

## **Personalized Learning in the Workplace: Bridging the Gap Between AI and Human Development**

### **Introduction**

Imagine a world where every learner, regardless of their background or current skill level, receives an education tailored to their unique needs and interests. A world where learning isn't a one-size-fits-all experience, but a dynamic, responsive journey that adapts to the individual. The vision of personalized learning is a dream that has captivated educators and innovators for centuries. As I write this review I find myself drawn into a historical narrative that reveals how the current emphasis on personalization in corporate education is not a sudden emergency, but rather the latest chapter in a long and complex story of educational evolution.

### ***History***

The concept of personalized learning, discussed as a modern pedagogical breakthrough, has deep historical roots, reflecting a centuries-old aspiration to cater to individual learner variability (Dockterman, 2018). Early attempts, like John Lancaster's Monitorial System in the 19th century, organized students by competence for self-paced, mastery-based learning (Dockterman, 2018).

The 20th century saw efforts to mechanize instruction. Sidney Pressey's Automatic Teacher in the 1920s aimed to automate testing and provide immediate feedback, influenced by behavioral psychology and efficiency (Brass & Lynch, 2020; Tursunkulova, 2022). Though it failed, B.F. Skinner revived teaching machines in the 1950s with programmed instruction, emphasizing self-pacing and immediate feedback (Brass & Lynch, 2020; Tursunkulova, 2022). This also declined due to inconsistent results and concerns about dehumanization (Brass & Lynch, 2020).

Despite setbacks, individualized instruction persisted. The mid-20th century saw renewed interest in non-age-graded schools and early computer-based instruction, with concepts like Aptitude Teaching Interaction (ATI) focusing on matching instruction to learner differences (Dockterman, 2018). Today, personalized learning has re-emerged, driven by digital technology and private funding. New efforts focused on personalized learning integrates big data, algorithms, and commercial practices, allowing extensive behavioral tailoring (Brass & Lynch, 2020). The journey from early ideals to modern AI-driven platforms highlights a continuous, challenging pursuit of tailored education.

### ***Definition of Key Terms***

The field of personalized learning (PL) lacks definition consensus, often serving as an umbrella term for various strategies addressing individual learning attributes (Shemshack & Spector, 2020; Walkington & Bernacki, 2020; Nguyen & Nguyen, 2023). The U.S. Department of Education defines PL as instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner, emphasizing meaningful, interest-driven and self-initiated activities (Hughey, 2020; Walkington & Bernacki, 2020).

Related terms used interchangeably include:

- **Adaptive Learning.** Technology-driven systems that dynamically adjust content or paths based on learner profiles and real-time interactions (Shemshack & Spector, 2020; Su et al., 2011; Tang et al., 2019; Peng & Fu, 2022).
- **Individualized Instruction.** Focuses on tailoring learning pace (Shemshack & Spector, 2020; Hughey, 2020).
- **Differentiated Instruction.** Varies teaching methods and content for diverse learners within a group (Shemshack & Spector, 2020; Walkington & Bernacki, 2020).

- **Customized Learning.** Emphasizes tailoring instructional methods and content to unique learner characteristics and goals (Shemshack & Spector, 2020).

Walkington and Bernacki (2020) propose three dimensions for PL; Depth (authenticity of experiences), Grain Size (individual, small group, or large population), and Ownership (learner control). These varying conceptualizations highlight PL's complexity. The interchangeable use of terms makes it difficult to unify research and practical implementation (Shemshack & Spector, 2020; Walkington & Bernacki, 2020).

### ***Problem Definition***

Corporate learning often struggles with effective employee development. Traditional one-size-fits-all training leads to slow production cycles, duplication, and disconnected experiences, resulting in inequitable development (Alamri et al., 2020). The rapidly changing work landscape, driven by global technological disruption, demands continuous lifelong learning (Beier et al., 2025). However, corporate structures struggle to adapt. Common barriers include lack of time, heavy workloads, insufficient financial resources, inadequate technology, and accessibility issues (Crouse et al., 2011). These constraints prevent agile, responsive learning in dynamic professional settings.

