

The Role of Technology in Employee Training and Development: A Systematic Review of Recent Advances and Future Directions

Peran Teknologi dalam Pelatihan dan Pengembangan Karyawan: Tinjauan Sistematis atas Kemajuan Terkini dan Arah Masa Depan

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ABSTRACT

This systematic review explores the role of technology in employee training and development, focusing on its impact on training effectiveness and organizational growth. Through analysis of various literature, this research identifies technology adoption in training as a key factor in enhancing accessibility, personalization, and efficiency of the learning process. Furthermore, findings highlight the role of mediating factors such as technological competence, organizational support, and employee motivation in strengthening the relationship between technology adoption and training effectiveness. Practical and theoretical implications of these findings are outlined, along with recommendations for further development in this domain.

Keywords: technology, employee training, human resource development, training effectiveness, technology adoption.

ABSTRAK

Tinjauan sistematis ini mengeksplorasi peran teknologi dalam pelatihan dan pengembangan karyawan, dengan fokus pada dampaknya terhadap efektivitas pelatihan dan pertumbuhan organisasi. Melalui analisis terhadap sejumlah literatur, penelitian ini mengidentifikasi adopsi teknologi dalam pelatihan sebagai faktor kunci dalam meningkatkan aksesibilitas, personalisasi, dan efisiensi proses pembelajaran. Selain itu, temuan menyoroti peran faktor mediasi seperti kompetensi teknologi, dukungan organisasi, dan motivasi karyawan dalam memperkuat hubungan antara adopsi teknologi dan efektivitas pelatihan. Implikasi praktis dan teoretis dari temuan ini diuraikan, serta rekomendasi untuk pengembangan lebih lanjut dalam domain ini.

Kata Kunci: teknologi, pelatihan karyawan, pengembangan sumber daya manusia, efektivitas pelatihan, adopsi teknologi.

Introduction

Employee training is a fundamental aspect of enhancing organizational performance and fostering innovation. Research has shown that investing in training leads to improved learning, adaptation to new tasks, and increased openness to innovative ideas among employees (Sung & Choi, 2013). Furthermore, training contributes to the development of firm-specific technological competence by enhancing employees' skills, abilities, and knowledge necessary for innovation (Kim & Lee, 2021). The integration of educational technology into workplace training has been demonstrated to enhance competency development among employees, thereby promoting organizational growth (Zhang et al., 2023).

In the realm of technology, the acceptance of competency-based e-learning systems is influenced by perceived individual and social learning support, underscoring the significance of technology in modern training approaches (Cheng et al., 2011). Additionally, the effectiveness of training during technological changes is evident, with the 70-20-10 training model being

recognized as effective in preparing employees for independent implementation of technological changes (Baroudi et al., 2018). Moreover, the COVID-19 pandemic has accelerated the adoption of e-learning methods, emphasizing the role of technology in ensuring continuous training and development for employees (Lytovchenko et al., 2022).

To optimize the benefits of technology in employee training, organizations should provide ongoing digital literacy training and equip employees with information technology resources to facilitate the utilization of digital learning materials (Klassen, 2019). Additionally, the use of educational technologies can enhance employees' learning motivation and satisfaction, ultimately improving training effectiveness in the workplace (Chow & Yeh, 2022). Overall, technology plays a vital role in modern employee training, enabling organizations to adapt to changing environments, foster innovation, and enhance employee performance.

Employee training is very important in the ever-changing business world. The employee training paradigm has undergone major changes as a result of the emergence of technology. It's important to conduct a thorough analysis of how technology impacts the quality of employee training. The primary goal of this review is to dig deeper into how technology impacts various aspects of employee training across a variety of industries and organizational environments. In this research, we aim to understand the different types of technology used in employee training, such as e-learning platforms, virtual simulations, and learning management systems. We also wanted to know the factors that influence the adoption and application of technology in employee training and its impact on productivity, knowledge and skills retention rates, and general employee performance. It is hoped that we can provide a deeper understanding of how technology correlates with employee training effectiveness to help stakeholders in various organizations improve their training strategies.

