Tuijin Jishu/Journal of Propulsion Technology
ISSN: 1001-4055
Vol. 46 No. 3 (2025)

Exploring the Role of Artificial Intelligence in Learning and Development for Personalized Career Growth Paths

Adedayo Olubunmi Odubanjo, Bright Onyedikachi Asonye

Rome Business School

Abstract:- This study investigates the role of Artificial Intelligence (AI) in enhancing learning and development (L&D) practices with a specific focus on its application in personalizing career growth paths among professionals in Nigeria. Amidst global transformations in workforce management and digital education, AI technologies such as adaptive learning platforms, intelligent content recommenders and predictive analytics are reshaping how individuals acquire skills and navigate career trajectories. Using a quantitative research design the study examined respondents' awareness of AI, their perceptions of its impact, the challenges encountered in its adoption and the risks associated with its integration into professional development systems. Chi-square tests, and one-sample t-tests were employed to analyze the data. Findings reveal that awareness and use of AI tools are relatively high, with no significant gender differences in adoption. AI is widely perceived as a transformative tool capable of enhancing personalized learning and guiding employee development. While challenges such as infrastructural readiness and staff competence were not perceived as major barriers. Risk perception was also low indicating strong professional confidence in adapting to AI enhanced systems. The study concludes that AI presents significant opportunities for advancing personalized learning and strategic career development in Nigeria's learning and development landscape. It recommends increased investment in AI literacy, capacity building, and policy support to accelerate effective and ethical AI integration.

Keywords: *Artificial Intelligence; Learning and Development; Personalized Learning; Career Growth; Workforce Development; Digital Learning Tools.*

1. Introduction

The present dynamic and digitally driven workplace results to organizations facing increasing pressure to equip employees with the skills needed to remain competitive, adaptable, and innovative. Traditional one size fits all training approaches are proving insufficient in addressing the diverse learning needs and career aspirations of a multigenerational and multicultural workforce. As a result, many forward-thinking organizations are turning to artificial intelligence (AI) as a strategic enabler of personalized learning and development (L&D) systems capable of tailoring career growth paths to individual capabilities, learning styles, and professional goals.

AI is transforming the learning and development landscape through intelligent content recommendation systems, adaptive learning platforms and predictive analytics that assess skill gaps and suggest targeted interventions (Bozkurt et al., 2021). By analyzing employee data such as performance history, role requirements, behavioral patterns and learning preferences, AI can curate individualized learning journeys. This level of personalization enhances engagement, accelerates skill acquisition, and supports long-term talent development (Rehan, 2023). Moreover, AI-driven tools facilitate real time feedback, dynamic assessments, and continuous re-skilling thus allowing employees to take ownership of their professional development while aligning with organizational needs (Ghedabna et al., 2024). These tools go beyond automating learning delivery they function as strategic partners in shaping agile future ready workforces. For example, AI powered career pathing platforms can map out various internal mobility options, suggest stretch assignments and match employees with mentors or projects based on their evolving competencies (Madhumithaa et al., 2025).However, despite the promise of AI in learning and development there are concerns about

bias in algorithms, data privacy, and the potential for technology to depersonalize human development processes (Ghamghami, 2024). Ethical considerations must therefore be balanced with innovation to ensure AI systems are transparent, inclusive, and aligned with employee well-being and organizational values. Furthermore, while multinational corporations are pioneering AI enabled learning and development systems but the adoption remains uneven across sectors and regions particularly in developing economies where digital infrastructure and AI literacy may be limited (Mannuru et al., 2023). This highlights the need for context sensitive frameworks that consider organizational readiness, digital maturity, and cultural factors when integrating AI into career development strategies.

In Nigeria's professional and organizational landscape, the learning and development programs are still largely generic, instructor driven and compliance-focused with little emphasis on employee or personalized career planning (Lawretta, 2021). This approach fails to cater to the diverse learning needs of a multigenerational, multi-skilled workforce and contributes to widespread dissatisfaction, poor engagement and underutilization of employee potential. Despite Nigeria's expanding digital infrastructure and a growing population of tech savvy professionals, most organizations especially in the public and SME sectors have not leveraged AI technologies to modernize their learning ecosystems (Ola-Oluwa, 2024). The few organizations that do utilize digital platforms for learning often employ static e-learning systems that lack personalization and adaptability. These systems do not effectively address key factors such as role-based upskilling, dynamic career pathing, or predictive talent development. As a result, career progression in many Nigerian workplaces remains informal, reactive, and heavily reliant on managerial discretion rather than data cognizant employee development planning (Fajimolu et al., 2023).

Furthermore, significant structural barriers hinder the adoption of AI in learning and development across Nigeria. These include limited awareness of AI's potential in HR functions, insufficient investment in AI infrastructure and a shortage of skilled professionals who can design and manage intelligent learning systems (Folorunso et al., 2024). Additionally, cultural perceptions about AI replacing human roles and decision making further complicate its integration into learning and career planning processes (Mantello, et al., 2023). The absence of scalable, intelligent and personalized career development frameworks not only stalls talent optimization but also puts Nigerian organizations at a strategic disadvantage in an increasingly competitive and digital global economy (Shah et al., 2023). Therefore, there is an urgent need to explore how AI can be effectively integrated into Nigeria's learning and development practices to support inclusive, adaptive, and forward-looking career growth systems.

Given the critical importance of learning agility and personalized development in a rapidly evolving job market, it is essential to explore the role of AI in transforming L&D. This study aims to examine how AI technologies can be leveraged to personalize career growth paths, identify the benefits and challenges involved, and propose practical guidelines for implementation across diverse organizational contexts. Furthermore, this study aims to fill this gap by investigating the role of AI in personalizing career development in Nigerian organizations, identifying the existing barriers and proposing practical context-specific strategies for implementation.

2. Objectives

1. To examine the level of awareness and extent of usage of AI technologies among learning and development professionals in Nigeria.
2. To assess how AI is perceived to influence personalized learning and career development functions.
3. To identify the key challenges professionals face in adopting AI-driven tools for personalized learning and development.
4. To explore the perceived risks associated with integrating AI into learning and development processes.

The research seeks to generate empirical insights into how AI tools are being understood, adopted and perceived by L&D practitioners while also evaluating the benefits, challenges and risks associated with their integration into

employee development strategies. Ultimately, the study aspires to contribute to policy and practice by offering data driven recommendations for optimizing AI adoption in career focused learning ecosystems.

3. Literature Review

Sathish et al (2024), explores the role of artificial intelligence (AI) in the ecosystem of career development and its impact on individuals, employers, and society. Their study highlights the significance of AI in career progression, focusing on its ability to optimize the job search process, enhance writing abilities, provide career guidance, and facilitate personalized skill development. AI-powered tools and systems are transforming the way individuals explore career paths, acquire new skills, and make informed decisions about their professional journeys. Furthermore, they also discuss the benefits of AI-driven career exploration platforms, which offer customized recommendations for viable career trajectories based on individual's skill sets, interests, and objectives. Additionally, the study emphasizes the importance of personalized skill development facilitated by AI, which evaluates individuals' current skills and suggests relevant courses and resources for advancement. The study further examines the use of AI in job matching, where sophisticated algorithms assess job postings, resumes, and candidate profiles to enhance the effectiveness and precision of candidate evaluation and recruitment. AI's role in employee engagement has also been analyzed further. Lastly, they address ethical considerations and challenges associated with AI implementation, highlighting the need for transparency, fairness, and accountability. The chapter draws on academic literature to support its findings and underscores the importance of policy development and research advancements to maximize the benefits and manage the risks of AI integration in career-related domains.