### ***Gap and Challenges***

Optimizing learning for diverse adult populations in professional contexts is a significant challenge (Barrera Castro et al., 2025), its implementation faces considerable, persistent hurdles beyond corporate settings. Uncertainty about the future of work, including job security and skill obsolescence, creates psychological barriers, leading to lower intrinsic motivation and disengagement (Mishra & Hill, 2025). Organizations may respond with budget cuts and short-term solutions, undermining long-term development (Mishra & Hill, 2025). This highlights

a conflict where learner anxiety can counteract personalized learning's benefits. Despite AI's transformative potential, the field still struggles with fundamental implementation barriers, shifting from technological to more complex pedagogical and psychological hurdles (Barrera Castro et al., 2025; Chen & Wang, 2021). Effective personalization requires the broader educational ecosystem to adapt holistically to individual differences.

### ***Research Question***

The central aim of this literature review is to answer the question: What does literature say about personalized learning in corporate education? Addressing this question is crucial for understanding how personalized learning can be effectively applied within professional settings, especially given the evolving demands of the modern workforce and the persistent challenges in traditional corporate training.

### ***Search Method and Process***

The literature discovery and review followed a systematic, phased approach, inspired by the four-phase PRISMA guidelines. This ensured a comprehensive and rigorous collection of scholarly research. The process involved initial broad searches, refinement using inclusion and exclusion criteria, and qualitative review of the quality of methodology used, culminating in a definitive set of included studies.

The primary databases used were: Primo, ERIC, Journal of Research on Technology in Education, and Google Scholar.

The search strings includeD:

- “personalized learning” AND “corporate” NOT “university, degree, higher education, academic, school, classroom”
- “personalized learning” AND “workplace learning”

- “adaptive learning” AND “learner models”
- “individualized instruction” AND “adults” NOT “university, degree, higher education, academic, school, classroom”

Articles were primarily included if they focused on personalized learning, adaptive learning, individualized instruction, or customized learning within a corporate or adult learning context. Initial exclusions targeted K-12 and higher education. However, due to the limited corporate-specific literature, some articles from K-12 or higher education were included when their theoretical or practical insights were transferable to the corporate environment. This pragmatic adjustment ensured a sufficiently comprehensive overview.

### **A Thematic Synthesis of Personalized Learning: Debates, Design Strategies, and Outcomes**

Building on foundational definitions, the literature on personalized learning (PL) often uses terms like adaptive learning, individualized instruction, and customized learning interchangeably, despite subtle distinctions (Shemshack & Spector, 2020; Su et al., 2011; Walkington & Bernacki, 2020). Adaptive learning is a technology-driven subset, where systems dynamically adjust content or paths based on learner profiles and real-time interactions, using algorithms and data analysis (Shemshack & Spector, 2020; Su et al., 2011; Tang et al., 2019; Peng & Fu, 2022).

Individualized instruction focuses on tailoring pace, while differentiated instruction varies methods for groups. Customized learning emphasizes bespoke content. The corporate environment often blends these, leveraging technology for adaptive delivery while considering individual roles and career pathways (Alamri et al., 2020; Fake & Dabbagh, 2020).

#### ***Themes***

##### **Overview of Literature Types.**

Research on personalized learning is diverse. However, during the literature discovery process it was found that systematic reviews were prominent, with empirical studies which include both qualitative and quantitative designs skewed heavily into qualitative research. There were very few mixed-methods studies found in the discovery process which is believed to be due to a lack of consistent implementation in corporate settings. In addition, research leaned towards educational technology and computer science as a primary means of implementation.

### **Debates.**

The field of personalized learning faces several ongoing debates. A primary issue is the lack of a unified definition, which makes research consistency a great challenge (Shemshack & Spector, 2020; Walkington & Bernacki, 2020; Nguyen & Nguyen, 2023). Another contention is the role of technology versus human interaction. While AI enables scaling and automation (Barrera Castro et al., 2024; Peng & Fu, 2022; Tang et al., 2019), over-reliance may de-personalize learning (Brass & Lynch, 2020). Human educators and social interaction remain desirable and critical in the view of many educators. (Zhang et al., 2025; Alamri et al., 2020).