The integration of technology in employee training and development is a critical area of focus in modern organizational practices. As businesses evolve and the pace of technological change accelerates, the need for continuous upskilling and adaptive learning becomes paramount. This synthesis examines the role of technology in enhancing training programs, fostering employee engagement, and facilitating the development of skills in the workplace.

Personalization and Engagement in Training: The majority of HR and training professionals recognize the need for personalized learning experiences and high employee engagement in training programs, with AI being identified as a potential driver for these aspects (Maity, 2019). **Support for Technology Adoption:** Structural equation analyses suggest that technology training supports employees' acceptance and preparation for new software, with beliefs about resources mediating the relationship between training and intention to use technology (Marler, et al. 2006). Advanced technology is now a tool for HRD professionals to support learning at work, enhance job performance, and facilitate organizational development and change (Benson, et al. 2002). Rapid technological changes necessitate that employees master complex technical skills, with training becoming central to organizational operations (Derouen, et al. 1994). Training and Development functions aim to improve employees' skills and update their knowledge, thereby increasing organizational productivity (Raheja, 2015). HRD and HRM professionals must understand the competencies needed to achieve harmony between people and technology use in the workplace (Hughes, et al. 2019). HR technology and e-practices are instrumental in making training more efficient, with a focus on the types of technology that can improve training quality (Batool, et al. 2021). New technologies impact the work system by enhancing the employee's ability to develop skills and knowledge conducive to professional activities (Nowastowska, et al. 2019). Digital HRM transforms traditional training into flexible, personalized learning journeys, emphasizing self-paced learning and feedback for long-term effectiveness (Nhung, 2023).

The role of technology in employee training and development is multifaceted, encompassing the personalization of learning experiences, support for technology adoption, and the enhancement of job performance. AI and digital HRM tools are pivotal in transforming

training into continuous, employee-led learning journeys. Organizations are increasingly recognizing the importance of integrating technology to keep pace with rapid changes and to develop a skilled, adaptable workforce. The synergy between human resource development and technology is essential for fostering a culture of continuous improvement and organizational success. Various technologies are employed in employee training and development to enhance learning outcomes. Artificial Intelligence (AI) analyzes individual performance, tailoring training programs to address specific strengths and weaknesses. Virtual and Augmented Reality (VR/AR) create immersive environments for skill practice in a safe setting. Chatbots provide real-time assistance, simulating customer interactions during training sessions. Learning Management Systems (LMS) streamline content delivery, ensuring accessibility and convenience. Collaborative Learning Platforms powered by AI foster knowledge sharing among employees. Continuous Learning Platforms enable access to training materials round the clock. While these technologies offer significant benefits, their integration should be balanced with human interaction and skill-building efforts for effective implementation (Ponomareva, et al. 2022).

A problematic phenomenon that often occurs related to the role of technology in employee training and development is the digital skills gap between team members. Although technology offers great opportunities to improve the quality of employee training and development, not all individuals have a sufficient level of digital skills to make optimal use of it. This phenomenon often arises due to several interrelated factors. First, some employees may experience limited access and sufficient technological skills to use digital learning platforms well (Marsh, 2018). Additionally, there are also feelings of discomfort or anxiety about new technology that may hinder active participation in online training (Fuller, et al. 2006). Difficulties can also be felt by employees from older generations who may not have the same experience in digital environments as younger generations. Lack of support and training from organizations can also exacerbate this problem, as there is not enough effort to help employees overcome technology-related barriers (Olphert, et al. 2013; Andrews, et al. 2018). In addition, rapid technological change is also a challenge in itself, because employees need to continuously update and improve their digital skills in accordance with technological developments (Bartel, et al. 1995; Matei, et al. 2023; Saleh, et al. 2019; Saputra, et al. 2021). Finally, differences in preferences in learning methods may also influence the acceptance of technology in employee training, with some individuals preferring traditional approaches or direct face-to-face interactions (Sumak, et al. 2011; Hsia, et al. 2014; Cheng, 2012). Therefore, the digital skills gap among employees is one of the main obstacles that organizations need to overcome to ensure the successful use of technology in the context of employee training and development.

