IMPACT OF AI INTEGRATION IN TRAINING PROGRAMS ON EMPLOYEE SKILL ENHANCEMENT, CAREER GROWTH AND SATISFACTION AMONG LECTURERS IN STATE OWNED TERTIARY INSTITUTIONS IN KATSINA STATE

BY

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Abstract

The integration of Artificial Intelligence (AI) in Human Resource Management (HRM) has transformed organizational operations. AI-driven training programs offer personalized and adaptive learning experiences, revolutionizing employee training and development. This quantitative study investigated the impact of AI-driven training programs on lecturers' skills, career growth, and job satisfaction in Katsina State-owned tertiary Institutions. A stratified random sampling technique selected 297 lecturers from four institutions, and data was analyzed using Partial Least Squares Path Modeling (PLS-SEM). The study revealed significant positive relationships between AI-driven training and lecturers' outcomes. Specifically, AI-driven training positively influenced lecturers' skills ($\beta = 0.35$, $p < 0.01$), career growth ($\beta = 0.52$, $p < 0.001$), and job satisfaction ($\beta = 0.48$, $p < 0.001$). Large effect sizes were observed for Career Growth ($f^2 = 0.34$) and Job Satisfaction ($f^2 = 0.29$), underscoring the substantial impact of AI-driven training. The study concludes that AI-driven training programs enhance lecturers' skills, career growth, and job satisfaction. Recommendations include prioritizing AI-driven training in tertiary institutions and improving predictive model capabilities. Future research should explore AI-driven training's impact on diverse institutional backgrounds, investigate specific mechanisms influencing lecturers' development, and utilize objective outcome measures. This study contributes to the growing body of research supporting AI-driven training's effectiveness in improving employee outcomes, providing actionable insights for policymakers and administrators to leverage AI-driven HRM practices and promote academic staff development.

Keywords: AI-driven training, Lecturers' development, Job satisfaction, Career growth, Human Resource Management (HRM)

Introduction

The integration of Artificial Intelligence (AI) in various sectors has marked a significant shift in how organizations operate, and Human Resource Management (HRM) is no exception. AI has the potential to revolutionize employee training and development programs by offering personalized and adaptive learning experiences that cater to individual needs and learning paces (Omar, Mior Harun, Mohd Ishar, Mustapha, & Ismail, 2024). In educational institutions, where the enhancement of faculty skills directly impacts the quality of education, AI-driven training programs can play a crucial role. As institutions strive to maintain high standards of teaching and learning, the continuous professional development of lecturers becomes imperative (Awoduji, Ogbudinkpa, & Agharanya, 2020; Vadivel, Namaziandost, & Saeedian, 2021). AI-driven training programs refers to the use of AI technologies to deliver personalized learning experiences, adaptive learning paths, and real-time feedback to lecturers. By its nature, AI can analyze individual learning behaviors and preferences, creating customized training modules that address specific skill gaps and learning needs (Chen, 2023; Murtaza, Ahmed, Shamsi, Sherwani, & Usman, 2022) . By utilizing AI, institutions can offer more efficient and targeted professional development opportunities, ensuring that lecturers receive the training they need to excel in their roles. The potential of AI to transform traditional training methods into dynamic and interactive learning experiences highlights its importance as a tool for enhancing HRM practices in educational settings.

Recent studies have highlighted the potential of AI-driven training programs to enhance employee skills, promote career growth, and boost employee satisfaction (Bagai & Mane, 2024; Boehmer & Schinnenburg, 2023; Popo-Olaniyan, James, Udeh, Daraojimba, & Ogedengbe, 2022). Kaswan, Dhatterwal, and Ojha (2024), posited that AI-powered training platforms can offer personalized learning experiences, real-time feedback, and adaptive assessments, leading to improved learning outcomes and increased efficiency. Moreover, AI-driven training programs can help lecturers develop specialized skills, such as data analysis, digital literacy, and online teaching, which are essential for success in today's digital age. Despite the growing interest in AI-driven training programs, there is a scarcity of research on their impact on university lecturers. Most studies have focused on the technical aspects of AI integration, neglecting the human factor and the complex dynamics of organizational change (Olan et al., 2022). Furthermore, little is known about the effects of AI-driven training programs on lecturers' career growth, job satisfaction, and overall well-being (Khan, Jamil, Piran, Kwon, & Lee, 2024). This study aims to address this knowledge gap by investigating the impact of AI integration in training programs on employee skill enhancement, career growth, and employee satisfaction among university lecturers.