The balance between learner control and system-driven adaptivity is also deviated. Empowering learner choice aligns with motivation theories (Alamri et al., 2020), but too much choice can be detrimental. Alternatively, complete system-controlled adaptivity might not fully cater to nuanced needs in context of a learner's role or career aspirations (Tang et al., 2019; Walkington & Bernacki, 2020).

Finally the controversy surrounding learning styles persists in the topic of personalized learning. Many systems use them as a means to tailor learning experiences to learner

preferences (Nazempour & Darabi, 2023; Su et al., 2011; Vargas Vanegas et al., 2024; Chen & Wang, 2021), but empirical evidence for their effectiveness is questioned (Kirschner, 2017, as cited in Lin et al., 2024; Pashler et al., 2008, as cited in Fiske & Dabbagh, 2020). These debates highlight the complexity and the need for rigorous research in diverse contexts.

### **Design Strategies.**

Personalized learning design strategies aim to tailor educational experiences through pedagogical approaches, adaptive mechanics, and technology integrations, shifting from uniform models to responsive environments.

### ***Pedagogical Approaches.***

Research on pedagogical approaches highlights the importance of adapting instruction to diverse learner needs. Differentiated instruction, for instance, involves educators varying methods, content, and assessments to meet diverse needs within a group (Shemshack & Spector, 2020; Walkington & Bernacki, 2020). This contrasts with traditional, static models by allowing for adjustments based on student readiness and interests. A key approach involves creating individualized learning paths, which provide learners with unique sequences of activities and content. These paths often support self-pacing and can be specifically designed to align with a learner's career goals or areas of professional interest, which has been shown to be effective in promoting a sense of autonomy and relevance (Alamri et al., 2020; Hughey, 2020). Additionally, competency-based learning is frequently integrated into personalized designs, allowing learners to progress based on their demonstrated mastery of specific skills rather than being constrained by time

(Dockterman, 2018; Hughey, 2020). This flexibility is particularly valuable for adult learners who may have varied prior knowledge and professional experience.

### ***Personalized Learning Mechanics.***

The implementation of these pedagogical strategies relies heavily on personalized learning mechanics. One central mechanic is adaptive sequencing, a process where learning content is dynamically reordered or selected based on a learner's performance, prior knowledge, or real-time interactions (Su et al., 2011; Tang et al., 2019; Peng & Fu, 2022). This ensures that the content remains at an optimal level of challenge, preventing boredom or frustration. Another critical mechanic is personalized feedback, which moves beyond generic responses to provide guidance tailored to an individual's work. This feedback, which can be delivered in real-time by intelligent systems or by human instructors, is essential for guiding a learner's progress, correcting misconceptions, and reinforcing a sense of competence (Alamri et al., 2020; Barrera Castro et al., 2024). The literature also emphasizes dynamic difficulty adjustment, a mechanic that automatically adapts the complexity of learning tasks to a learner's ability, which is vital for maintaining engagement and promoting continuous learning (Sampayo-Vargas et al., 2013, as cited in Barrera Castro et al., 2024).

### ***Technological Integrations.***

Technology integrations serve as crucial enablers for personalized learning. Learning Experience Platforms (LXP) and Learning Management Systems (LMS) provide the foundational infrastructure for delivering and managing adaptive content and learner profiles (Su et al., 2011). These platforms support a variety of integrations that enable personalization, such as simulations for immersive practice and AI tutors or Intelligent