Studying the impact of technology on employee training and development is critical to human resource management. The goal is to gain a thorough understanding of how the application of technology affects the effectiveness and productivity of training programs in a variety of businesses. The goal is to identify various technologies used in training settings, such as e-learning platforms, virtual simulations, and mobile applications, and assess their impact on factors, such as information and skills retention, employee engagement, and overall team productivity. The study also investigates the difficulties and barriers that may arise when implementing technology in training programs, and offers successful solutions to overcome them. This research aims to offer practical assistance to human resource managers and training practitioners, thereby enabling them to increase the effectiveness of their training programs and ultimately improve organizational performance in the digital era.

Research Methods

Research that uses a systematic literature review approach in exploring the topic "The Role of Technology in Employee Training and Development: A Systematic Review of Recent

"Advances and Future Directions" follows a series of structured steps. First, researchers established clear goals and specific research questions regarding the use of technology in employee training and development. Then, a literature search was carried out in various international databases such as PubMed, IEEE Xplore, Scopus, and Web of Science using a number of relevant keywords such as "technology in employee training", "e-learning in the workplace", and others. Relevant articles were then selected using predetermined inclusion and exclusion criteria, evaluating their quality and relevance to the research topic. Once appropriate articles were selected, data from each article was extracted and synthesized to understand key findings and trends in the use of technology in employee training. Finally, a systematic report is prepared, including a summary of findings, identification of gaps in research, and recommendations for future research. Through this approach, the research is expected to provide comprehensive insight into the role of technology in employee training and development and highlight promising research directions for the future.

Results and Discussions

Basic Concepts of Employee Training

1. Definition of employee training and its importance in human resource development

Employee training is an essential component of organizational human resource development. The training and development programs are customized to enhance employees' knowledge, abilities, competences, attitudes, and behaviors, resulting in improved performance (Jeni et al., 2021). The objective of human resource development is to enhance the competences, dynamism, motivation, and effectiveness of employees, with the ultimate goal of improving organizational efficiency and effectiveness (Chalise, 2020; Hakuduwal, 2019). Training is recognized as a means to improve the abilities of employees for specific work positions, resulting in higher production and performance (Bamidele et al., 2013; Shelley, n.d.).

Moreover, the provision of training and development is of utmost importance in creating a favorable atmosphere for the exchange of information among employees, which is vital for the advancement and prosperity of the business (Ooi et al., 2010). Studies suggest that human resource procedures, including recruitment, training, performance appraisal, career planning, and compensation, have a strong correlation with the overall success of a firm (Amin et al., 2014). In addition, offering training opportunities that are tailored to meet the specific needs of employees can enhance their level of commitment and general effectiveness in their work (Ahmed et al., 2019).

Employee retention within a firm is strongly influenced by the investment made in employee training and career development (Asif & Nisar, 2022). The promotion of environmentally friendly practices among employees, known as green training, is acknowledged as a crucial component of employee development (Mayangsari et al., 2021). Furthermore, the importance of fostering a training culture within an organization is emphasized as a vital component in creating successful strategies for training and development programs (Polo et al., 2018).

Employee training is an essential component of human resource development that improves both individual employee performance and overall corporate effectiveness. Organizations may foster a motivated and skilled staff that enhances productivity and innovation by providing ongoing learning and skill development opportunities.

2. Factors influencing the effectiveness of employee training

Various factors that impact the efficacy of employee training cover a multitude of elements that businesses must take into account in order to improve training results. A study conducted by Mahmood et al. (2018) highlights the significance of various elements, including the quality of products or services, organizational profitability, employee motivation and efficiency, competency levels, reduced wastage, and employee work satisfaction, in enhancing

the effectiveness of training. Moreover, research conducted by Hajjar & Alkhanaizi (2018) and Sanjeevkumar & Hu (2011) emphasize the importance of demographic factors, individual traits, and the correlation between training activities and employee productivity.