This study explores the impact of AI-driven training programs on lecturers in Katsina State Government Owned Tertiary Institutions, examining their effect on skill development, career advancement, and job satisfaction. By investigating the impact of AI integration in training programs on employee skill enhancement, career growth, and employee satisfaction among university lecturers, the research aims to provide actionable insights for policymakers and administrators to leverage AI-driven HRM practices, promote academic staff development, and improve educational outcomes. The findings will inform the design and implementation of effective training initiatives, enhancing the quality of teaching and learning in higher education institutions, and ultimately contributing to the development of a more skilled and satisfied academic workforce.

Objectives of the study

The following objectives guide the study:

i. To find out if AI-driven training program enhances lecturers' skill in Katsina state owned Tertiary Institutions;
ii. To investigate if AI-driven training program positively contributes to lecturers' career growth in Katsina state owned Tertiary Institutions.
iii. To discover if AI-driven training program positively affects job satisfaction among lecturers in Katsina state owned Tertiary Institutions.

Literature Review

This literature review examines the impact of AI Integration in training programs, employee skill enhancement, career growth, and employee job satisfaction, thereby providing insights into the effectiveness of AI-driven training initiatives in improving employees' skills, advancing their careers, and job satisfaction.

Employee Skill Enhancement

Employee Skill Enhancement refers to the process of improving employees' skills and competencies through AI-driven training programs. This concept encompasses the acquisition of new skills, the enhancement of existing skills, and the development of specialized skills that are essential for success in today's digital age (Selwin et al., 2024; Subramanian & Kumar, 2017; Yaghi, 2024). AI-driven training programs have been shown to significantly enhance employees' skills, particularly in areas such as data analysis, digital literacy, and technical skills (David-West & Ig-worlu, 2023; Maimela, 2024; Olaniyi, Ezeugwa, Okatta, Arigbabu, & Joeaneke, 2024). These programs offer personalized learning experiences, adaptive assessments, and real-time feedback, allowing employees to develop specialized skills that are essential for success in today's digital age (Vladimirovna, 2024). Studies have

consistently demonstrated the effectiveness of AI-driven training programs in enhancing employees' soft skills, including communication (Singh & Chouhan, 2023), collaboration (Ekuma, 2024; Ouyang & Zhang, 2024), and problem-solving (Singh & Chouhan, 2023). Notably, research by Singh and Chouhan (2023) has also highlighted the positive impact of AI-driven training on these soft skills, leading to improved employee performance and organizational outcomes, underscoring the potential of AI-driven training to develop a more skilled and adaptable workforce. By leveraging AI-powered tools and platforms, employees can engage in excessive and interactive learning experiences that simulate real-world scenarios, leading to improved skill acquisition and retention (Alam, 2023). Hence the following hypothesis is developed:

H1: AI-driven training program does not positively enhances lecturers' skill in Katsina state owned Tertiary Institutions.

Career Growth

Career Growth refers to the advancement and progression of employees' careers through AI-driven training programs. This concept encompasses the development of new skills, the expansion of job responsibilities, and the movement into new roles and positions within an organization (Bhaskar & Dayalan, 2021; Modem, Lakshminarayanan, Pillai, & Prabhu, 2022). AI-driven training programs have been found to have a positive impact on employees' career advancement and professional development (Bagai & Mane, 2024; Ramachandran et al., 2024). It is believed that when employees are provided with opportunities to develop in-demand skills and competencies, these programs can enhance career prospects and increase employability. Moreover, AI-driven training programs can help employees identify skill gaps and develop personalized learning plans, leading to more effective career planning and development (Marwan, 2020). Research has consistently demonstrated that AI-driven training programs can lead to increased employee mobility and career progression within organizations (Bankins et al., 2024; Chukwuka & Dibie, 2024), including enhanced career outcomes and increased job satisfaction (Gayathri & Bella, 2024). Through the strategic use of AI-powered tools and platforms, employees can access new learning pathways and development opportunities, leading to improved skill acquisition and retention (Alam, 2023) and increased potential for career advancement and professional growth (Marwan, 2020). Consequently, the following hypothesis is advanced:

H2: AI-driven training program does not positively contribute to lecturers' career growth in Katsina state owned Tertiary Institutions.