Vadisetty and Polamarasetti (2024), opines that rapid convergence between Education 4.0 and Industry 4.0 demands adaptive learning models that would equip people with future-ready skills in the dynamically changing workforce. This work introduces AI-augmented skill development roadmaps, underlining how to design and implement personalized 12-month learning paths. The proposed framework is based on data-driven learner profiling, machine learning algorithms, and continuous adaptive assessments for optimization of building individual learning pathways toward emerging technology trends alignment. This review will be predicated on existing AI applications in competency development, identifying gaps in conventional models. It also involves the holistic roadmap structure such as milestones, phases, and progression metrics. Case studies of real-world examples would then be delivered where AI-powered learning pathways have resulted in targeted competency development, employability, and lifelong learning. The key performance indicators will be defined to provide the effectiveness of the framework for scalability and adaptability. The findings bring to the fore that AI can cause a paradigm shift in skill gaps through enabling personalized learning at scale and furthering strategic goals related to Industry 4.0. This research makes a substantial contribution to the development of scalable education models for essential competencies that are part of the fast-evolving facets of digitalization.

Morozevich et al (2022), opines that in the contemporary economy is undergoing a digital transformation. Its key barriers are a lack of qualified personnel, competencies and knowledge, as well as internal resistance in organizations. It can be overcome through quality staff development and training. An urgent problem is to build a personalized learning path. Modern research is aimed at the implementation of recommendation systems in order to select relevant material. However, these recommendations are based on digital traces; the student's full personal profile, as well as organizational values are not considered. Their study aims is to create an intelligent guide that would accompany an employee throughout his life in the organization involving him in the learning process according to a personalized path based on a complex personal profile and reactions to educational material, training soft and hard skills in accordance with the values of the organization and the employee. Methods of system analysis, system engineering,

psychodiagnostic research (the DISC model, Rowe's "Decision-making Style" methodology, Honey and Mumford's method of determining activity styles, psychotype test), software design and artificial intelligence (matrix factorization and neural networks) were used in this study. The study was conducted on a unique database collected as part of its implementation and consisting of educational tasks for soft skills development, plus data on their implementation by users with different soft skills profiles. An intelligent guide model has been developed and implemented as a software component for an enterprise management system. The basis consists of psychodiagnostic modules, organizational management, training and recommendations. The intelligence of the system we developed allows you to qualitatively form a personalized learning path that will involve an employee not only in the learning and development process, but also in achieving organizational goals. The organization receives T-shaped specialists who have a proactive position and are capable of self-organization by investing in the development of employees. The results of this study can be used by enterprises not only at the organizational level, but also through broadcasting in the education system to form an education ecosystem in accordance with the requirements of innovative development of a given region's economy.

Duan and Wu (2024), investigates the transformative impact of generative artificial intelligence (AI) on vocational education career planning, transitioning from traditional methodologies to personalized, dynamic strategies. By leveraging Natural Language Processing (NLP) and Machine Learning (ML), it delves into how generative AI can provide tailored career guidance, adaptive learning pathways, and labor market insights, underpinned by constructivist learning theory and career development models. The study's methodology blends theoretical analysis with practical implementation, focusing on strategic planning, stakeholder engagement, technology customization, and ethical considerations. It discusses the implications for educators, students, and institutions, emphasizing the necessity for continuous adaptation and innovation in the face of technological advancements. Additionally, the paper identifies future research avenues, including the long-term impact of AI on employment outcomes, its scalability across vocational disciplines, and ethical challenges, advocating for the strategic employment of generative AI to align vocational education more closely with the evolving job market and enhance students' readiness for future careers.

Bayly-Castaneda et al (2024), assert that the rapid evolution of knowledge requires constantly acquiring and updating skills, making lifelong learning crucial. Despite decades of artificial intelligence, recent advances promote new solutions to personalize learning in this context. The purpose of their article is to explore the current state of research on the development of artificial intelligence-mediated solutions for the design of personalized learning paths. To achieve this, a systematic literature review (SRL) of 78 articles published between 2019 and 2024 from the Scopus and Web or Science databases was conducted, answering seven questions grouped into three themes: characteristics of the published research, context of the research, and type of solution analyzed. This study identified that: (a) the greatest production of scientific research on the topic is developed in China, India and the United States, (b) the focus is mainly directed towards the educational context at the higher education level with areas of opportunity for application in the work context, and (c) the development of adaptive learning technologies predominates; however, there is a growing interest in the application of generative language models. The article contributes to the growing interest and literature related to personalized learning under artificial intelligence mediated solutions that will serve as a basis for academic institutions and organizations to design programs under this model.

Kulugh et al (2025), stresses that career guidance is the practice of providing individuals with information, advice and support to help them make informed decisions with respect to their education, training, skills development and subsequent career paths. Thus, supporting individuals to navigate the process of making education and skills development choices and by extension career paths. Personalized career guidance further refines this process by tailoring recommendations to individual profiles and aspirations. With growing availability of digital data, this presents a vast amount of data that traditional methods of personalized career guidance are incapable of handling. However, AI tools have shown promising capability to sieve through huge volume of data to generate highly accurate and relevant recommendations for each individual, thus, their study presents a personalized AI-based career guidance

tool to overcome the limitations of the traditional approaches. In the methodology, the structured waterfall was adopted; ensuring systematic design, implementation, and testing phases. System modelling was accomplished through use-case, activity, class, and entity-relationship diagrams, providing a comprehensive framework for the system's implementation and functionality. The implementation utilised Supabase for a real-time database, authentication, and backend services, facilitating seamless integration with the AI layer. Rigorous testing, including functional, unit, and API tests validated the platform's performance thereby achieving efficient execution times and accurate recommendations. User acceptance testing engaged target users, whose feedbacks were used to further refine the system, improving its practicality and user centered design. The recommendations engine demonstrated its adaptability by generating tailored career suggestions for diverse user profiles. The study demonstrates the potentials of AI in personalized career guidance while highlighting the importance of structured development and iterative user feedback.

Tuhame et al. (2022) explored the intricate challenges involved in predicting suitable career paths and selecting relevant academic subjects. Their research emphasizes the necessity of incorporating multiple factors such as students' personal interests, cognitive abilities, and the alignment of subjects with long-term career goals into the decision-making process. While the theoretical frameworks presented in their work offer valuable perspectives, their practical application remains limited, particularly within developing countries where educational resources and digital infrastructure may be lacking. Complementing this line of inquiry, other researchers have made significant strides toward digitalizing career guidance. For instance, Hendahewa et al. (2018) designed and implemented a Career Advisory Expert System, intended to assist students in making informed choices regarding career trajectories and elective subject selections. This tool served as an innovative step toward individualized career support, especially for undergraduates seeking tailored guidance. For students with uncertain aspirations, the system utilized academic records to propose possible career paths, effectively offering direction based on historical academic performance. However, the system faced notable limitations. Its recommendations were heavily reliant on past academic achievements and did not integrate students' personal interests, passions, or innate aptitudes. This narrow focus led to perceptions among users that the system overestimated their competencies, as it failed to holistically evaluate psychological or motivational dimensions.