Furthermore, the study conducted by Kadarningsih et al. (2020) highlights the significance of organizational citizenship behavior (OCB) in enhancing employee performance. It emphasizes that factors such as training, work environment, and OCB have a direct impact on employee performance. Memi & Murni (2019) provide additional details on how the selection and training process affects competency and employee performance, highlighting the significance of training techniques and objectives.

Moreover, the studies conducted by Purworusmiardi et al. (2021) and Amir et al. (2022) highlight the impact of employee orientation, work discipline, leadership style, and job training on improving employee performance. Furthermore, research conducted by Jalil et al. (2019) and Hidayat & Aziz (2022) provides evidence of the beneficial impact of training and work discipline on employee performance.

Ultimately, the efficiency of employee training hinges on various aspects, including the levels of competency, demographic demographics, organizational citizenship behavior (OCB), training methodologies, work discipline, and leadership styles. Organizations must thoroughly evaluate these variables in order to develop and execute training programs that optimize employee performance and contribute to overall organizational success.

The Evolution of Technology in Employee Training

1. Technological developments and transformation of employee training

Technological advancements have significantly impacted employee training and development. Studies have shown that digital transformations necessitate updating employees' skills to manage their careers effectively (Kaveri, 2013). Implementing transformational training programs not only enhances employees' loyalty but also improves their orientation towards quality, ultimately benefiting the organization (Qudah et al., 2018). Furthermore, the use of technology-enhanced training positively influences both training effectiveness and employee development (Batoool et al., 2021).

Training plays a crucial role in preparing employees for technological changes within organizations. The 70-20-10 training model has been identified as effective in helping employees independently implement technological changes (Baroudi et al., 2018). Additionally, continuous learning frameworks contribute to transforming employees into active learners within advanced technological environments (Billiot, 2023). Moreover, training programs create awareness among employees for the use of new technologies, thereby enhancing their performance (Khan et al., 2016).

Employee training is essential for enhancing organizational competitiveness and achieving a competitive advantage. Training programs facilitate employee learning, increase knowledge, skills, and abilities (KSA's), and improve overall performance and productivity, leading to a competitive edge (S & Gomathi, 2015). Furthermore, training helps employees acquire advanced technological skills and competencies necessary to handle new technical equipment effectively ("Visualization in Learning as a Factor in the Development of Motivation for Self-education of Adults", 2022).

In conclusion, the integration of technological advancements in employee training is crucial for organizational success. By investing in transformational training programs, utilizing technology-enhanced training methods, and adopting continuous learning frameworks, organizations can ensure that their employees are well-equipped to adapt to technological changes, enhance their performance, and contribute to the overall success of the organization.

2. Types of technology used in employee training

Employee training in organizations today heavily relies on various types of technology to enhance learning outcomes and improve performance. Information and Communication Technology (ICT) plays a significant role in training employees, as evidenced by studies showing its popularity and positive impact on training effectiveness (Volfová, 2022). Web-based training systems are being widely accepted by employees, with factors like system flexibility and interactivity influencing their acceptance (Alrawashdeh & Al-Mahadeen, 2013). Moreover, the use of simulation training, such as role-playing simulations, provides employees with hands-on experience in real-life situations to enhance their skills and decision-making abilities (Elmohandes et al., 2018).

Training employees to use new technologies is crucial for organizational success, as highlighted by research emphasizing the positive effects of strategic training on employee performance and innovation (Oketch & Muathe, 2022). Additionally, the integration of technology training has been shown to improve employees' acceptance and readiness for using mandated technology systems (Marler et al., 2006). Furthermore, the 70-20-10 training model has been identified as effective in preparing employees to independently implement technological changes, as suggested by managers and employees in various organizations (Baroudi et al., 2018).