Employee Satisfaction with Training

Employee Satisfaction with Training encompasses employees' attitudes, feelings, and experiences with the training process, including their motivation, engagement, and overall satisfaction. Employees' perceived satisfaction and engagement with AI-driven training programs have been found to be high, particularly when compared to traditional training methods (Rožman, Tominc, & Milfelner, 2023). AI-driven training programs offer personalized learning experiences, flexible learning paths, and real-time feedback, leading to increased employee engagement and motivation (Kaswan et al., 2024; Vladimirovna, 2024). This, in turn, enables AI-driven training programs to revolutionize employee development by providing tailored learning experiences, adaptable learning paths, and instant feedback, thereby boosting engagement, motivation, and overall performance. Study has consistently demonstrated that the strategic utilisation of AI in training programs can lead to increased employee satisfaction and engagement, particularly when interface design is intuitive, interactive, and visually appealing (Fisher & Baird, 2020). Moreover, AI-driven training programs can provide employees with a sense of autonomy and agency, leading to increased satisfaction and engagement with the training process (Passalacqua et al., 2024; Theben, Plamenova, Perramon, & Llach, 2023; Viterouli, Belias, Koustelios, Tsigilis, & Papademetriou, 2024). By tapping into AI-powered tools and platforms, training programs can be designed with user-centric interfaces, leading to improved

learning outcomes and increased potential for skill acquisition and retention. Thus, the following hypothesis is presented:

H3: AI-driven training program does not positively affect job satisfaction among lecturers in Katsina state owned Tertiary Institutions.

AI Integration

Research has shown that organizations are increasingly adopting AI-driven training programs to enhance employee learning and development (Vladimirovna, 2024). Effective AI integration can lead to improved training outcomes, increased efficiency, and enhanced employee engagement (Ramachandran et al., 2024; Rožman et al., 2023). However, the level of AI integration in training programs can vary, ranging from basic automation to advanced personalized learning experiences. Studies have highlighted the importance of aligning AI integration with organizational goals and training objectives to ensure maximum impact (Chowdhury et al., 2023; Kulkov et al., 2024; Olan et al., 2022). Use of AI technologies is becoming increasingly predominant, which has been described by Colchester, Hagras, Alghazzawi, and Aldabbagh (2017) as the application of machine learning, natural language processing, and adaptive learning platforms commonly used in training programs. These technologies enable organizations to offer tailored learning experiences, real-time feedback, and adaptive assessments, leading to improved learning outcomes (Gligorea et al., 2023). However, the choice of AI technology depends on various factors, including training objectives, employee needs, and organizational resources. Research has shown that a combination of AI technologies can lead to more effective training outcomes than a single technology (Kaplan, Kessler, Brill, & Hancock, 2023) as different AI technologies can complement each other and provide a more comprehensive and personalized learning experience.

Effective implementation of AI-driven training programs requires careful planning, stakeholder engagement, and change management (Kulkov et al., 2024). Vladimirovna (2024), has highlighted the importance of considering factors such as employee readiness, data privacy, and technical infrastructure when implementing AI-driven training programs. A phased implementation approach, starting with pilot programs and gradually scaling up, can lead to more successful adoption (Uren & Edwards, 2023). This test is necessary to ensure the AI-driven training program are effective, free from potential issues/errors, and assist in making data-driven decisions leading to optimized the implementation, improved learning outcomes and increased return on investment (ROI). Moreover, ongoing evaluation and monitoring are crucial to ensure the effectiveness and continuous improvement of AI-driven training programs (Kulkov et al., 2024).