Tutoring Systems (ITS) that provide one-on-one adaptive instruction (Barrera Castro et al., 2024; Tang et al., 2019; Zhang et al., 2025). These intelligent systems can detect cognitive levels, learning styles, and emotional states to tailor explanations, exercises, and feedback to the individual learner (Barrera Castro et al., 2024; Holmes et al., 2023, as cited in Barrera Castro et al., 2024). A core function of these technological ecosystems is the use of recommendation systems, which leverage machine learning and reinforcement learning to suggest relevant resources or pathways based on a learner's profile and past behavior (Tang et al., 2019; Peng & Fu, 2022; Leon et al., 2024). This entire process is underpinned by learning analytics and data mining, which are fundamental for analyzing vast amounts of learner data to inform personalization decisions and predict performance (Nazempour & Darabi, 2023; Peng & Fu, 2022; Chen & Wang, 2021). Emerging Generative AI (GenAI) tools, such as large language models (LLMs), are now showing promise in assisting educators by creating dynamic, personalized instructional content and flexible suggestions for designing complex learning experiences (Zhang et al., 2025).

### **Learner Models**

Learner models are fundamental to personalized learning, acting as dynamic representations of individual student characteristics that guide adaptability (Su et al., 2011; Chen & Wang, 2021). These models are continuously updated based on a learner's interactions and progress, providing data for effective personalization. Key components include knowledge status or prior knowledge, tracking understanding and identifying gaps for adaptive sequencing (Su et al., 2011; Chen & Wang, 2021; Nazempour & Darabi, 2023). Learning styles and preferences capture preferred information processing and content types, influencing presentation (Su et al., 2011; Chen

& Wang, 2021; Nazempour & Darabi, 2023; Vargas Vanegas et al., 2024). Cognitive levels and abilities influence content complexity (Peng & Fu, 2022; Chen & Wang, 2021). Interests and goals enable relevant content delivery, boosting motivation (Alamri et al., 2020; Su et al., 2011; Chen & Wang, 2021; Lin et al., 2024). Behavioral patterns from system interactions provide insights into learner engagement (Peng & Fu, 2022; Nazempour & Darabi, 2023). An emerging trend is including emotional states, where systems detect and respond to emotions for adaptive emotional support (Chen & Wang, 2021). Finally, demographic information provides static foundational data (Nazempour & Darabi, 2023), and social characteristics reflect influence in collaborative environments (Peng & Fu, 2022). These components are integrated using data mining, machine learning, and semantic web technologies to create comprehensive, adaptive profiles (Su et al., 2011; Chen & Wang, 2021; Nazempour & Darabi, 2023; Tang et al., 2019; Leon et al., 2024).

### ***Theoretical Frameworks***

Personalized learning is deeply rooted in various theoretical frameworks that inform its design and implementation. These theories, drawn from fields such as psychology, education, and computer science, explain how individuals learn and how learning environments can be optimized.

#### **Constructivism.**

Constructivism asserts that learners actively build their knowledge through experience and reflection (Shemshack & Spector, 2020). This perspective underpins personalized learning by emphasizing learner-centered environments where individuals interact

meaningfully with content and peers, thereby constructing knowledge based on their unique prior experiences and cognitive structures (Alamri et al., 2020; Su et al., 2011).

### **Connectivism.**

In the digital age, connectivism offers a particularly relevant framework stating that learning occurs through connections within networks. From a connectivist perspective, personalized learning systems support social learning platforms, recognizing that knowledge is distributed across digital networks and that learners must be able to navigate and create these connections (Leon et al., 2024; Fack & Dabbagh, 2020). This theory highlights the importance of networked learning for adult learners in an increasingly digital and interconnected world.

### **Behaviorism.**

While early teaching machines had strong behaviorist roots, relying on stimulus-response, immediate feedback, and reinforcement schedules (Brass & Lynch, 2020; Tursunkulova, 2022), contemporary personalized learning integrates these elements in more sophisticated ways. Modern adaptive systems, for example, use performance data to trigger specific interventions or content delivery, effectively reinforcing desired learning behaviors (Tang et al., 2019). However, modern, personalized learning aims to move beyond simple memorization, blending these behavioral aspects with more holistic approaches.