Training not only enhances job satisfaction and employee morale but also increases efficiency, innovation, and the capacity to adopt new technologies and methods (Ocen et al., 2017). Organizations are increasingly investing in training and development to foster learning and innovation among employees, ultimately driving organizational growth and sustainability (Sung & Choi, 2013). By integrating technology-supported learning in professional development strategies, organizations can achieve long-term employee outcomes that align with technological advancements (Billiot, 2023).

In conclusion, the use of technology in employee training is a critical aspect of modern organizational development, enabling employees to adapt to technological changes, enhance their skills, and drive innovation within the organization.

3. The advantages of technology in facilitating employee training

Technology plays a crucial role in enhancing employee training by providing numerous advantages. Firstly, technology-enhanced training has a positive impact on both training effectiveness and employee development (Batoool et al., 2021). It allows for the integration of digital resources to supplement traditional training methods, leading to improved learning outcomes (Paine & Chand, 2021). Moreover, technology-based training not only increases employee knowledge, skills, and abilities but also enhances performance and productivity (S & Gomathi, 2015). This is supported by the fact that training is recognized as a means to cope with technological innovations and market competition, ultimately improving employee performance (Landa, 2018).

Furthermore, the use of technology in training programs can lead to increased perceived organizational support, as it communicates an investment in employees (Rhoades & Eisenberger, 2002). Additionally, technology enables the encoding of subject knowledge and teaching skills into software, allowing for personalized and innovative training approaches (Chen, 2022). The benefits of technology-based training extend beyond the traditional advantages, offering cost-efficiency, effectiveness, and reduced risks in training-related activities (Grassini et al., 2020).

In the context of employee development, technology facilitates the adoption of environmentally friendly practices through training programs (Omara et al., 2020). It also plays a significant role in improving cognitive performance, especially in elderly individuals, through virtual training scenarios (Wirzberger et al., 2019). Moreover, the integration of technology in

training programs for fields like couple and family therapy enhances clinical competence and prepares students for utilizing technology in their professional work (Sampson et al., 2021).

In conclusion, technology serves as a powerful tool in modern employee training, offering benefits such as improved learning outcomes, increased performance, personalized training approaches, and enhanced support for employees. By leveraging technology in training initiatives, organizations can effectively prepare their workforce to adapt to technological advancements, improve productivity, and stay competitive in the ever-evolving business landscape.

The Influence of Technology on the Effectiveness of Employee Training

1. Increased accessibility and flexibility of training through technology

Technology has significantly impacted the effectiveness of employee training by enhancing accessibility and flexibility. Studies have shown that technological advancements positively influence leadership styles, which in turn affect employee motivation and performance (Mpody et al., 2020). Training, especially through e-learning, has been proven to contribute to organizational commitment, employee retention, and overall organizational effectiveness (Kadiresan et al., 2015). Moreover, technological advancements have a significant impact on motivating and training employees, leading to improved performance in various sectors such as banking (Imran et al., 2014).

Empirical evidence suggests that technological change has a positive influence on employer-provided training, indicating that technology plays a crucial role in shaping training practices (Campaner et al., 2022). Training orientation, organizational support, and training satisfaction are interconnected, with training directly and indirectly influencing employee satisfaction and perceived value of training (To, 2023). Furthermore, R&D employee training has been identified as an effective way to enhance the impact of technological knowledge on research and development productivity (Kim & Lee, 2021).

Studies have also explored how training effectiveness during technological changes is influenced by training program characteristics and employees' motivation to learn (Baroudi et al., 2018). The acceptance and use of new technology by employees are enhanced through training, leading to increased willingness to adopt new technologies (Rubel et al., 2019). Additionally, technological advancements have been linked to improved employee performance through enhanced motivation and training (Jumanne & Njoroge, 2019).