Theoretical Framework

The theoretical framework for this study is the Technology Acceptance Model (TAM) by (Davis, 1989). TAM posits that an individual's intention to use technology is influenced by their perceived usefulness and perceived ease of use. In the context of AI integration in training programs among lecturers in Katsina state owned tertiary institutions, TAM can help explain how lecturers' beliefs and attitudes towards AI-driven training programs affect their adoption and utilization, ultimately impacting their skill enhancement, career growth, and job satisfaction. This framework is based on the idea that individuals' behavioral intentions are shaped by their cognitive evaluations of the technology. With TAM as a guiding theory, this study can investigate how lecturers' perceptions of AI-driven training programs influence their willingness to engage with and benefit from these programs. The Social Cognitive Theory (SCT) by Bandura (1992) supports the TAM by providing a deeper understanding of the social and environmental factors that influence lecturers' adoption and utilization of AI-driven training programs.

Research Methodology

This study employed a quantitative research approach to investigate the impact of AI-driven training programs on lecturers in Katsina State Owned Tertiary Institutions, with a population size of 1,317 lecturers distributed across four selected tertiary institutions in the state: Umaru Musa Yaradua University (625 lecturers), Hassan Usman Katsina Polytechnic (430 lecturers), Isah Kaita College of Education Katsina (217 lecturers), and Katsina State Institute of Technology and Management (45 lecturers). The sample size was determined using Morgan Table at a 5% sampling error, resulting in a sample size of 297 lecturers. A stratified random sampling technique was used to allocate the sample as follows: Umaru Musa Yaradua University (141 lecturers), Hassan Usman Katsina Polytechnic (97 lecturers), Isah Kaita College of Education Katsina (49 lecturers), and Katsina State Institute of Technology and Management (10 lecturers). A structured survey questionnaire was administered to collect data, which was analyzed using Smart PLS (Partial Least Squares) software, a variance-based structural equation modeling technique, to examine the relationships between AI-driven training programs and lecturers' skill enhancement, career growth, and job satisfaction.

Data Analysis

This study was conducted with a sample size of 297 lecturers from Katsina state-owned tertiary institutions, out of which 276 returned the questionnaire, and 261 responses were deemed usable for analysis, providing a substantial dataset for examining the effects of AI-driven training on lecturers' skills, career growth, and job satisfaction. The data was analyzed using Partial Least Squares Path Modeling (PLS-SEM) to test the hypothesis, a components-based Structural Equation Modeling (SEM) technique that offers advantages over ordinary least squares regression. PLS-SEM consists of a measurement model, which examines relationships between latent variables and their measures, and a structural model, which investigates relationships between latent variables (Hair, Sarstedt, & Ringle, 2021). This approach was chosen for its ability to handle complex models regardless of sample size, non-parametric predictor specification, and capacity to manage both reflective and formative measures (Ramayah, Jacky, Chuah, Ting, & Memon, 2018). Additionally, PLS-SEM is well-suited for social science research, where data often deviate from normality, as it can effectively accommodate non-normal data, making it an ideal choice for this study (Cain, Zhang, & Yuan, 2017; Hair, Sarstedt, Ringle, & Mena, 2017; Knief & Forstmeier, 2021).

Measurement Model

PLS-SEM employs a two-stage evaluation process for the measurement model, ensuring the reliability and validity of construct measures. Initially, the reliability of measures is assessed, followed by an examination of construct validity in the second stage (Hair et al., 2021; Sarstedt, Ringle, & Hair, 2021). This rigorous two-stage approach guarantees the measurement model's accuracy and consistency, which is vital for deriving meaningful conclusions in PLS-SEM analyses.

Validity and Reliability

The results show satisfactory internal consistency and validity for all constructs, with Cronbach's Alpha and Composite Reliability (rho_a) values exceeding 0.7, indicating good reliability (Sarstedt et al., 2021; Sürücü & Maslakçi, 2020). Average Variance Extracted (AVE) values are above 0.5, demonstrating adequate convergent validity. Specifically, AI Integration (AIT) has loadings ranging from 0.736 to 0.867, Career Growth (CG) from 0.755 to 0.904, Employee Skill Enhancement (ESE) from 0.766 to 0.889, and Job Satisfaction (JS) from 0.762 to 0.861, indicating that the items are suitable measures for their respective constructs.