Further advancing the discussion, Kiselev et al. (2020) demonstrated that data derived from individuals' social network activities where personal values, beliefs, and identities are often constructed could be leveraged by artificial intelligence to match individuals with career paths that reflect their core values. This approach introduces a more nuanced and person-centered dimension to AI based career guidance, emphasizing identity alignment over mere academic performance. Tuhame et al. (2022), developed a theoretical model aimed at predicting students' subject selections and career choices by incorporating a broad range of influencing factors. These include personality traits, environmental conditions, self-confidence levels, personal goals, and available career options. The model draws inspiration from established psychological and career development theories while introducing novel elements such as monitoring changes in student interests over time and integrating labor market trends into decision-making. A distinctive feature of the model is its dynamic approach it conceptualizes subject and career choice as a continuous decision-making process rather than a one-off selection. Furthermore, the model explores the interrelationships among variables, demonstrating, for instance, how a student's confidence level can shape their goals, which in turn influence their career decisions.

Key components of the model include:

- **Personality Analysis**: The model employs Holland's RIASEC framework to track shifts in vocational interests across time.
- **Career Decision-Making Process**: It outlines what constitutes an effective and informed career decision.

- **Job Market Forecasting**: Unlike conventional models, it considers projected job growth and emerging career trends to make future-ready recommendations.
- **Hypothesis Testing**: It examines the causal relationships between the model's variables, such as how confidence might impact long-term aspirations.

Despite its strong theoretical foundation and forward-thinking design, the model remains untested and lacks real-world implementation. This gap between theory and practice is further underscored by Westman et al. (2021), who critically examined unsuccessful attempts to integrate AI into career guidance systems. Their study emphasized essential functional and ethical requirements for applying AI to career counseling, but no accompanying AI software or prototype was developed to validate these recommendations.

In a related study, Asma and Abeeda (2017), conducted a survey to identify the primary influences on students' career choices. Factors assessed included peer influence, gender, guidance counselors, parental input, media exposure, and personal interests. Their findings revealed that personal interest exerted the most significant influence, surpassing even that of professional guidance counselors. Although the research effectively highlighted the limitations of traditional career counseling methods in meeting the individual needs of students, it fell short of proposing a viable technological or systematic solution.

Similarly, Javed (2018) conducted a study focusing on the determinants of subject selection among secondary school students, using diverse data collection techniques to capture the multifaceted nature of the decision-making process. Like the previous study, it concluded that personal interest plays a dominant role in influencing students' academic choices. However, this research also failed to propose or develop a tailored guidance system capable of leveraging such insights to offer personalized career or subject recommendations.

These studies underscore the consistent recognition of personal interest as a key determinant in student decision-making. Yet, they also reveal a persistent gap in practical solutions particularly AI-driven systems that can translate these findings into customized, actionable guidance for students navigating educational and career choices.

Theoretical Framework

The theoretical foundation of this article is anchored in two prominent psychological frameworks: **Holland's Vocational Theory (HVC)** and **Social Cognitive Theory (SCT)**. Theory one which is the Holland's Vocational Theory introduced by psychologist John Holland in the 1950s, remains a seminal model in the field of career development, particularly for understanding the interplay between personality and occupational environments. According to HVC, both individuals and work settings can be classified into six distinct typologies, collectively known by the acronym **RIASEC** and each representing a dominant set of interests, skills, and behavioral tendencies that guide career preferences.

These six categories include:

1. **Realistic (R):** Individuals in this group are characterized by their strong mechanical aptitude and physical coordination. They are typically drawn to practical, hands-on tasks that involve tools, machinery, or outdoor activities, and often excel in careers such as engineering, construction, or mechanics.
2. **Investigative (I):** These individuals possess analytical thinking and intellectual curiosity. They gravitate toward roles that require critical thinking, scientific inquiry, and problem-solving, such as research, medicine, or data science.
3. **Artistic (A):** Creative and non-conforming, artistic types are inclined toward self-expression through visual arts, music, writing, or design. They thrive in environments that value innovation, originality, and emotional expression.

4. **Social (S):** Empathetic and communicative, individuals in this category are motivated by the opportunity to help others. They are best suited for careers in education, counseling, healthcare, and social work where interpersonal interactions are central.
5. **Enterprising (E):** Energetic and persuasive, enterprising individuals are goal-driven and excel in roles involving leadership, negotiation, and entrepreneurship. Careers in management, politics, or sales often align well with this type.
6. **Conventional (C):** These individuals are typically organized, dependable, and detail-oriented. They prefer structured environments with clear rules and are suited for careers in administration, accounting, or information management.

HVC is widely used in career assessment tools, vocational inventories, and counseling settings to identify personality-career fit and guide individuals toward suitable career paths. However, it is essential to recognize that HVC is **not deterministic**. While the model provides valuable insights into person-environment congruence, it does not account for all the complexities influencing career decisions. Factors such as individual personality traits, intrinsic values, socio-economic conditions, educational background, and evolving life circumstances also significantly impact career trajectories (Rossier et al., 2023).

Thus, while Holland's theory offers a structured and accessible framework for aligning personality with vocational options, its application must be contextualized within a broader understanding of human development and the dynamic nature of modern career planning.

In contrast to more static models of career development, theory two which is the **Social Cognitive Theory (SCT)** formulated by psychologist Albert Bandura offers a dynamic and interactional framework that more comprehensively captures the complexities of career decision-making. SCT posits that an individual's career choices are not solely determined by innate interests or environmental opportunities, but are instead the result of continuous interactions among personal, behavioral, and environmental influences. The theory emphasizes **three core constructs** that shape vocational behavior:

1. **Self-efficacy:** This refers to an individual's belief in their capacity to successfully perform tasks and achieve goals within a given career domain. Higher self-efficacy enhances motivation, resilience, and persistence, making individuals more likely to pursue and succeed in challenging career paths (Swami et al., 2024). For example, a student who believes they possess the cognitive and technical skills to succeed in engineering is more likely to commit to and thrive in that field.
2. **Outcome Expectations:** These involve anticipatory beliefs about the potential consequences of both positive and negative associated with various career options. Individuals consider factors such as job satisfaction, income, social status, and work-life balance when forming these expectations. If a person expects that a career will offer meaningful rewards and align with their values, they are more inclined to pursue it.
3. **Social Learning (or Modeling):** SCT underscores the importance of observing others especially role models such as family members, mentors, or public figures as a means of shaping career aspirations. When individuals observe someone they admire navigating a particular profession successfully, it reinforces the belief that they too can achieve similar outcomes under comparable circumstances.

To illustrate this interaction, consider the case of a high school student with a budding interest in computer programming. If this student has a mentor who works in the technology sector and consistently demonstrates enthusiasm, resilience, and success in their career, the student's own self-efficacy is likely to increase. The mentor's journey provides a tangible example of what is possible, while the rewards the mentor reaps (e.g., career satisfaction, financial stability) shape the student's outcome expectations. Together, these factors create a stronger internal motivation to pursue a similar path, illustrating SCT's emphasis on the reciprocal influence between personal agency, environmental input, and observed behavior.

This comprehensive and adaptable nature makes SCT especially useful in the modern context, where career trajectories are no longer linear and are increasingly influenced by global trends, digital technologies, and social media. ***Figure 1*** illustrates the SCT framework, detailing the interaction between self-efficacy, outcome expectations, and observational learning, and how these elements collectively inform and influence career development choices.

