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AI Powered Personalized Learning among Civil Servants in Anambra State.

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Abstract

This study explores the utilization and perspectives on AI-powered personalized learning among civil servants in selected local governments in Anambra State, Nigeria. As artificial intelligence (AI) continues to transform various sectors, its integration into public sector training presents both opportunities and challenges. Traditional training methods often fail to meet the diverse learning needs of employees, leading to disengagement and knowledge gaps. This research investigates the current level of adoption of AI-driven personalized learning technologies, the perceived effectiveness by civil servants, and the factors influencing these views. A structured questionnaire was administered to public personnel to gather quantitative data. Findings indicate that while there is some engagement with computer-based training, the adoption of AI-specific learning tools is limited. Perceptions of effectiveness are largely negative, with concerns about job relevance and institutional support. Challenges such as data privacy and technology access further hinder implementation. The study highlights the need for a strategic approach to enhance the adoption and effectiveness of AI-driven personalized learning, ultimately aiming to foster a more competent public workforce capable of meeting contemporary governance challenges.

Keywords: Artificial Intelligence, AI Powered Training, Personalized Training, Personalized
Training among Civil Servants, Anambra State.

Background to the Study

The rapid advancement of artificial intelligence (AI) has significantly transformed various sectors, including public administration. In recent years, the integration of AI technologies into education and training has gained considerable attention, particularly in the context of personalized learning. AI-powered personalized learning offers tailored educational experiences that cater to individual needs, skills, and learning styles, making it an increasingly relevant approach in public sector training programs.

In Anambra State, Nigeria, civil servants play a crucial role in delivering public services effectively. However, traditional training methods often fail to accommodate the diverse learning needs of employees, leading to disengagement and knowledge gaps. The one-size-fits-all approach can hinder the professional development of personnel, as some may struggle to keep up while others find the material insufficiently challenging. With the increasing complexity of public service roles, there is a pressing need for innovative training solutions that foster engagement and enhance skill acquisition.

AI-powered personalized learning (AI-PL) presents an opportunity to address these challenges by utilizing data analytics to create customized learning pathways. By identifying individual learning gaps, AI systems can recommend resources and strategies that best suit each employee's unique learning style. This adaptive approach not only improves engagement but also enhances training outcomes, ultimately contributing to a more competent public workforce (Abubakar et al., 2024; Alam, 2023).

Despite the potential benefits, the adoption of AI-driven personalized learning in public sector training within Anambra State faces several challenges. Concerns regarding data privacy, access to technology, and the readiness of trainers to embrace new methodologies are significant barriers that must be addressed. Additionally, understanding the perceptions of civil servants towards AI-PL is essential for successful implementation. Their views on the effectiveness and relevance of these technologies will play a critical role in shaping training programs that meet the evolving demands of public service (Maity, 2019).

Statement of the Problem

The integration of artificial intelligence (AI) in public sector training presents both opportunities and challenges. In Anambra State, Nigeria, civil servants often face significant obstacles in their professional development due to the limitations of traditional training methods. These conventional approaches frequently employ a standardized format that fails to accommodate the diverse learning needs of employees. As a result, many civil servants experience disengagement and knowledge gaps, which can undermine their ability to effectively serve the public.

Moreover, while AI-powered personalized learning (AI-PL) has the potential to enhance training by providing tailored educational experiences, its adoption within public institutions remains limited. Factors such as insufficient access to technology, concerns over data privacy, and a lack of readiness among trainers to implement AI-driven methodologies pose significant barriers to successful integration.

Additionally, there is a gap in understanding the perceptions of civil servants regarding AI-PL. Their views on the effectiveness, relevance, and usability of these technologies are crucial for shaping future training programs. Without a clear understanding of these perceptions, public institutions may struggle to effectively implement AI-driven solutions that meet the evolving demands of public service.