Table 1:
Loading Internal Consistency and AVE

Items	Loadings	Cronbach's Alpha	Composite Reliability (rho_a)	Average Variance Extracted (AVE)
AIT1	0.822	0.819	0.835	0.649
AIT2	0.867			

AIT3	0.736			
AIT4	0.791			
CG1	0.755	0.894	0.900	0.705
CG2	0.880			
CG4	0.883			
CG5	0.904			
CG6	0.764			
ESE2	0.766	0.877	0.925	0.726
ESE3	0.889			
ESE5	0.858			
ESE6	0.889			
JS1	0.861	0.871	0.881	0.659
JS2	0.843			
JS3	0.768			
JS4	0.762			
JS5	0.820			

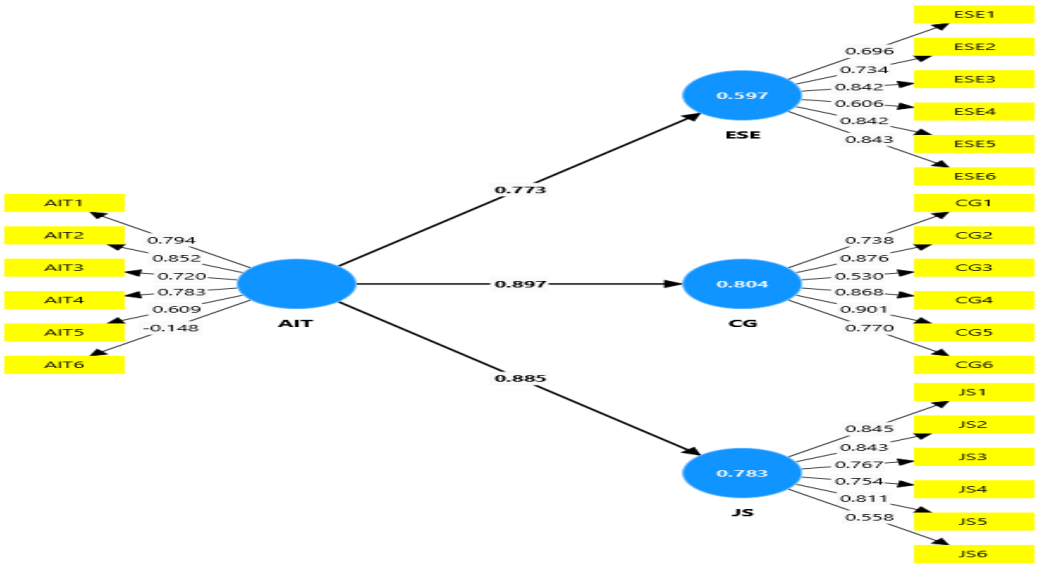

Figure 1 Initial measurement model

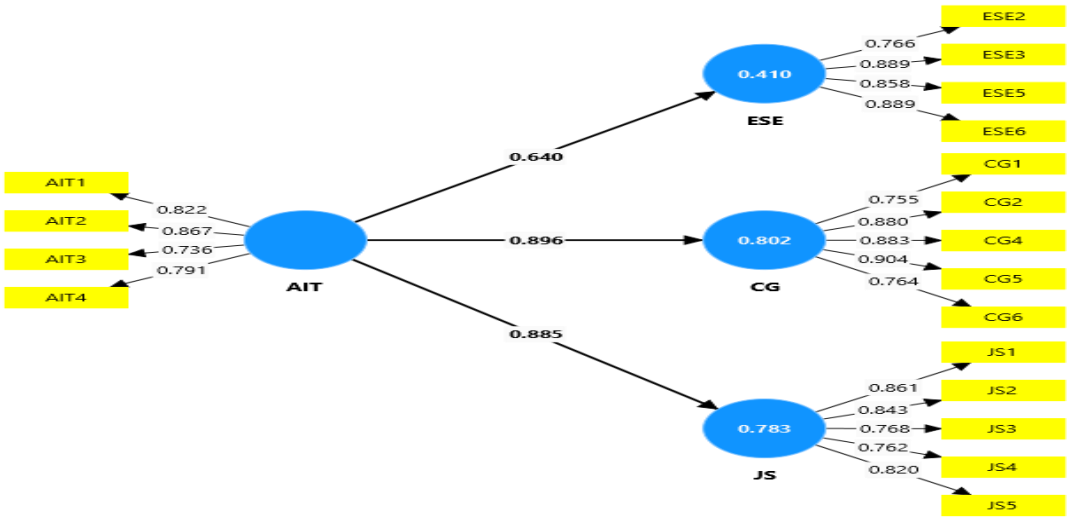

Figure 2 Revised Measurement Model

Discriminant validity

The results demonstrate satisfactory discriminant validity, indicating that each construct is distinct and captures unique aspects of the research model. The Heterotrait-monotrait ratio (HTMT) matrix (Table 2) shows values below the threshold of 0.90, confirming discriminant validity between constructs (Henseler, Ringle, & Sarstedt, 2015). Similarly, the Fornell and Larcker (1981) criterion (Table 3) reveals that the square root of AVE for each construct is greater than its correlations with other constructs, further supporting discriminant validity. Overall, these results suggest that the constructs - AIT, CG, ESE, and JS - are empirically distinct and well-defined, allowing for meaningful interpretations of their relationships.

Table 2:
Heterotrait-monotrait ratio (HTMT) – Matrix

	AIT	CG	ESE	JS
AIT				
CG	0.736			
ESE	0.701	0.753		
JS	0.829	0.790	0.755	

Table 3:
Fornell-Larcker criterion

	AIT	CG	ESE	JS
AIT	0.805			
CG	0.896	0.840		
ESE	0.640	0.713	0.852	
JS	0.885	0.879	0.707	0.812

Structural Model

This study utilized a PLS algorithm-based approach to calculate R^2 values, employed bootstrapping to determine the significance of path coefficients, and assessed predictive relevance using Q^2 values. Furthermore, the effect size (f^2) of the endogenous construct was examined to provide insights into the practical significance of relationships

between constructs, complementing the statistical significance obtained from bootstrapping (Chin, 1998). The PLS algorithm was chosen for its ability to effectively handle complex models with multiple constructs and indicators, providing reliable estimates of path coefficients and R^2 values (Hair et al., 2021). By combining these analytical techniques, this study ensured a comprehensive evaluation of the research model.

R^2 and Confidence Intervals