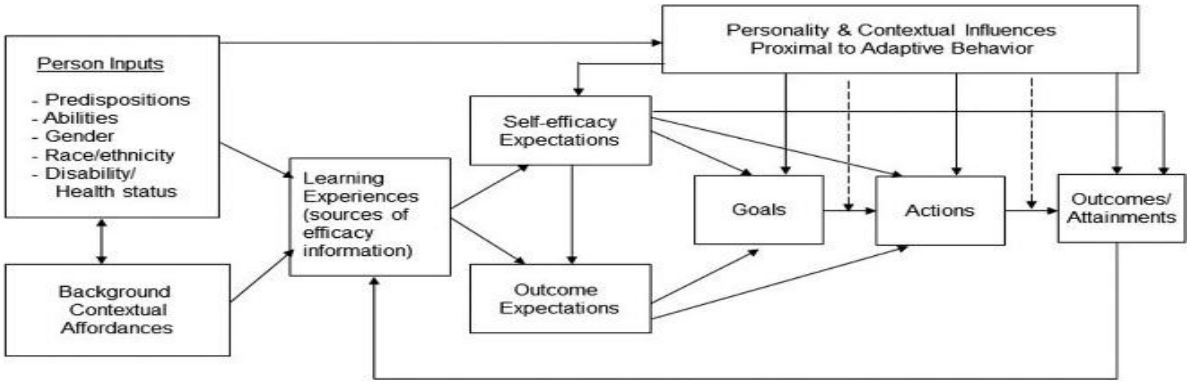

Figure 1: The SCT Framework ***(Adapted from Lent & Brown, 2019).***

Social Cognitive Theory (SCT) extends beyond the concept of passive observation or behavioral imitation. At its core, SCT emphasizes **personal agency**, wherein individuals actively engage with, interpret, and internalize the behaviors and experiences they observe in others, applying them in ways that align with their personal values, aspirations, and goals. This process allows for adaptive and personalized career exploration. For instance, a student who is inspired by a nurse may not necessarily seek to enter the nursing profession but might instead channel that inspiration into a related career path, such as healthcare research or public health advocacy. Such individual interpretation underscores SCT's strength in accommodating diverse career pathways based on observational learning.

To maximize the effectiveness of **artificial intelligence (AI)** in delivering personalized career guidance, this paper proposes an integrated theoretical framework that combines **Holland's Vocational Theory (HVT)** with **Social Cognitive Theory (SCT)**. The fusion of these two models offers a comprehensive foundation for building an AI-powered guidance system capable of offering personalized, adaptive, and predictive career recommendations. The integration is structured around the following key components:

1. **Personality-Driven Assessment:** Grounded in HVT, this component enables AI to initiate the guidance process by categorizing users according to their personality types using the RIASEC model. This serves as a preliminary filter to identify broad vocational interests and align them with relevant career paths.
2. **Dynamic Adaptation:** SCT's emphasis on self-efficacy, personal goals, and evolving experiences allows AI to continuously update its understanding of a user's preferences and competencies. As users acquire new skills or redefine their career aspirations, the system adjusts its recommendations accordingly, promoting ongoing relevance and personalization.
3. **Predictive Insights:** By analyzing historical user data such as task performance, learning progress, and behavior patterns AI can forecast a user's likelihood of success in specific careers associated with their personality profile. This predictive layer enhances the system's ability to provide not just suitable, but strategic guidance.
4. **Adaptive Guidance Based on Outcome Expectations:** SCT highlights the role of outcome expectations in shaping decision-making. AI systems can use this construct to tailor recommendations based on each user's anticipated rewards, challenges, and satisfaction levels within various career paths, increasing motivational alignment and user engagement.

5. **Continuous Learning and Market Responsiveness:** Beyond user-centered design, the AI system is envisioned to function as a dynamic knowledge engine, regularly updating its database of career options, educational requirements, and labor market trends. This ensures that users receive timely and future-ready guidance.

The novelty of this approach lies in its **dual-layered AI architecture**, firmly rooted in two robust psychological theories. The **first layer** focuses on collecting rich user data, including personality traits, interests, aspirations, and contextual factors. The **second layer** leverages AI to synthesize this data and generate accurate, individualized career recommendations. This structure not only bridges the gap between static career assessment tools and dynamic career decision making but also enables the development of a truly intelligent and responsive career guidance system tailored to the unique trajectories of individual users.

4. Methods

To explore how Artificial Intelligence (AI) influences learning and development particularly its use in customizing career growth trajectories. This investigation is grounded in a structured, data-driven methodology. A quantitative approach was adopted to enable the collection of empirical evidence from a sample of learning and development (L&D) professionals in Nigeria. This method was deemed highly suitable for assessing key dimensions such as levels of AI awareness, its perceived influence on L&D practices, barriers to implementation, and professional risk perceptions. By utilizing this approach, the study was able to systematically gather standardized responses, ensuring consistency in data interpretation and enabling the application of statistical techniques for rigorous analysis. The structured format also enhanced comparability across different demographic and organizational variables. In addition, the broad distribution of the survey tool supported the inclusion of diverse participants which not only enriched the dataset but also strengthened the generalizability of the findings. This allowed the research to reveal sector wide patterns and provide insights into the current state of AI integration in learning and career development frameworks within the Nigerian context. Also, this approach allowed for statistical analysis and generalizable insights aligning with the study's goal of exploring patterns and attitudes across a broad professional population. The target population comprised human resource managers, training consultants, career development practitioners, and related professionals operating within both public and private organizations across Nigeria. A purposive sampling technique was employed to ensure that respondents had direct exposure to learning and development systems and some level of interaction with digital tools or AI-enhanced platforms. The data were analyzed using descriptive statistics**,** including frequencies, percentages, means, and standard deviations to interpret general trends. Additionally, inferential statistics were applied such as Chi-square test was conducted to assess the relationship between demographic variables and AI usage, and One-sample t-tests were used to determine whether the mean scores for perceived challenges and risks significantly differed from a test value of 4, which represented high difficulty or high risk. Results were presented using tables and visualizations such as bar and horizontal charts for clarity and effective comparison.

5. Results

This chapter presents the findings which are organized according to the study's four research questions. Descriptive statistics such as frequency counts, percentages, means, and standard deviations are presented alongside inferential tests such as Chi-square and one-sample t-tests. Visual aids including tables and charts are used to enhance clarity and understanding. This section presents the findings of the research, structured around the study’s key research questions. The results are organized to reflect participants' insights on the application of Artificial Intelligence (AI) in learning and development, particularly in the context of personalized career growth.

RQ1: What do learning and development professionals in Nigeria know about Artificial Intelligence (AI), and to what extent are they currently integrating AI technologies into professional development programs?

RQ2: How do learning and development professionals perceive the impact of AI on personalized career growth and employee skill development?

RQ3: What challenges do professionals encounter when implementing AI-driven solutions for personalized learning and career pathing?

RQ4: What risks or ethical concerns do professionals associate with the use of AI in learning and development initiatives?

Analysis of Result

RQ1: Awareness and Utilization of Artificial Intelligence in Learning and Development

The findings reveal that a significant proportion of respondents are aware of and have begun adopting Artificial Intelligence (AI) technologies within the context of learning and development (L&D). Specifically, **75%** of participants reported having used AI-powered learning platforms or tools (e.g., adaptive learning systems, intelligent course recommenders), while **52%** indicated that their organizations currently utilize AI-based systems to support employee upskilling and career development.

To examine the potential relationship between gender and the adoption of AI in L&D practices, a Chi-square test of independence was conducted. The analysis showed **no statistically significant association** between gender and the use of AI technologies for learning and career development purposes (see Table 1). This suggests that both male and female professionals are equally likely to engage with AI-driven tools in learning contexts.