This study aims to address these issues by exploring the utilization and perspectives on AI-powered personalized learning among civil servants in selected local governments in Anambra State. By identifying the current level of adoption, perceived effectiveness, and the challenges faced, this research seeks to provide insights that can inform policy decisions and enhance the training landscape for public personnel.

Aim and Objectives

This study aims to explore the utilization and perspectives on AI-powered personalized learning among civil servants in selected local governments in Anambra State. By investigating the current level of adoption, the effectiveness perceived by personnel, and the factors influencing these views, the research seeks to provide valuable insights that can inform policy decisions and strategies for enhancing public sector training. Ultimately, the goal is to contribute to the development of a more effective and agile public workforce capable of meeting the diverse challenges of contemporary governance.

Ultimately, the study aims to contribute to the development of a more competent and effective public workforce by leveraging AI technologies to create tailored training experiences that meet the diverse needs of employees in the Nigerian public sector.

Research Questions

1. What is the current level of adoption of AI-driven personalized learning technologies in public personnel training programs?
2. How do public personnel perceive the effectiveness of AI-driven personalized learning in improving their training experiences?
3. What factors influence the adoption of AI-driven personalized learning among public personnel?
4. What challenges do public institutions face in implementing AI-driven personalized learning solutions?

Hypotheses

Ho_1: There is no significant difference in the mean responses of male and female public servants on level of adoption of AI-driven personalized learning technologies in public personnel training programs

Ho_2: There is no significant difference in the mean responses of male and female public servants on the effectiveness of AI-driven personalized learning in improving their training experiences

Literature Review

AI-driven personalized learning (AI-PL) has emerged as a transformative approach in education, leveraging artificial intelligence to tailor educational experiences to the individual needs of learners. As stated in the background, AI-driven personalized learning refers to a pedagogical approach that utilizes artificial intelligence technologies to customize educational content, learning pathways, and assessments based on individual learner characteristics, preferences, and progress. According to Woolf (2016), AI-PL integrates various AI technologies to create adaptive learning environments that respond dynamically to the unique needs of each student. This approach contrasts with traditional one-size-fits-all educational models, enabling a more learner-centred framework that fosters engagement and improves academic outcomes.

Personalized learning is characterized by its focus on the individual learner, allowing for flexibility in pacing, content, and instructional methods. As noted by Pane et al. (2017), personalized learning systems harness student data to adapt the educational experience, ensuring that it aligns with the learner's pace and style. This adaptability is particularly beneficial in diverse educational settings, where students often exhibit varying levels of readiness and motivation.

A foundational component of AI-driven personalized learning is the collection and analysis of student data. This data can include academic performance, learning behaviours, preferences, and assessments. AI systems utilize this information to generate insights about each learner's strengths and weaknesses, allowing educators to provide targeted support and resources. As highlighted by Pardo, Dawson, Gašević, & Steigler-Peters, (2016), effective data analytics can significantly enhance the personalization process, enabling timely interventions and customized learning experiences.

Adaptive learning technologies are central to AI-driven personalized learning. These technologies adjust the difficulty and type of content presented to students based on their performance and engagement levels. For instance, platforms like DreamBox and Smart Sparrow employ algorithms that modify the learning path in real-time, ensuring that students are appropriately challenged without becoming overwhelmed (Darling-Hammond et al., 2020). This adaptability is crucial in maintaining student motivation and fostering a growth mindset.

Intelligent tutoring systems (ITS) are another critical element of AI-PL. These systems provide personalized feedback and guidance to learners, similar to one-on-one tutoring. As described by Pedró, Subosa, Rivas, & Valverde (2019), ITS leverage AI to simulate human tutoring by analysing student interactions and delivering customized prompts, hints, and explanations. This real-time feedback helps students navigate complex concepts and reinforces their understanding, ultimately leading to improved learning outcomes.