According to Tables 4 and 5, AI Integration in Training Program (AIT) has a profound impact on Career Growth, Employee Skill Enhancement, and Job Satisfaction, with R-squared values indicating that AIT accounts for 80.2%, 41%, and 78.3% of the variance in these constructs, respectively. The confidence intervals for the path coefficients further confirm the strong positive relationships between AIT and these constructs, with ranges of 0.861-0.896 for Career Growth, 0.538-0.641 for Employee Skill Enhancement, and 0.853-0.885 for Job Satisfaction.

Table 4:
Coefficient of Determination R2

Endogenous Latent Variable	R – Squared Value
Career Growth	0.802
Employee Skill Enhancement	0.410
Job Satisfaction	0.783

Table 5:
Confidence Intervals

	Original sample (O)	Sample mean (M)	2.5%	97.5%
AIT -> CG	0.896	0.896	0.000	0.861
AIT -> ESE	0.640	0.641	0.000	0.538
AIT -> JS	0.885	0.885	0.000	0.853

Hypothesis Test

The impact of AI-driven training on lecturers' skills, career growth, and job satisfaction is a growing area of interest. This study investigates the relationship between AI-driven training and these outcomes in Katsina state-owned tertiary institutions. The results in table 6 show significant positive relationships, with coefficients of 0.896 (Career Growth), 0.640 (Employee Skill Enhancement), and 0.885 (Job Satisfaction), indicating a strong positive impact of AI-driven training on these outcomes. Based on these findings, the study rejects the null hypotheses (H1, H2, and H3), aligning with existing literature that highlights the positive impact of AI-driven training programs on employees' skills, career growth, and job satisfaction (Alam, 2023; Bankins et al., 2024; Chukwuka & Dibie, 2024; Passalacqua et al., 2024; Singh & Chouhan, 2023). Studies have shown that AI-driven training programs can enhance employees' skills and knowledge, leading to improved job performance and career advancement opportunities (Chukwuka & Dibie, 2024; Kumar, Mohan, & Shivalini, 2024). Additionally, research has found that AI-driven training programs can increase job satisfaction by providing employees with a sense of accomplishment and confidence in their abilities (Rožman et al., 2023). Overall, the findings of this study align with and contribute to the growing body of research that supports the effectiveness of AI-driven training programs in improving employees' skills, career growth, and job satisfaction.