Table 1: Use of AI Tools in Learning and Career Development by Gender

Gender	**Use AI-Powered Learning Tools**			**Use AI-Based Career Development Systems**		
	Yes	No	Don't know	Yes	No	Don't know
Male	36 (72.0%)	10 (20.0%)	4 (8.0%)	26 (52.0%)	20 (40.0%)	4 (8.0%)
Female	39 (78.0%)	8 (16.0%)	3 (6.0%)	26 (52.0%)	22 (44.0%)	2 (4.0%)
Total	**75 (75.0%)**	**18 (18.0%)**	**7 (7.0%)**	**52 (52.0%)**	**42 (42.0%)**	**6 (6.0%)**
	χ^2(N = 100) = 0.923, p = 0.630			**χ^2(N = 100) = 0.438, p = 0.803**		

As shown in Table 1, 72% of male respondents and 78% of female respondents reported using AI-powered learning tools. Similarly, 52% of respondents from both genders indicated the use of AI-based systems for career development support in their organizations. The Chi-square test indicated no significant relationship between gender and AI usage ($p > 0.05$). The chi-square tests confirmed that gender is not a significant predictor of AI usage in either category (AI learning tools: $\chi^2 = 0.923$, $p = 0.630$; AI career systems: $\chi^2 = 0.438$, $p = 0.803$). These results suggest a growing, gender-neutral engagement with AI technologies in Nigeria's learning and development landscape.

The corresponding chart (Figure 1) visualizes this distribution.

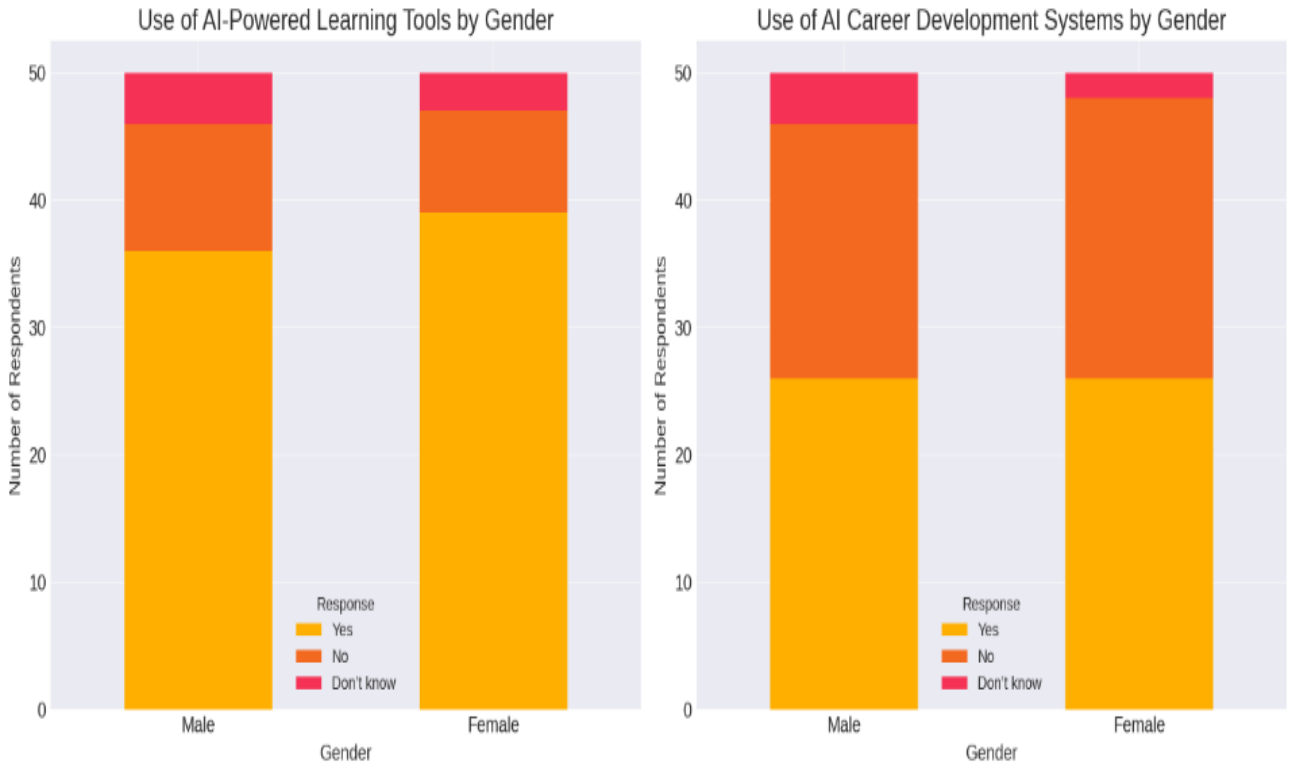

Figure 1: *Use of AI-Powered Tools and Systems by Gender*

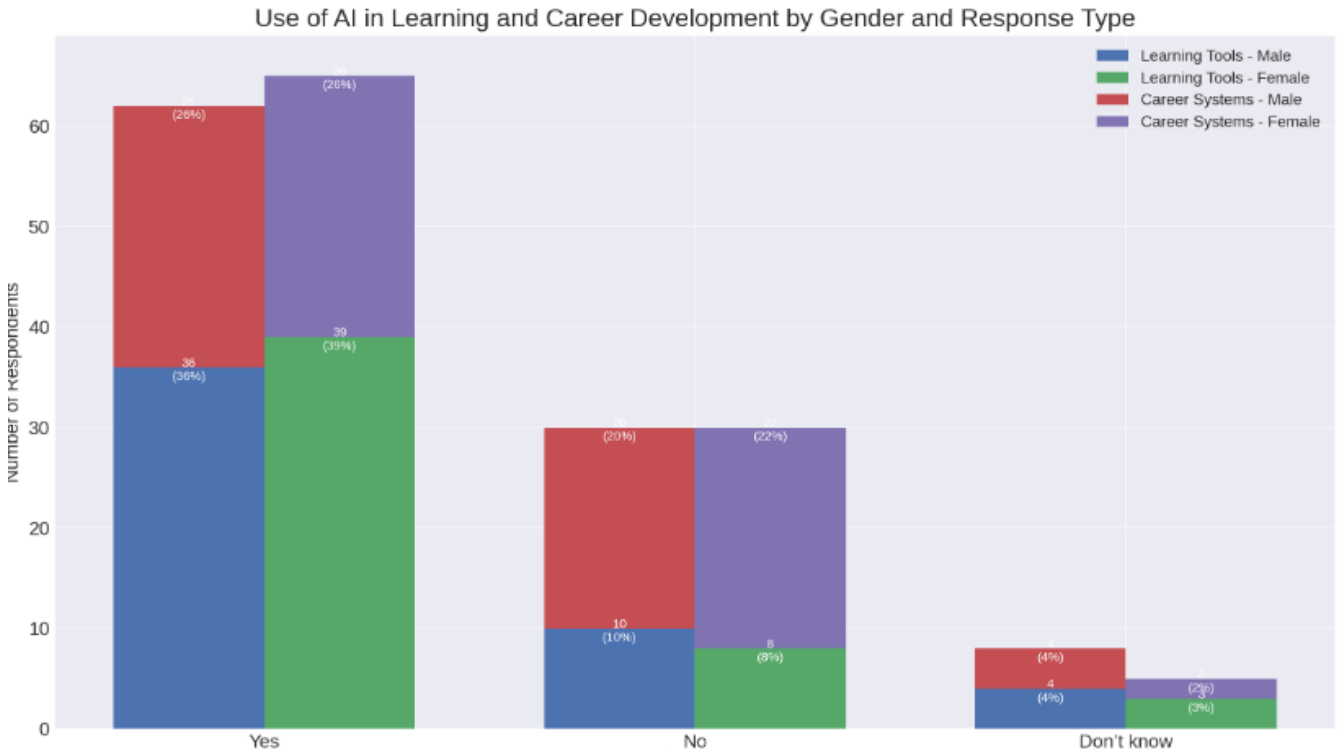

Figure 2: Awareness and Utilization of Artificial Intelligence in Learning and Development by Gender and Response Type

The charts above show gender-based responses for the use of AI-powered learning tools and AI-based career development systems. They illustrate similar adoption rates between males and females across both categories.