In conclusion, the integration of technology in employee training programs has revolutionized the way organizations approach skill development and performance enhancement. By leveraging technology, organizations can provide more accessible, flexible, and effective training opportunities for their employees, ultimately leading to improved motivation, performance, and overall organizational success.

2. The role of technology in increasing employee engagement and information retention

Technology plays a crucial role in enhancing employee engagement and information retention in training programs. Research by Alnoor et al. (2019) emphasizes the significance of training in boosting employees' confidence in utilizing new technologies effectively to achieve organizational objectives. Furthermore, the study by Kim (2023) highlights the importance of employees' comfort with newer technologies and the perceived effectiveness of online courses in predicting retention in the digital era. These findings underscore the positive impact of technology on employee training outcomes.

Moreover, the study by Renaud et al. (2015) indicates that HRM practices such as training and development significantly contribute to enhancing employee retention. This suggests that incorporating technology into training programs can lead to improved retention rates. Additionally, the research by Priyashantha et al. (2022) suggests that promoting

employee engagement through technology disruptions in HRM can positively influence employee commitment.

Furthermore, Gaber (2021) discusses how technology utilization can enhance employee engagement, emphasizing its role in improving work engagement among healthcare workers. This highlights the broader applicability of technology in various sectors to boost employee engagement and retention.

In conclusion, the synthesis of these references underscores the positive influence of technology on employee training effectiveness, engagement, and retention. By leveraging technology in training programs, organizations can enhance employee skills, confidence, and overall commitment, leading to improved performance and retention rates.

3. The impact of technology on the transfer of skills from training to the workplace

The impact of technology on the transfer of skills from training to the workplace is a critical aspect to consider in modern organizational settings. Research by Dixit & Sinha (2022) highlighted that while conventional tools like reading materials are used for workplace training, technology-led tools such as WhatsApp learning chat groups, e-learning platforms, and mobile learning applications were found to be less effective in facilitating the transfer of training to the workplace. This suggests that the type of tools and techniques employed in training programs can influence the effectiveness of skill transfer.

Moreover, Gashi et al. (2010) discussed how technological advancements in the workplace can lead to an increased demand for skills, prompting a higher provision of training. This indicates that as technology evolves, the need for continuous training to transfer new skills to the workplace becomes more pronounced.

Additionally, research by Na-Nan et al. (2017) emphasized the importance of the workplace environment in facilitating the transfer of training. They noted that a conducive workplace climate plays a significant role in enabling employees to apply the knowledge and skills acquired during training in their day-to-day tasks. This underscores the significance of not only the training content but also the organizational context in ensuring successful skill transfer.

In conclusion, the interplay between technology, workplace environment, and training methods significantly influences the transfer of skills from training programs to the workplace. Organizations need to leverage appropriate tools, consider the impact of technological changes, and foster supportive workplace climates to enhance the effectiveness of skill transfer and ultimately improve employee performance.

Challenges and Limitations of Using Technology in Employee Training

1. Barriers and challenges in adopting technology for employee training

In the realm of technology adoption for employee training, various challenges and barriers have been identified in the literature. Leesakul et al. (2022) highlight job displacement, employee acceptance, trust, and privacy as inherent challenges in technology adoption. Ismail et al. (2021) point out challenges related to hardware upgrades, lack of clear guidelines, training provision, and high costs as barriers to adopting Building Information Modeling (BIM). Additionally, Javaid et al. (2022) mention poor infrastructure, high technology costs, and fear of unemployment as major barriers to adopting modern technologies.

Moreover, Drewry et al. (2022) discuss barriers such as attracting qualified IT employees, training needs for employees and clients, and data security concerns in the adoption of digital technologies. Yehualashet et al. (2021) emphasize barriers like lack of EMR training, limited computer access, poor computer literacy, and inadequate technical support in the adoption of Electronic Medical Record (EMR) systems. Leite et al. (2019) suggest that cultural and technical barriers can be overcome through investment in employee training and acquiring more efficient machines.