### **Self-Determination Theory (SDT).**

SDT is a key humanistic theory of motivation and is central to many personalized learning designs. It proposes that individuals possess innate psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2000, as cited in Alamri et al.,

2020; Hughey, 2020). Personalized learning leverages SDT by offering learners choices, control over their learning paths, opportunities to experience effectiveness in their learning tasks, and fostering connections with instructors and peers. Research consistently shows that supporting these fundamental needs can enhance intrinsic motivation, engagement, and overall well-being in diverse learning environments (Alamri et al., 2020).

### **Adaptive Learning Theory.**

Adaptive learning theory outlines the principles and mechanisms by which learning systems dynamically adjust to individual learner characteristics. This involves designing algorithms that diagnose learner states and adapt instructional content, strategies, and feedback in real-time (Su et al., 2011; Chen & Wang, 2021; Peng & Fu, 2022). This theoretical perspective is deeply intertwined with advancements in artificial intelligence and data mining, which enable the creation of highly responsive learning environments.

### **Cognitive Load Theory.**

Cognitive load theory provides insights into how learning is optimized by effectively managing the mental effort required from learners (Sweller, 1988, as cited in Mishra & Hill, 2025). Personalized learning, particularly approaches that tailor content based on a learner's interests, can reduce extraneous cognitive load by making material more relevant and engaging, thereby freeing up cognitive resources for deeper processing (Lin et al., 2024). This theory is crucial for designing instruction that presents information in a way that is easily digestible and aligned with a learner's cognitive capabilities.

### **Situated Learning Theory.**

This theory emphasizes that learning is most effective when it occurs within authentic contexts and through active participation in communities of practice (Lave & Wenger, 1991, as cited in Mishra & Hill, 2025). Situated learning theory informs personalized learning strategies like scenario-based learning, which simulates real-world work environments to promote adaptability and skill development (Mishra & Hill, 2025). These frameworks often complement each other, providing a multifaceted understanding of personalized learning. For instance, SDT's focus on autonomy aligns with constructivist approaches that emphasize active learning and learner control. Similarly, adaptive learning theory provides the technical means to implement personalized strategies informed by cognitive load theory, ensuring that content is delivered efficiently and effectively. Connectivism extends these ideas by highlighting the importance of networked learning in an increasingly digital world, where individuals constantly seek and create connections to knowledge and other learners. Together, these theories guide researchers and practitioners in developing comprehensive and effective personalized learning experiences that cater to the diverse and evolving needs of learners.

### ***Methodologies***

Research into personalized learning employs a wide range of methods. The literature on personalized learning demonstrates a mix of methodological approaches, ranging from broad syntheses to granular analyses of individual experiences. This list of methods and how they have been used in existing literature include:

#### **Systematic Reviews.**

Systematic reviews were the primary result of the literature discovery. This method is used for synthesizing vast bodies of research, clarifying terminology, and identifying

overarching trends and effects across studies (Shemshack & Spector, 2020). For instance, this method has been used to map the research landscape of technology-enhanced adaptive learning and to quantify the impact of personalized learning (Lin et al., 2024).

### **Qualitative Research.**

Quantitative research methods were the second most dominant method used in the literature discovered. This method uses interviews and case studies to provide deep insights into the experiences and perceptions of learners and educators. Thematic analysis is a common technique used to identify recurring patterns and insights from the data gathered through this method.

### **Quantitative Research and Mixed-Methods Research.**

There were few quantitative methods and even fewer mixed-method approaches used in the literature discovered. Both methods can provide a clear understanding of the impact and effectiveness of personalized learning. While there were a few studies used that employed these methods, most of these types of studies were found to be in the context of K-12 and higher education.

### ***Results and Outcomes***

The literature consistently demonstrates positive outcomes from personalized learning, spanning cognitive, motivational, and behavioral dimensions.

An enhancement in motivation is frequently reported. Tailored experiences lead to increased intrinsic motivation, fostering autonomy and competence (Alamri et al., 2020; Hughey, 2020; Lin et al., 2024). This heightened motivation often translates directly into greater engagement, with learners actively participating and interacting more deeply, especially with adaptive

technologies (Barrera Castro et al., 2024; Peng & Fu, 2022; Alamri et al., 2020; Fake & Dabbagh, 2020).