Table 2: Perception of AI among Learning and Development Professionals in Nigeria

AI Function or Capability Identified	**Percentage (%)**
Automated decision-making by intelligent systems	76.0%
Enhancing learning through data-driven insights	58.0%
Supporting tasks in collaboration with human input	63.5%
Adapting learning paths to new objectives or career shifts	48.2%
Understanding and responding to learner input via natural language	52.6%
(Recognizing human emotions)	*33.7%*
(Possessing all human cognitive abilities)	*21.0%*
(Feeling emotions like humans)	*18.5%*

Note: Items in *italics* represent **common misconceptions** about AI capabilities. Respondents selected from a predefined list of descriptions based on their understanding of AI in the context of learning and development.

Interpretation

The results indicate that most learning and development professionals have a foundational understanding of how AI functions in educational environments. A high percentage (76%) correctly associated AI with automated decision-making, while 58% acknowledged its ability to generate insights from data to personalize learning. Furthermore, 63.5% recognized that AI can support tasks when integrated with human expertise, such as designing adaptive learning content or identifying skill gaps. However, a notable proportion of respondents also demonstrated conceptual misunderstandings. For example, 33.7% mistakenly believed AI can recognize human emotions, and 18.5% assumed it can feel emotions like humans, which reflects an overestimation of AI's capabilities. These misconceptions may contribute to inflated expectations or misapplications of AI in career development systems.

Overall, these findings highlight a moderate-to-high level of AI awareness among L&D professionals, with clear opportunities for capacity building to ensure accurate understanding and effective application.

RQ2: Perceived Influence of AI on Personalized Career Growth and Skill Development

Learning and development professionals in Nigeria generally perceive Artificial Intelligence (AI) as a transformative force within the domain of employee training, skill enhancement, and long-term career planning. Respondents reported that AI is expected to:

- Revolutionize the broader learning and development (L&D) landscape (Mean = 3.74, SD = 1.10),
- Reshape operational practices within their organizations (Mean = 3.56, SD = 1.14), and
- Influence their individual responsibilities and methods in facilitating personalized learning paths (Mean = 3.63, SD = 1.18).

These findings suggest that despite varying levels of technical familiarity with AI, most professionals recognize its potential to significantly alter both organizational systems and their personal roles in guiding employee growth. They anticipate that AI will improve learning efficiency, enable customized content delivery, and streamline performance tracking ultimately leading to more targeted and meaningful career development for employees.

Table 3: Perceived Impact of AI on Learning and Career Development Functions

AI Expected Influence	Mean (M)	Standard Deviation (SD)
The learning and development (L&D) profession as a whole	3.74	1.10
Internal learning processes and talent development systems in my organization	3.56	1.14
Individual personalized role in guiding personalized learning and career planning	3.63	1.18

Note: With increasing use of AI technologies such as adaptive learning platforms, intelligent content recommendation engines, and AI-driven performance analytics, professionals were asked to rate the expected level of AI impact across different areas of their work. Responses were measured on a 5-point Likert scale (1 = Very low impact, 5 = Very high impact).

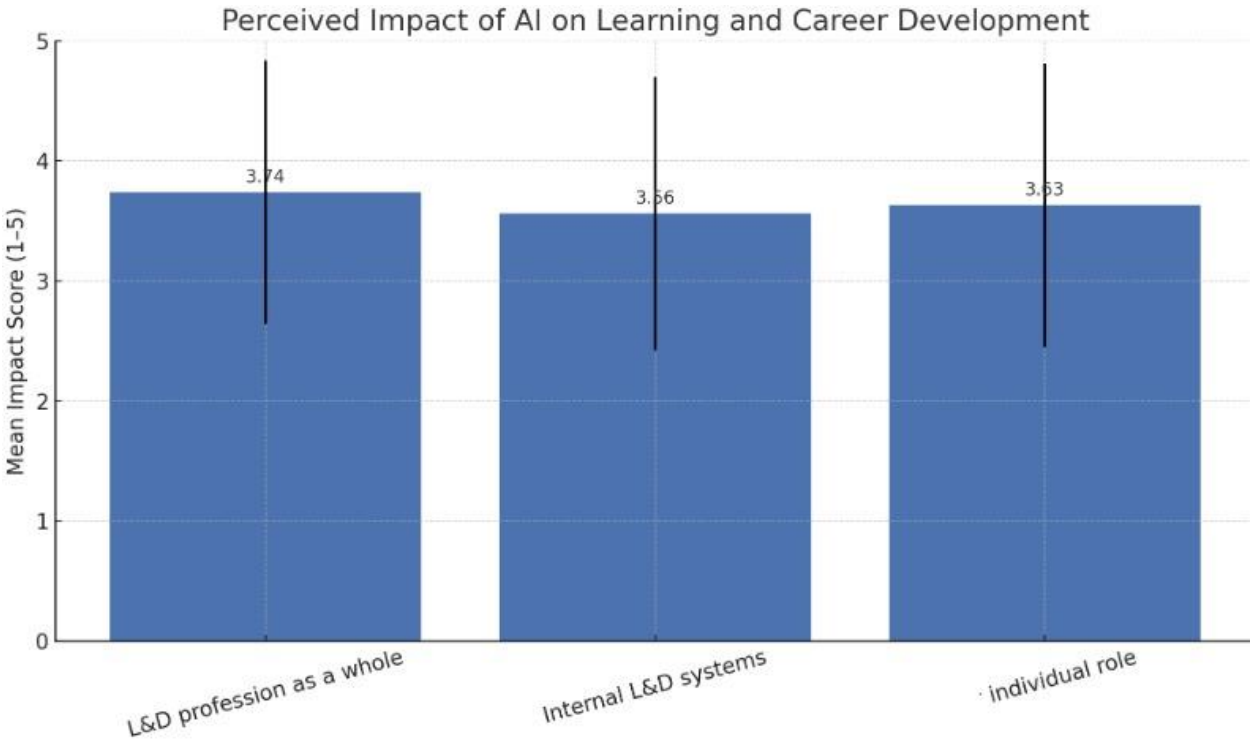

Figure 3: Perceived Impact of AI on L&D Functions

RQ3: Perceived Challenges in Implementing AI for Learning and Personalized Career Development?

A key objective of this study was to explore the perceived barriers faced by learning and development (L&D) professionals in adopting AI-driven solutions for personalized career planning and skill development. Interestingly, the findings indicate that respondents generally do not perceive AI implementation as highly challenging. While acknowledging the disruptive and transformative nature of AI technologies, most professionals expressed optimism about the attainability of essential support systems required for successful integration.

Specifically, a large proportion of respondents considered the following factors to be relatively manageable:

- **Availability of AI-related skills and competencies among L&D staff** (72.5%)
- **Employee motivation and openness to AI tools in training** (78.6%)
- **Institutional readiness and digital infrastructure** (66.3%)
- **Leadership support for AI initiatives** (71.4%)
- **National or societal infrastructure (e.g., internet, digital policies)** (60.2%)
- **User acceptance among employees or learners** (68.9%)

These figures suggest a growing recognition that AI is not only a future-oriented tool but a practical enabler of innovation in today's learning environments. Professionals appear increasingly confident in their ability to overcome technical, organizational, and cultural challenges associated with AI adoption.