AI-driven personalized learning facilitates the creation of individualized learning pathways. By assessing student data, AI systems can curate content that aligns with the learner's interests and academic goals. As noted by Selwyn (2020), this customization extends to various educational resources, including videos, readings, and interactive activities, allowing students to engage with material that resonates with their learning style. This tailored approach not only enhances comprehension but also promotes deeper engagement with the subject matter.

Continuous assessment is integral to AI-driven personalized learning, as it enables ongoing monitoring of student progress. AI systems can provide real-time feedback on assessments, allowing students to understand their performance immediately and make necessary adjustments. According to Hattie and Yates (2021), timely feedback is essential for effective learning, as it helps learners identify areas for improvement and reinforces mastery of concepts.

Despite the technological advancements in AI-driven personalized learning, the role of educators remains crucial. Teachers are not replaced by AI; rather, they become facilitators who guide students through their personalized learning journeys. As emphasized by Dede (2020), educators can leverage AI insights to tailor their instructional strategies, provide additional support, and foster a collaborative learning environment. This synergy between technology and teaching expertise enhances the overall educational experience.

AI-driven personalized learning represents a significant advancement in educational methodologies, harnessing the power of artificial intelligence to create tailored learning experiences. By focusing on individual learner needs through data analysis, adaptive technologies, intelligent tutoring systems, and continuous assessment, AI-PL has the potential to enhance student engagement, motivation, and academic performance. As educational institutions increasingly adopt these technologies, it is essential to recognize the vital role of educators in facilitating this personalized learning landscape.

Data Collection

The instrument for data collection was a 16-item structured questionnaire distributed to selected public personnel working atEkwudigo, Idemil North and Idemili South Local Government to gather quantitative data on their experiences with AI-driven personalized learning. The selection was based on public institutions and personnel who have in one way or another experienced computer-based training that integrated AI-driven personalized learning.

Population and Sample

The target population included all public personnel across various departments and levels within selected local government. A stratified random sampling technique was used to select a total of ensure representation from different roles, experience levels, and educational backgrounds and based on experience with digital tools and AI-driven taining.

Data Analysis

Descriptive and inferential statistical tools were employed in analysing the data. Mean scores were used to answer the research questions and a five-point Likert scale was used to compute the mean score for the items of the questionnaire.

The first null hypothesis formulated was tested using t-test at 0.05 level of probability to determine if to accept or reject the null hypothesis, while the second hypothesis was tested using ANOVA at 0.05 level of probability to determine if to accept or reject the null hypothesis.Both hypotheses were accepted when p value is greater than 0.05 and not-accepted when the p value is less than 0.05 (George & Mallery, 2003).All computations were done using the Statistical Package for the Social Sciences (SPSS).

Presentation and Analysis of Data

Question 1: What is the current level of adoption of AI-driven personalized learning technologies in public personnel training programs?

S/N	Item Statement		SD	Remark
1	I have undergone computer-based training	4.54	0.77	Agree
2	I have attended AI-driven staff training	1.48	0.61	Agree
3	It was easy to understand and use ICT/AI -driven learning tools	4.54	0.80	Agree
	Grand	**3.52**	**0.73**	**Accepted**

The table above presents the level of adoption of AI-driven personalized learning technologies. The data reveals that usage of Computer-Based Training, showing a mean score of 4.54 (SD = 0.77) indicating a strong agreement that civil servants have engaged in computer-based training. However, a mean of 1.48 (SD = 0.61) suggests limited exposure to AI-specific training programs, which is concerning for future integration. Furthermore, a mean of 4.54 (SD = 0.80) reflects agreement on the comprehensibility of ICT/AI tools, highlighting that those who have engaged with these technologies found them user-friendly. The overall grand mean of 3.52 (SD = 0.73) suggests a moderate acceptance of AI-driven tools in training, though the low participation in AI-driven staff training raises questions about the depth of adoption.

Question 2: How do public personnel perceive the effectiveness of AI-driven personalized learning in improving their training experiences?