Furthermore, Hashim (2008) identifies barriers faced in web-based training adoption by employers and employees. Gupta et al. (2017) discuss challenges faced by government employees in adopting e-government, including administrative, technological, and infrastructural issues, lack of trust in computer applications, security concerns, and the digital divide. Purnomo & Kusnandar (2018) mention cultural barriers, lack of training availability, limited technical support, and awareness issues as hindrances to the acceptance of information and communication technology in agricultural extension in Indonesia.

In conclusion, the literature underscores a range of barriers to technology adoption for employee training, encompassing issues related to job displacement, acceptance, trust, privacy, hardware upgrades, lack of guidelines, training provision, high costs, infrastructure, fear of unemployment, attracting qualified IT employees, training needs, data security, EMR training, computer access, literacy, technical support, cultural barriers, and awareness issues. Addressing these challenges is crucial for successful technology integration in training programs.

2. Possible limitations in the application of technology in the context of employee training

In the context of employee training, the application of technology can face several limitations. One key limitation is the need for employees to be well-trained to effectively utilize new technologies for innovation and productivity (Oketch & Muathe, 2022). Additionally, the trap of path dependency can hinder the optimal utilization of firm-specific technological knowledge, emphasizing the importance of continuous training for R&D employees to enhance productivity (Kim & Lee, 2021). Moreover, creating a conducive training climate is crucial for ensuring that employees engage in trained behaviors on the job (Colquitt et al., 2000).

Furthermore, older employees in sectors like healthcare may require specialized training on healthcare information systems, necessitating a well-organized and managed training process that considers their unique needs and experiences with technology (Mantzana et al., 2010). It is also essential to address technological illiteracy among employees, especially younger generations who may be proficient in using technology for personal purposes but lack skills in applying it effectively in a business context (Pfaltzgraf & Insch, 2021).

Moreover, the effectiveness of training during technological changes has been highlighted, with the 70-20-10 training model being recommended for preparing employees to independently implement technological advancements (Baroudi et al., 2018). Organizations must develop training systems that encourage cooperation among employees to bridge knowledge gaps and enhance technology adoption (Altwijri & Aldosemani, 2022). Additionally, integrating technological advancements into training programs can significantly impact employee motivation and performance (Imran et al., 2014).

In conclusion, while technology offers numerous benefits for employee training, addressing factors such as age-related training needs, technological literacy, and creating a supportive training environment are crucial to maximizing the effectiveness of technology in training initiatives.

Strategies and Recommendations for Increasing the Effectiveness of Employee Training through Technology

1. Strategies for overcoming challenges and limitations faced in the use of technology

To address challenges and limitations in the effective use of technology, various strategies have been identified in the literature. These strategies encompass having a shared vision and technology integration plan, overcoming resource scarcity, changing attitudes and beliefs, conducting professional development, and reconsidering assessments (Hew & Brush, 2006). Critical reflection is also recommended for social workers to understand clients' capabilities and risks associated with technology use (Pascoe, 2021). Moreover, the adoption of

assistive technology can be improved by considering factors influencing acceptance based on a designed survey (Shehri et al., 2022).

Furthermore, ensuring equitable technology deployment can help bridge gaps, such as disparities in telehealth use among individuals with limited English proficiency (Rodriguez et al., 2021). Strategies like awareness raising, community-level service delivery, collaboration, and consideration of cultural factors can address the assistive technology needs of vulnerable groups (Borg & Östergren, 2014). Additionally, efforts to enhance patient safety through smart pump technology have been implemented in healthcare settings (Makic, 2015).

It is essential to recognize the interplay between teachers' beliefs and pedagogical change to effectively integrate technology in classrooms (Salleh, 2016). Additionally, technology can significantly contribute to creating resilience in micro-businesses during challenging times like the Covid-19 pandemic (Gandoriah et al., 2022).

In conclusion, by implementing these strategies, considering technology acceptance factors, addressing disparities, and promoting awareness and collaboration, it is feasible to overcome challenges and limitations in technology use across various domains.