A one-sample t-test was conducted to assess whether these challenges were perceived as significantly high. The results showed that mean ratings for all six implementation factors were statistically lower than the reference difficulty score of 4 (indicating "very difficult"), confirming that most professionals view these obstacles as relatively low (see Table 4).

Table 4: Perceived Challenges to AI Implementation in Learning and Career Development

Factors Impeding AI Adoption in L&D Contexts	Mean (M)	Standard Deviation (SD)	t-value	p-value
Skills and competencies of L&D professionals in AI application	2.68	1.05	-18.022	0.000
Willingness of staff and learners to adopt AI tools	2.63	1.08	-19.734	0.000
Institutional infrastructure (e.g., platforms, budget, integration)	2.79	1.12	-14.902	0.000
Managerial and leadership endorsement	2.74	1.10	-15.412	0.000
National infrastructure (e.g., connectivity, policy frameworks)	3.07	1.18	-11.108	0.000
User acceptance (employee/learner buy-in and engagement)	2.85	1.06	-15.230	0.000

Note: Respondents rated the difficulty of meeting each implementation requirement on a 5-point Likert scale (1 = Not difficult, 5 = Very difficult). A test value of 4 was used as the benchmark for high perceived difficulty.

RQ4: Perceived Risks of Integrating AI into Learning and Personalized Career Development

This study also examined the perceived risks associated with the integration of Artificial Intelligence (AI) into learning and development (L&D), particularly in relation to personalized career planning. Contrary to common concerns about automation and workforce displacement, the findings indicate that L&D professionals in Nigeria do not generally

view AI as a significant threat to their roles, compensation, or the broader professional identity of talent development practitioners.

A one-sample t-test revealed that the majority of respondents disagreed with statements suggesting that AI would negatively impact their job security (**72.6%**), reduce professional earnings (**72.8%**), or undermine core workforce competencies (**68.3%**). Additionally, most did not believe that AI would lead to confusion in roles and responsibilities (**70.9%**), diminish essential human capabilities (**79.3%**), or erode the distinct identity of the L&D profession (**79.7%**).

These results (see Table 5) underscore a prevailing sense of professional confidence and adaptability. Respondents largely view AI as a tool to enhance, rather than replace, human expertise. The low mean values recorded across all items were statistically different from the benchmark risk score of 4, reinforcing the conclusion that perceived threats from AI remain minimal among L&D professionals.

Table 5: Perceived Risk of AI in Learning and Career Development Roles

Perceived Risk Area	Mean (M)	Standard Deviation (SD)	t-test	p-value
Learning professionals will lose their jobs	2.48	1.19	-19.210	0.000
AI will lead to reduced salaries in L&D roles	2.53	1.17	-18.342	0.000
Workforce competence will decline due to AI reliance	2.75	1.14	-15.108	0.000
Roles and responsibilities will become unclear	2.60	1.22	-16.489	0.000
AI will displace essential human capabilities in professional practice	2.18	1.21	-21.804	0.000
The learning and development profession will lose its identity	2.10	1.25	-22.716	0.000

Note: Respondents rated each risk on a 5-point Likert scale (1 = Not likely, 5 = Very likely). The reference score of 4 represents a high level of perceived risk.

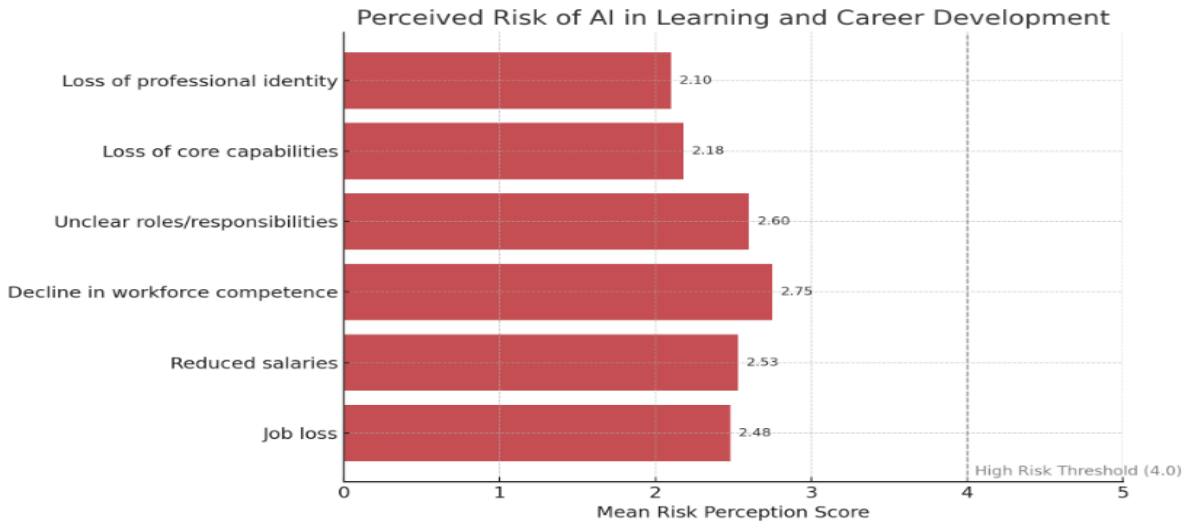

Figure 4: Risk Perception Chart

Summary of Overall Findings across all Research Questions

RQ1: Awareness and Utilization

Most learning and development professionals demonstrated basic awareness of AI and reported using AI-powered tools in personal and organizational settings. Gender did not significantly affect AI adoption rates.

RQ2: Perceived Impact

Respondents viewed AI as a positive force in learning and career development. They believed it could revolutionize L&D processes, enhance personalized learning experiences, and support more strategic talent development.

RQ3: Perceived Challenges

AI adoption was not seen as highly problematic. Professionals expressed confidence in their ability to overcome implementation barriers such as skill development, infrastructure, and leadership support. All perceived difficulty scores were significantly lower than the reference threshold.

RQ4: Perceived Risks

There was minimal concern about job loss, role confusion, or decline in professional identity. The data suggest a strong belief in human adaptability and the enduring relevance of L&D professionals, even as AI capabilities expand.

6. Discussion

The role of Artificial Intelligence (AI) in transforming learning and development (L&D) practices is increasingly recognized in global academic and professional discourse. However, much of the existing literature tends to be conceptual or opinion-based with limited empirical research focused specifically on how AI can personalize career growth and support talent development particularly in emerging economy like Nigeria. This study contributes to that gap by examining L&D professionals' awareness, perceptions, challenges, and risk evaluations regarding AI integration in career planning and learning environments.

While respondents demonstrated a general awareness of AI and its applications such as adaptive learning systems and performance analytics the overall low mean scores relating to perceived challenges and risks suggest that many professionals have not yet fully grasped the deeper implications of AI-driven L&D systems. Additionally, perceptions of AI-related risks such as job displacement, erosion of human competencies and professional identity loss were also low. This indicates a prevailing confidence among L&D professionals in their continued relevance and adaptability despite the expanding use of AI tools. Nevertheless, this optimism could mask deeper issues such as the misconception that using AI tools automatically equates to competence in deploying them strategically for career development outcomes.

Findings reveal that AI in L&D remains an emerging theme within Nigerian professional practice. While some organizations have begun incorporating AI-enabled platforms, such as learning management systems and automated skill assessments but the level of strategic engagement with AI for long-term career growth remains limited. Some professionals acknowledged that although AI is frequently discussed its actual influence on structured career development pathways is yet to be fully realized. This supports the view that AI for many is still more of a conceptual innovation than a transformative force in practice.