S/N	Item Statement		SD	Remark
1	Internalisation of has been very easy du enhancement of A-dIriven methods	2.34	0.52	Disagree
2	AI-driven tools made the trainings kmesa engageme easy during trainings	2.55	0.41	Agree
3	Skill acquisition and knowledge retention g improved due to A-dIriven personalisation	2.12	0.78	Disagree
	Grand	2.34	0.57	Rejected

The data in the table above shows the perceptions of effectiveness hence, the results are less favourable to the perception of effectiveness AI tools in training. With mean scores of 2.34 (SD = 0.52) and 2.55 (SD = 0.41), respondents disagreed that AI tools significantly enhance internalization and engagement. However, A score of 2.12 (SD = 0.78) shows strong disagreement regarding improvements in skill acquisition and knowledge retention due to AI personalization.The grand mean of 2.34 (SD = 0.57) indicates a rejection of the effectiveness of AI-driven learning in enhancing training experiences, pointing to a potential mismatch between technology capabilities and user expectations.

Question 3: What factors influence the adoption of AI-driven personalized learning among public personnel?

S/N	Item Statement		SD	Remark
1	AI-driven learning experience improves my jo relevance	2.51	0.76	Disagree
2	With the adoption of AI-driven tools and methods, there is ease of institutional support	2.72	0.49	Agree
3	The AI-driven tools are often accessible and can be re-used after the training duration	1.98	0.48	Disagree
	Grand	**2.4**	**0.58**	**Rejected**

This table identifies factors impacting the adoption of AI-driven learning, thus showing a mean of 2.51 (SD = 0.76) indicating a disagreement that AI tools improve job relevance which goes to suggest that personnel do not see a direct connection between AI training and their professional development. However, a mean of 2.72 (SD = 0.49) reveals some agreement on the ease of obtaining institutional support with AI adoption. A low mean of 1.98 (SD = 0.48) reflects disagreement about the accessibility of AI tools post-training.The grand mean of 2.4 (SD = 0.58) indicates overall rejection of the perceived benefits of AI-driven learning adoption, suggesting systemic barriers that may hinder effective integration.

Question 4: What challenges do public institutions face in imp The data in the table outlines challenges faced by public institutions in

S/N	Item Statement	$\bar{x}$	SD	Remark
1	We experience considerable lack of ICT/AI infrastructure during training	2.51	0.76	Disagree
2	Using AI to learn is often confusing and difficult	2.72	0.49	Agree
3	Majority of my colleagues are computer literate	2.58	0.78	Disagree
4	There were adequate electricity supply and internet connectivity during the training	3.22	0.71	Agree
	Grand	**2.76**	**0.69**	**Rejected**

adopting AI in training of personnel. The table shows a mean of 2.51 (SD = 0.76) indicates disagreement about a lack of necessary infrastructure, but suggesting that technology is available but perhaps not effectively utilized. The respondents however reveals a probable c**onfusion and difficulty** with a score of 2.72 (SD = 0.49) showing shows agreement that AI is often perceived as confusing, which may deter adoption.A mean of 2.58 (SD = 0.78) in ICT l**iteracy**indicates disagreement that most colleagues are computer literate, highlighting a potential skills gap.The grand mean of 2.76 (SD = 0.69) suggests that while some challenges are acknowledged, there is a belief that institutions can manage these issues.
Hypothesis 1: Summary of t-test analysis of the means scores of male and female public servants on level of adoption of AI-driven personalized learning technologies in public personnel training programs
lementing AI-driven personalized learning solutions?

Gender	N	Mean	S.D	t-cal	df	p.val	t-tab	Std error
Female	74	2.75	1.02	0.75	118	0.35	1.96	0.12
Male	46	2.84	0.93					

The t-test analysis on table above posits that there is no significant difference in the mean responses of male and female public servants regarding the level of adoption of AI-driven personalized learning technologies in public personnel training programs. The data reveals that female respondents (N = 74) have a mean score of 2.75 with a standard deviation of 1.02, while male respondents (N = 46) report a mean score of 2.84 and a standard deviation of 0.93. The statistical analysis, which yields a t-calculated value of 0.75 and a p-value of 0.35, indicates that the differences in mean scores between the genders are not statistically significant. Since the p-value exceeds the typical significance level of 0.05, we fail to reject the null hypothesis. This suggests that both male and female civil servants demonstrate similar levels of engagement with AI-driven personalized learning technologies, indicating a uniformity in adoption across gender lines.