Table 6:
Path coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
AIT -> CG	0.896	0.896	0.016	56.810	0.000
AIT -> ESE	0.640	0.641	0.048	13.263	0.000

AIT -> JS	0.885	0.885	0.014	62.667	0.000

Effect Size (f^2) and Predictive Relevance Q^2

The results in Tables 7 and 8 indicate that AI-driven training has a significant impact on lecturers' outcomes, with large effect sizes observed for Career Growth (4.056) and Job Satisfaction (3.601), and a medium effect size for Employee Skill Enhancement (0.695). Additionally, the Q^2 values in Table 8 reveal varying levels of predictive relevance, with Career Growth (Q^2 = 0.801) and Job Satisfaction (Q^2 = 0.779) demonstrating excellent and good predictive capabilities, respectively, indicating that the models can reliably predict these outcomes. In contrast, Employee Skill Enhancement (Q^2 = 0.404) shows moderate predictive relevance, suggesting that the model's predictive power is relatively weaker for this outcome, indicating room for improvement in predicting this aspect of AI-driven training's impact.

Table 7:
The Level of Effect Size (f^2)

Relationship	f-square	Decision
AIT -> CG	4.056	Large effect
AIT -> ESE	0.695	Medium effect
AIT -> JS	3.601	Large effect

Table 8:
Predictive Relevance Q^2

	Q^2predict
Career Growth	0.801
Employee Skill Enhancement	0.404
Job Satisfaction	0.779

Conclusion and Recommendations

This study investigated the impact of AI-driven training on lecturers' skills, career growth, and job satisfaction in Katsina state-owned tertiary institutions. The results show significant positive relationships between AI-driven training and the outcomes, with large effect sizes observed for Career Growth and Job Satisfaction, and a medium effect size for Employee Skill Enhancement. The study's findings align with existing literature, highlighting the effectiveness of AI-driven training programs in improving employees' skills, career growth, and job satisfaction.
The study's results also demonstrate the predictive capabilities of the models, with excellent and good predictive relevance observed for Career Growth and Job Satisfaction, respectively. However, the model's predictive power is relatively weaker for Employee Skill Enhancement, indicating room for improvement. Overall, the study contributes to the growing body of research supporting the effectiveness of AI-driven training programs in improving employees' outcomes. Based on the study's findings, it is recommended that tertiary institutions in Katsina state and beyond prioritize the implementation of AI-driven training programs to enhance lecturers' skills, career growth, and job satisfaction. Additionally, institutions should focus on improving the predictive capabilities of their models, particularly for Employee Skill Enhancement, to ensure that AI-driven training programs are effectively tailored to meet the needs of lecturers. By doing so, institutions can maximize the benefits of AI-driven training and contribute to the development of a more skilled and satisfied workforce.

Limitation and Direction for Future Research

This study has some limitations that should be acknowledged. Firstly, the study's sample size, although substantial, was limited to lecturers from Katsina state-owned tertiary institutions, which may not be representative of all tertiary institutions in Nigeria. Secondly, the study relied on self-reported data, which may be subject to biases and limitations. Finally, the study's focus on AI-driven training programs may not capture the full range of factors that influence lecturers' skills, career growth, and job satisfaction. Future research should aim to address the limitations of this study by exploring the impact of AI-driven training programs on lecturers from diverse institutional backgrounds and using more objective measures of outcomes such as student learning outcomes, lecturer performance etc. Additionally, researchers could investigate the specific mechanisms by which AI-driven training programs influence lecturers' skills, career growth, and job satisfaction, such as how AI-driven training influences lecturers' adoption of innovative teaching methods and technologies, enhances their ability to personalize learning, and promotes their self-efficacy and motivation. By examining these mechanisms, future research can build on the findings of this study and provide a more comprehensive understanding of the impact of AI-driven training programs on lecturers' development.

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