There is, therefore, an urgent need for L&D practitioners to deepen their understanding of AI and its practical applications in skills mapping, personalized learning plans, and predictive career pathing. Professional bodies in Nigeria, such as the Chartered Institute of Personnel Management (CIPM) and HR development associations should take the lead in sparking industry-wide conversations on the future of AI in L&D. This includes hosting workshops, policy dialogues, and certification programs focused on AI literacy and ethical deployment in employee development contexts. Moreover, educators and trainers responsible for shaping the next generation of professionals must also adapt

because integrating AI concepts into learning and development curricula especially in professional training programs is critical. Instructors need not become technologists but they should invest in continuous learning through AI-focused professional development, ensuring they can deliver relevant, future-ready instruction to their students.

While AI may not replace the human centered aspects of talent development such as empathy, mentorship, and emotional intelligence it does offer a powerful set of tools for supporting personalized, data driven and scalable career development strategies. Embracing AI intelligently and ethically will enable learning and development professionals in Nigeria to future proof their practices**,** empower employees, and align talent growth with evolving organizational needs.

References

1. Asma, S. K., & Abeeda A. (2017). Factors affecting students' career choice. *Journal of Research and Reflections in Education*, 2(2), 187-196.
2. Bayly-Castaneda, K., Ramirez-Montoya, M. S., & Morita-Alexander, A. (2024, August). Crafting personalized learning paths with AI for lifelong learning: a systematic literature review. In *Frontiers in Education* (Vol. 9, p. 1424386). Frontiers Media SA.
3. Bozkurt, A., Karadeniz, A., Baneres, D., Guerrero-Roldán, A. E., & Rodríguez, M. E. (2021). Artificial intelligence and reflections from educational landscape: A review of AI studies in half a century. *Sustainability*, *13*(2), 800.
4. Duan, J., & Wu, S. (2024). Beyond traditional pathways: Leveraging generative AI for dynamic career planning in vocational education. *International Journal of New Developments in Education*, *6*(2), 24-31.
5. Fajimolu, O., Okonji, P., & Onyemaobi, C. (2023). The role of organizational creativity between artificial intelligence capability and organizational performance. *Business and Entrepreneurial Review*, *23*(1), 157-174.
6. Folorunso, A., Olanipekun, K., Adewumi, T., & Samuel, B. (2024). A policy framework on AI usage in developing countries and its impact. *Global Journal of Engineering and Technology Advances*, *21*(01), 154-166.
7. Ghamghami, C. (2024). *Dominant employee threat perceptions and AI adoption risks across departments* (Doctoral dissertation, Saint Mary's College of California).
8. Ghedabna, L., Ghedabna, R., Imtiaz, Q., Faheem, M. A., Alkhayyat, A., & Hosen, M. S. (2024). Artificial intelligence in human resource management: Revolutionizing recruitment, performance, and employee development. *Nanotechnology Perceptions*, 52-68.
9. Hendahewa, C., Dissanayake, M., Samaraweera, S., Wijayawickrama, N., Ruwanpathirana, A., & Karunananda, A. S. (2018). Artificial intelligence approach to effective career guidance. In Sri Lanka Association for Artificial Intelligence (SLAAI) *Proceedings of the third Annual Sessions (pp. 1-8)*. Colombo, Sri Lanka.
10. Javed, M. (2018). Investigating factors affecting students' subject selection at secondary school level. *International Journal of Information and Education Technology*, *8*(11), 815–820.
11. Kiselev, P., Kiselev, B., Matsuta, V., Feshchenko, A., Bogdanovskaya, I. M., & Kosheleva, A. (2020). Career guidance based on machine learning: social networks in professional identity construction. *Procedia Computer Science*, *169*, 158–163.
12. Kulugh, V. E., Aondover, K. P., & Faki, A. S. (2025). Artificial intelligence-powered personalised career guidance system. *Dutse Journal of Pure and Applied Sciences*, *11*(1c), 92-104.
13. Lawretta, A. O. (2021). A critical assessment of personnel perceptions on training and its impacts on job performance in Nigerian organizations: The way forward.
14. Lent, R. W., & Brown, S. D. (2019). Social cognitive career theory at 25: Empirical status of the interest, choice, and performance models. *Journal of Vocational Behavior*, *115*, 103316.

15. Madhumithaa, N., Sharma, A., Adabala, S. K., Siddiqui, S., & Kothinti, R. R. (2025). Leveraging AI for personalized employee development: A new era in human resource management. *Advances in Consumer Research*, *2*, 134-141.
16. Mannuru, N. R., Shahriar, S., Teel, Z. A., Wang, T., Lund, B. D., Tijani, S., & Vaidya, P. (2023). Artificial intelligence in developing countries: The impact of generative artificial intelligence (AI) technologies for development. *Information Development*, 02666669231200628.
17. Mantello, P., Ho, M. T., Nguyen, M. H., & Vuong, Q. H. (2023). Bosses without a heart: socio-demographic and cross-cultural determinants of attitude toward Emotional AI in the workplace. *AI & society*, *38*(1), 97-119.
18. Morozevich, E. S., Korotkikh, V. S., & Kuznetsova, Y. A. (2022). The development of a model for a personalized learning path using machine learning methods. *Бизнес-информатика*, *16*(2 (eng)), 21-35.
19. Ola-Oluwa, J. A. (2024). Impact of artificial intelligence (AI) in enhancing knowledge sharing and boosting organizational efficiency in Nigerian enterprises. *African Journal of Management and Business Research*, *17*(1), 76-95.
20. Rehan, H. (2023). Shaping the future of education with cloud and AI technologies: Enhancing personalized learning and securing data integrity in the evolving edtech landscape. *Australian Journal of Machine Learning Research & Applications*, *3*(1), 359-395.
21. Rossier, J., Urbanaviciute, I., Gander, F., Hofmann, J., Masdonati, J., & Ruch, W. (2023). Vulnerabilities and psychological adjustment resources in career development. In *Withstanding Vulnerability throughout Adult Life: Dynamics of Stressors, Resources, and Reserves* (pp. 253-267). Singapore: Springer Nature Singapore.
22. Sathish, A. S., Rajkumar, V. S., Vijay, V., & Kathiravan, C. (2024). The significance of artificial intelligence in career progression and career pathway development. In *AI-Oriented Competency Framework for Talent Management in the Digital Economy* (pp. 28-41). CRC Press.
23. Shah, N., Bano, S., Saraih, U. N., Abdelwahed, N. A. A., & Soomro, B. A. (2023). Leading towards the students' career development and career intentions through using multidimensional soft skills in the digital age. *Education+ Training*, *65*(6/7), 848-870.
24. Swami, B., Sharma, S. K., & Sharma, R. (2024). Navigating career success: How career commitment shapes self-efficacy and career resilience for subjective career success. *Tourism and hospitality management*, *30*(1), 51-65.
25. Tuhame, M. & Maiga, G. & Habinka, A. & Kayondo, B. (2022). *Towards a conceptual model for developing a career prediction system for students' subject selection at secondary school level.* Research Gate.
26. Vadisetty, R., & Polamarasetti, A. (2024, December). AI-augmented skill development roadmaps: Tailoring 12-month learning paths for future-ready careers in education 4.0 and industry 4.0. In *2024 13th International Conference on System Modeling & Advancement in Research Trends (SMART)* (pp. 655-661). IEEE.
27. Westman, S., Kauttonen, J., Klemetti, A., Korhonen, N., Manninen, M., Mononen, A., Niittymäki, S., & Paananen, H. (2021). Artificial intelligence for Career Guidance – Current requirements and prospects for the future. *IAFOR Journal of Education*, *9*(4), 43–62.