Hypothesis 2:*Summary of t-test analysis of the means scores of male and female* public servants on the effectiveness of AI-driven personalized learning in improving their training experiences?

Gender	N	Mean	S.D	t-cal	df	p.val	t-tab	Std error
Female	74	2.65	1.02	0.95	118	0.35	1.96	0.12
Male	46	2.74	0.93					

The result of the t-test computation reveals that female respondents reported a mean score of 2.65 (SD = 1.02), while male respondents had a mean score of 2.74 (SD = 0.93). The t-calculated value for this hypothesis is 0.95, with a degree of freedom of 118, resulting in a p-value of 0.35. As this p-value also exceeds the 0.05 threshold, we again fail to reject the null hypothesis. This outcome indicates that there is no significant difference in how male and female public servants perceive the effectiveness of AI-driven personalized learning in enhancing their training experiences. Both genders appear to share similar views on the impact of these technologies.

Findings

The analysis of these tables indicates that while there is some level of adoption of AI-driven personalized learning technologies among civil servants, perceptions of their effectiveness are largely negative. Factors such as perceived job relevance, institutional support, and challenges in implementation highlight areas that need addressing for successful integration. Future training programs should focus on enhancing engagement with AI tools and ensuring that they are aligned with the needs and expectations of public personnel.

Results of the analysis of both hypotheses indicate that gender does not significantly influence either the adoption or the perceived effectiveness of AI-driven personalized learning technologies among civil servants. The lack of significant differences suggests a collective approach to AI adoption in training programs, highlighting the need for further investigation into other factors that may influence engagement and perception, such as experience level, job relevance, and institutional support. Understanding these dynamics could be crucial for enhancing the effectiveness of AI-driven training initiatives in the public sector.

Discussion

The analysis reveals a strong engagement in computer-based training, indicating that civil servants are generally familiar with digital learning tools. However, the low participation in AI-specific training raises concerns about the depth of adoption. This inconsistency suggests that while civil servants are comfortable with technology, their exposure to advanced AI-driven methods is limited. Such a gap could hinder the potential benefits that AI technologies can offer in enhancing training experiences.

Perceptions of effectiveness are largely negative, as respondents expressed disagreement about the enhancements in internalization, engagement, and skill acquisition attributed to AI tools. This indicates a disconnect between the capabilities of AI technologies and the expectations of civil servants. Such a mismatch signals a critical area for improvement in future training programs, as it highlights the need for better alignment of AI solutions with user needs.

The document also discusses several factors influencing the adoption of AI-driven learning. While some respondents acknowledged the availability of institutional support, there was general disagreement about the relevance of AI tools to their job roles. This suggests that civil servants do not see a direct connection between AI training and their professional development, which could undermine motivation to adopt these technologies.

Moreover, the analysis identifies various challenges faced by public institutions in implementing AI-driven learning solutions. Although respondents disagreed about a lack of necessary infrastructure, they did acknowledge confusion and difficulty in using AI tools. This indicates that while technology may be available, effective utilization remains a challenge due to perceived complexity and potential skills gaps among personnel.

The findings also explore gender differences in the adoption and perceptions of AI-driven learning. Statistical analyses reveal no significant differences between male and female respondents regarding both adoption levels and perceptions of effectiveness. This suggests a shared perspective among civil servants, regardless of gender, regarding the integration of AI technologies in training.