Personalized learning environments also foster self-regulated skills by encouraging learner ownership, goal setting, and progress monitoring (Alamri et al., 2020; Hughey, 2020; Walkington & Bernacki, 2020). The potential for developing these lifelong learning skills is a recognized benefit (Fake & Dabbagh, 2020).

Impact on academic achievement and performance is a central focus, with many studies reporting improved grades, higher assessment scores, and enhanced retention and transfer of knowledge (Hughey, 2020; Nazempour & Darabi, 2023; Vargas Vanegas et al., 2024; Lin et al., 2024). Adaptive systems significantly improve learning effectiveness by adjusting content based on performance (Peng & Fu, 2022; Su et al., 2011). However, outcomes can vary, influenced by design, learner characteristics, and context (Walkington & Bernacki, 2020).

Furthermore, personalized learning, when designed with cognitive load theory in mind, can contribute to a reduction in the mental effort required for learning. By presenting information in a manner that is relevant and tailored to a learner's existing knowledge and cognitive processing, it can free up mental resources for deeper understanding and application (Lin et al., 2024).

Finally, consistent learner satisfaction is reported, with individuals perceiving personalized experiences as more relevant and effective (Alamri et al., 2020; Hughey, 2020; Vargas Vanegas et al., 2024). This enhanced satisfaction can, in turn, contribute to greater engagement and persistence in learning.

While these positive outcomes are frequently observed, the literature also acknowledges the ongoing challenge of consistently measuring and generalizing these effects across diverse contexts. Factors such as the specific personalization strategies employed, the quality of

technology integration, and the psychological readiness of learners can moderate the observed outcomes.

## **Discussion**

### *Synthesis of Findings*

The review of literature on personalized learning reveals a consistent narrative across its historical roots, definition complexities, design strategies, theoretical underpinnings, and observed outcomes. Historically, personalized learning is not new, with centuries of efforts to address individual learner variability (Dockterman, 2018). Early attempts laid the groundwork for modern approaches, showing a persistent desire to move beyond one-size-fits-all instruction (Brass & Lynch, 2020; Tursunkulova, 2022).

Despite this history, a significant challenge is the field's lack of unified definition. Personalized learning often serves as an umbrella term for adaptive, individualized, and customized learning, leading to confusion (Shemshack & Spector, 2020; Walkington & Bernacki, 2020; Nguyen & Nguyen, 2023). While distinctions exist, terms are often interchanged, complicating synthesis. Design strategies are multifaceted, integrating pedagogical approaches, adaptive mechanics, and technology.

Learner models are central, dynamically representing student characteristics like knowledge, learning styles, cognitive abilities, interests, goals, behaviors, emotions and demographics. Effectiveness is often attributed to alignment with theoretical frameworks outlined in this literature review.

Methodologically, the field uses diverse approaches including systematic reviews, meta-analysis, qualitative, quantitative and mixed methods research.

Outcomes are generally positive, enhancing motivation, engagement, and self-regulation (Alamri et al., 2020; Hughey, 2020). Academic achievement, retention, and transfer also show positive effects, though with variability (Lin et al., 2024; Nazempour & Darabi, 2023). Learners report increased satisfaction and reduced cognitive load (Alamri et al., 2020; Vargas Vanegas et al., 2024; Lin et al., 2024).

### ***Challenges and Gaps in Literature***

Despite its potential, personalized learning literature reveals persistent challenges and gaps, particularly for corporate applications. A primary challenge is the lack of definition alignment (Shemshack & Spector, 2020; Walkington & Bernacki, 2020; Nguyen & Nguyen, 2023).

The balance between technology-driven solutions and human interaction is significant. While AI scales personalization (Barrera Castro et al., 2024; Peng & Fu, 2022), over-reliance may de-personalize learning (Brass & Lynch, 2020).

The tension between learner control and system-driven adaptivity is ongoing. Empowering choice is central (Alamri et al., 2020; Hughey, 2020), but too much can be detrimental.