2. Practical recommendations for organizations in effectively utilizing technology in employee training

To effectively utilize technology in employee training, organizations can consider several practical recommendations based on research findings. Firstly, integrating technology-supported learning (TSL) into professional development and training strategies can enhance employee outcomes and help organizations adapt to technological advancements (Billiot, 2023). Secondly, implementing the 70-20-10 training model, which emphasizes experiential learning, social learning, and formal education, can effectively prepare employees to independently implement technological changes during training programs (Baroudi et al., 2018).

Moreover, organizations should focus on providing knowledge-based training and development to enhance employee innovative behavior, especially to bridge the gap caused by using outdated methods and technology (Abrar, 2021). Additionally, employers can help employees transition from technological illiteracy to proficiency by building software skills, fostering a culture of continuous learning through digitally focused training programs, and applying design thinking in business settings (Pfaltzgraf & Insch, 2021).

Furthermore, R&D employee training plays a crucial role in reinforcing the utilization of technological knowledge, offsetting potential limitations due to path dependency and depleting technological opportunities (Kim & Lee, 2021). It is essential for organizations to understand the impact of employee perceptions of training on organizational commitment and turnover intentions, especially in multinational corporations, to enhance employee retention and engagement (Newman et al., 2011).

In conclusion, by considering these recommendations and insights from research studies, organizations can develop effective strategies to leverage technology in employee training, fostering a culture of continuous learning, innovation, and organizational growth.

Research Framework

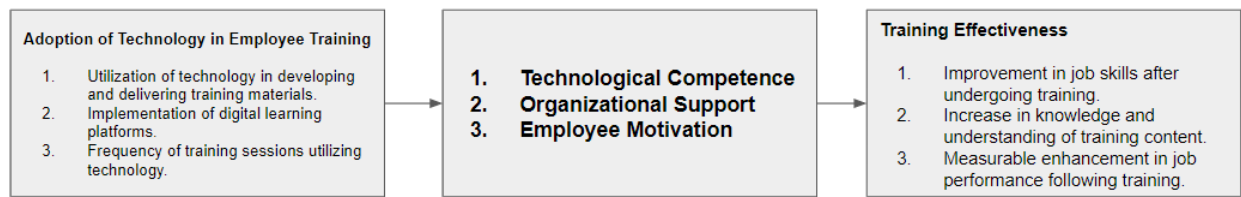


Figure 1 Research Framework

Hypothesis:

H1: The adoption of technology in employee training has a positive influence on training effectiveness, which is reflected in improving employee skills, knowledge and performance in the workplace.

H2: Factors such as technological competence, organizational support, and employee motivation mediate the relationship between technology adoption and training effectiveness.

Conclusion

Overall, this systematic review comprehensively examines the role of technology in employee training and development, highlighting its significance in enhancing organizational effectiveness. A literature synthesis revealed several key findings:

1. **Technology Adoption and Training Effectiveness:** Technology adoption in employee training positively influences training effectiveness by providing innovative learning platforms, increasing accessibility, and facilitating personalized learning experiences.

2. **Mediating Factors:** Technological competence, organizational support, and employee motivation mediate the relationship between technology adoption and training effectiveness. These factors play an important role in shaping employee perceptions, skills, and engagement in technology-based training initiatives.

3. **Organizational Implications:** Organizations should invest in technology infrastructure, provide adequate support, and foster a culture of continuous learning to maximize the benefits of technology in employee training. Additionally, overcoming challenges such as technological literacy and resistance to change is critical to successful implementation.

4. **Future Directions:** Future research should focus on exploring emerging technologies such as virtual reality, artificial intelligence, and augmented reality in employee training. Additionally, longitudinal studies examining the long-term impact of technology adoption on organizational performance are urgently needed.

Overall, this systematic review emphasizes the importance of integrating technology into employee training and development initiatives to increase organizational competitiveness, foster employee growth, and drive continued success in the digital era.

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