Conclusion

The study reveals that although the integration of AI-driven personalized learning into public personnel training offers a promising solution to the challenges posed by traditional training methods, by tailoring educational experiences to individual needs. Again, AI-PL can enhance engagement, improve knowledge retention, and ultimately foster a more competent and effective public workforce. However, there is the need for a strategic approach to enhance the adoption and effectiveness of AI-driven personalized learning in public personnel training. Addressing the identified gaps in perception, relevance, and implementation challenges is essential for maximizing the potential of AI technologies. Future training initiatives should focus on aligning AI tools with the specific needs of civil servants and providing adequate support to facilitate effective integration. Understanding these dynamics will be crucial for the successful enhancement of training programs in the public sector.

Reference

Abubakar, U., Onasanya, S. A., & Ibrahim, H. A. (2024). Student perspectives and impact of AI integration in pedagogical practices in Nigerian tertiary institutions. *Advances in Mobile Learning Educational Research*, *4*(2), 1135-1148.

Alam, A. (2023). Harnessing the power of AI to create intelligent tutoring systems for enhanced classroom experience and improved learning outcomes. In *Intelligent Communication Technologies and Virtual Mobile Networks* (pp. 571–591).

Darling-Hammond, L., et al. (2020). Equity in education: How personalized learning can support diverse learners. *Educational Leadership*, 77(8), 36-41.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2020). *Effective teacher professional development*. Palo Alto, CA: Learning Policy Institute.

Dede, C. (2020). The role of technology in personalized learning. *Harvard Education Press*.

Gašević, D., Ternier, S., & Duval, E. (2017). *Harnessing the power of learning analytics in higher education: A systematic review*. *Educational Technology & Society*, *20*(4), 60-74.

Hattie, J., & Yates, G. (2021). *Visible learning and the science of how we learn*. Abingdon, UK: Routledge.

Kerr, D., & McMahon, M. (2020). *AI in education: A strategic approach to personalized learning*. *Journal of Educational Technology*, *35*(2), 45-56.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. London, UK: Pearson.

Maity, S. (2019). Identifying opportunities for artificial intelligence in the evolution of training and development practices. *Journal of Management Development*, *38*(8), 651–663.

Meyer, K. A., & Land, R. (2020). *Threshold concepts and troublesome knowledge: Linkages to ways of thinking and practicing within the disciplines*. *Higher Education*, *65*(3), 1-16.

OECD. (2019). *AI in education: Challenges and opportunities for schools*. Paris, France: OECD Publishing.

Pane, J. F., Steiner, E. D., Baird, M. D., & Hamilton, L. S. (2017). Continued progress: Promising evidence on personalized learning. *RAND Corporation.*

Pardo, A., Dawson, S., Gašević, D., & Steigler-Peters, S. (2016). *The role of learning analytics in future education models* (Technical report.

Pardo, A., Dawson, S., Gašević, D., & Steigler-Peters, S. (2016). *The role of learning analytics in future education models* (Technical report). https://doi.org/10.13140/RG.2.2.16834.68802

Popenici, S. A. D., & Kerr, S. (2017). *Exploring the impact of artificial intelligence on teaching and learning in higher education. Research and Practice in Technology Enhanced Learning, 12*(1), 1-10.

Selwyn, N. (2020). Education and technology: Key issues and debates. *Bloomsbury Publishing*

Siemens, G. (2013). *Learning analytics: The emergence of a discipline. American Behavioral Scientist, 57*(10), 1380-1400.

UNESCO. (2021). *Artificial intelligence in education: Challenges and opportunities for sustainable development*. Paris, France: UNESCO Publishing.

Woolf, B. P. (2016). *Building Intelligent Interactive Tutors: Student-centered strategies for revolutionizing e-learning*. Morgan Kaufmann.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). *Systematic review of research on artificial intelligence in higher education. International Journal of Educational Technology in Higher Education, 16*(1), 1-27.

Zhang, K., & Zheng, L. (2019). *The role of AI in personalized learning: A review of the literature. Computers & Education, 129*, 1-12.