Alternatively, purely system-controlled adaptivity may not fully cater to nuanced needs (Tang et al., 2019; Walkington & Bernacki, 2020).

A notable gap is the generalizability of findings to corporate education. A lot of research is in K-12 and higher education with less exploration in corporate settings despite urgent needs (Beier et al., 2025). Corporate environments face unique challenges; stakeholder buy-in, infrastructure integration, and cultural resistance (Fake & Dabbagh, 2020; Crouse et al., 2011; Mishra & Hill, 2025). Corporate leaders often struggle with implementing and measuring personalized learning initiatives (Fake & Dabbagh, 2020).

The controversy surrounding learning styles also persists. Many systems use them but empirical evidence for their effectiveness is questioned (Kirschner, 2017, as cited in Lin et al., 2024; Pashler et al., 2008, as cited in Fake & Dabbagh, 2020).

These challenges highlight the need for targeted, interdisciplinary research to bridge the divide between theoretical potential and practical implementation in corporate education.

### ***Implications for Future Research***

The identified challenges and gaps in personalized learning literature, especially in corporate contexts, suggest several important directions for future inquiry.

First, more empirical research is needed specifically within corporate and adult learning settings. Future studies should focus on how personalized learning principles and technologies translate to the unique demands, motivational factors, and constraints of adult learners in the workplace. This includes investigating the effectiveness of personalized learning approaches on corporate outcomes like skill acquisition and job performance.

Second, research should prioritize developing a more unified and context-specific definition of personalized learning for corporate education. This would help to build consistent research and enable better comparison of findings.

Third, research should explore models for integrating technology and human interaction in corporate personalized learning. This includes investigating hybrid models that leverage AI for adaptive content and data analysis while preserving the crucial role of human instructors and peer collaboration.

Fourth, there is a need for research that examines long-term impact of personalized learning on employee career progression and organizational resilience. Studies could track individuals' skill

development, adaptability, and career trajectories in response to personalized learning interventions, providing evidence of return on investment for organizations. Finally, research should address the practical implementation of challenges identified in corporate environments. This includes studies on effective strategies for securing stakeholder buy-in, managing resource constraints, and overcoming cultural barriers to new learning approaches.

By focusing on these areas, future research can provide clearer, evidence-based guidance for corporate organizations seeking to leverage personalized learning to enhance workforce development and meet the evolving demands of the future of work.

## References

Alamri, H., Lowell, V., Watson, W., & Watson, S. L. (2020). Using personalized learning as an instructional approach to motivate learners in online higher education: Learner self-determination and intrinsic motivation. *Journal of Research on Technology in Education*, 52(3), 322–352. <https://doi.org/10.1080/15391523.2020.1728449>

Barrera Castro, G. P., Chiappe, A., Becerra Rodríguez, D. F., & Sepulveda, F. G. (2024). Harnessing AI for Education 4.0: Drivers of Personalized Learning. *Electronic Journal of e-Learning*, 22(5), 1–14. <https://doi.org/10.34190/ejel.22.5.3467>

Barrera Castro, G. P., Chiappe, A., Ramírez-Montoya, M. S., & Alcántar Nieblas, C. (2025). Key barriers to personalized learning in times of artificial intelligence: A literature review. *Applied Sciences*, 15(6), 2-16. <https://doi.org/10.3390/app15063103>

Beier, M. E., Saxena, M., Kraiger, K., Costanza, D. P., Rudolph, C. W., Cadiz, D. M., Petery, G. A., & Fisher, G. G. (2025). Workplace learning and the future of work. *Industrial and Organizational Psychology*, 18, 84–109. <https://doi.org/10.1017/iop.2024.57>

Brass, J., & Lynch, T. L. (2020). Personalized learning: A history of the present. *Journal of Curriculum Theorizing*, 35(2), 3–21.

