale & Benders, Jos & Marneffe, Wim & Pijls-Johannesma, Madelon & Vandijck, Dominique. (2015). Workshops as a useful tool to better understand care professionals' Views of a Lean change program. *International Journal of Health Care Quality Assurance*. 28. 64-74. 10.1108/IJHCQA-01-2014-0007.
- [51] Stalph, M. C. and Hill, S. E. (2019). The expectation of Adulting: Developing Soft skills through Active learning classrooms', *Journal of Learnin Spaces*, Vol.,8. Available at: <https://core.ac.uk/download/pdf/234819792.pdf>
- [52] Sung SY, Choi JN. Do organizations spend wisely on employees? Effects of training and development investments on learning and innovation in organizations. *J Organ Behav*. 2014 Apr;35(3):393-412. doi: 10.1002/job.1897. Epub 2013 Sep 9. PMID: 25598576; PMCID: PMC4282068.
- [53] Timsal, Ahmad & Awais, Mustabsar & Shoaib, Omer. (2016). On job Training and Its Effectiveness: An Employee Perspective. *South Asian Journal of Banking & Social Sciences*. 02. [Accessed: 30th July 2024]
- [54] Ulari, N. (2024). Importance of Continuous Learning and Development in the Workplace. *Myrtle Mana Consulting*. Available at: <https://myrtlemcltd.com/insights/people-strategy/the-importance-of-continuous-learning-and-development-in-the-workplace.html>
- [55] Walters, Kelley & Rodriguez, Joel. (2017). The Importance of Training and Development in Employee Performance and Evaluation.
- [56] Walters, Kelley & Rodriguez, Joel. (2017). The Importance of Training and Development in Employee Performance and Evaluation. Ra, S., Shrestha, U., Khatiwada, S., Yoon, S. W., & Kwon, K. (2019). The rise of technology and impact on skills. *International Journal of Training Research*, 17(sup1), 26–40. <https://doi.org/10.1080/14480220.2019.1629727>
- [57] Wang, Y. (2022) A Comparative Study on the effect of traditional and Modern Teaching Method. file:///C:/Users/dell/Downloads/125983137.pdf
- [58] Wang, Yuemeng. (2022). A Comparative Study on the Effectiveness of Traditional and Modern Teaching Methods. 10.2991/978-2-494069-89-3_32.
- [59] Wut TM, Xu J. Person-to-person interactions in online classroom settings under the impact of COVID-19: a social presence theory perspective. *Asia Pacific Educ. Rev*. 2021;22(3):371–83. doi: 10.1007/s12564-021-09673-1. Epub 2021 Feb 4. PMCID: PMC7861159.
- [60] Xiao, Y., & Watson, M. (2019). Guidance on Conducting a Systematic Literature Review. *Journal of Planning Education and Research*, 39(1), 93-112. <https://doi.org/10.1177/0739456X17723971>
- [61] Xu, Zhiyi. (2024). AI in education: Enhancing learning experiences and student outcomes. *Applied and Computational Engineering*. 51. 104-111. 10.54254/2755-2721/51/2024118