Chen, S. Y., & Wang, J.-H. (2021). Individual differences and personalized learning: A review and appraisal. *Universal Access in the Information Society*, 20, 833–849. <https://doi.org/10.1007/s10209-020-00753-4>

Crouse, P., Doyle, W., & Young, J. D. (2011). Workplace learning strategies, barriers, facilitators and outcomes: A qualitative study among human resource management practitioners. *Human Resource Development International, 14*(1), 39–55.

Dockterman, D. (2018). Insights from 200+ years of personalized learning. *Nature Partner Journals: Science of Learning, 3*(15), 1-6.

Fake, H., & Dabbagh, N. (2020). Personalized learning within online workforce learning environments: Exploring implementations, obstacles, opportunities, and perspectives of workforce leaders. *Technology, Knowledge and Learning, 25*, 789–809.

<https://doi.org/10.1007/s10758-020-09441-x>

Hughey, J. (2020). Individual personalized learning. *Educational Considerations, 46*(2).

<https://doi.org/10.4148/0146-9282.2237>

Leon, R.-D., Ortiz, Á., Díaz, M. D. M. A., & Alvarez, A. E. (2024). Using AI for developing personalized learning paths. *International Journal of Advanced Statistics and IT&C for Economics and Life Sciences, 14*(1), 13–19.

Lin, L., Lin, X., Zhang, X., & Ginns, P. (2024). The personalized learning by interest effect on interest, cognitive load, retention, and transfer: A meta-analysis. *Educational Psychology Review, 36*(88), 1–39. <https://doi.org/10.1007/s10648-024-09933-7>

Mishra, P., & Hill, G. L. (2025). Navigating uncertainty: Challenges and solutions for person-centered workplace learning in a rapidly changing world. *Industrial and Organizational Psychology, 18*, 110–114. <https://doi.org/10.1017/iop.2024.73>

Nazempour, R., & Darabi, H. (2023). Personalized learning in virtual learning environments using students' behavior analysis. *Education Sciences*, 13(5), 1-15.

<https://doi.org/10.3390/educsci13050457>

Nguyen, H.-H., & Nguyen, V. A. (2023). Personalized learning in the online learning from 2011 to 2021: A bibliometric analysis. *International Journal of Information and Education Technology*, 13(8), 1261–1272.

Peng, P., & Fu, W. (2022). A pattern recognition method of personalized adaptive learning in online education. *Mobile Networks and Applications*, 27, 1186–1198.

<https://doi.org/10.1007/s11036-022-01942-6>

Shemshack, A., & Spector, J. M. (2020). A systematic literature review of personalized learning terms. *Smart Learning Environments*, 7(33), 1-20.

<https://doi.org/10.1186/s40561-020-00140-9>

Su, J.-M., Lin, H.-Y., Tseng, S.-S., & Chen, C.-H. (2011). A personalized learning content adaptation mechanism to meet diverse user needs in mobile learning environments. *User Modeling and User-Adapted Interaction*, 21, 5–49.

Tang, X., Chen, Y., Li, X., Liu, J., & Ying, Z. (2019). A reinforcement learning approach to personalized learning recommendation systems. *British Journal of Mathematical and Statistical Psychology*, 72, 108–135.

Tursunkulova, I. (2022). Teaching machines: The history of personalized learning, 2021. *Canadian Journal of Learning and Technology*, 48(1), 1–6.

Vargas Vanegas, C., Arboleda Puerta, J. E., Noreña Ceballos, M., & Moreno Sánchez, J. M. (2024). Personalized learning: An adaptive approach based on the VARK model to improve distance education. *Revista De Gestão Social E Ambiental*, 18(12), 1–17.

Walkington, C., & Bernacki, M. L. (2020). Appraising research on personalized learning: Definitions, theoretical alignment, advancements, and future directions. *Journal of Research on Technology in Education*, 52(3), 235–252.

<https://doi.org/10.1080/15391523.2020.1747757>

Zhang, L., Yao, Z., & Hadizadeh Moghaddam, A. (2025). Designing GenAI tools for personalized learning implementation: Theoretical analysis and prototype of a multi-agent system. *Journal of Teacher Education*, 76(3), 280–293.