
DIGITAL LEARNING AND EMPLOYEE DEVELOPMENT IN OIL AND GAS FIRMS IN RIVERS STATE, NIGERIA

By

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Abstract

This study investigates the relationship between digital learning and employee development in oil and gas firms in Rivers State, Nigeria. Digital learning (the predictor variable) was operationalised with e-learning and virtual learning, while employee development (the criterion variable) was measured with technical skill development and career development. The study adopts a cross-sectional survey design. The accessible population comprises 3,425 employees from eight (8) oil and gas firms in Rivers State. The sample size of 328 employees was determined using the Taro Yamane formula at a 5% margin of error. The simple random sampling technique was used. The questionnaire was the instrument used for data collection. Face and content validity were studied and analysed using Spearman's rank-order correlation. The findings revealed a positive association between the dimensions of digital learning and employee development. The study concludes that digital learning and employee development in oil and gas firms in Rivers State are beneficial. The study recommends enhancing e-learning and virtual learning for employee technical skills and career development.

Keywords: Digital Learning, E-learning, Virtual Learning, Employee Development, Technical Skill Development, Career Development.

1.0 Introduction

Employee development is an essential element of specialised human capabilities for performing technically demanding tasks. The oil and gas industry requires employees with current technical knowledge, professional competencies and ability to respond effectively to dynamic operational demands. Most often, the operating environment of the oil sector is highly dangerous, as the environment is shaped by changing regulatory requirements, speedy technological innovation disrupting the work environment, regulatory requirements, and changing market conditions (Fadare & Omiko, 2024). Continuous professional development is therefore of great importance. Therefore, continuous employee development helps oil and gas companies to retain a skilled workforce that can support safe and efficient operations. Employee development is also crucial in enhancing employees' technical competencies and preparing them for more responsibilities in oil and gas organisations. The complexity of petroleum exploration, production, processing, maintenance and related activities requires that employees continually update their knowledge and skills, rather than relying solely on qualifications acquired in the past.

More significantly, employee development contributes to organisational sustainability in terms of increasing employees' ability to adapt to technological, operational and regulatory changes. This process is becoming increasingly important in the oil and gas industry as companies deploy new technologies and as expectations around operational efficiency and environmental performance evolve. When corporate organisation invest in the development of the employees through learning, mentoring, coaching and other methods, it is a significant implication beyond enhancing individual capacity, as it influences the corporate productivity (Kankpang et al., 2024); hence, continuous professional development can support employees' career development, technical competence, efficiency, wellbeing and the broader effectiveness of oil and gas firms.

A significant means of enhancing employee development is through the adoption of digital learning by corporate firms. Digital learning is the ability to utilize digital technologies and platforms to support learning and development activities. Digital learning enhances multiple training access worldwide, ensuring availability of training material, promoting virtual learning activities and gaining knowledge without relying on the traditional face-to-face mode of training (Gubbins et al., 2023). Among significant digital enhancement strategies used by employees for the enhancement of corporate goals is technology-enhanced learning (Lee & Tan, 2023). Digital learning can therefore provide oil and gas firms with a flexible mechanism for continuous technical and professional development, particularly where employees operate across different locations, shifts, operational sites, or hybrid arrangements.

Existing empirical studies provide evidence of the relevance of training, development, and digital technologies to employees and organisations in the contribution of digital learning through mechanisms like e-learning and virtual training to employees' outcomes, but their focus varies from that of this study. Badom and Girigiri (2021) studied training and development in the Nigerian Agip Oil Company, Port Harcourt, and found a significant relationship with workers' productivity. Udoh et al. (2021) studied training and job security among oil and gas companies in Rivers State. These contributions notwithstanding, there is a gap in the literature on the relationship between digital learning and employee development in the oil and gas firms in Rivers State, Nigeria.

Previous research (Fadare & Omiko; Lee & Tan, 2023; Badom & Girigiri, 2021; Gubbins et al., 2023, Osuagwu & David-Alonge, 2026) has mainly looked at traditional training and development in terms of outcomes such as productivity and job security, while international research on digital learning has focused mainly on workplace learning approaches or organisational digital transformation, rather than the employee development context of the Nigerian oil and gas sector. There is a contextual and empirical gap in the contribution of digital learning through mechanisms like e-learning and virtual training to the employee's technical skill development and career development in oil and gas firms in Rivers State. Thus, this study seeks to examine the relationship between digital learning and employee development in oil and gas companies in Rivers State, Nigeria, and thus provide empirical evidence that standardisation can result in more effective employee development practice in the sector.

Statement of the Problem

The success, effectiveness, competitiveness and sustenance of oil and gas firms is contingent on a well-developed workforce. Employee development is essential at the workplace to maintain operational effectiveness given the industry's reliance on employees who possess updated knowledge, competencies in technical operations, relevant digital skills, practical abilities, procedural, managerial, safety, and problem-solving competencies. Nevertheless, despite this requirement and the recognised importance of human capital, the strategic role of human capital has not eliminated the challenge of inadequate employee development; it is still a concern among some oil and gas firms in Rivers State, Nigeria.

The evolving technological advancement is reshaping the oil and gas industry through the growing application of digital technologies, data analytics, artificial intelligence, enhanced automation, and other emerging technological innovations, and thus, creating a significant demand for continuous workforce development. These developments are creating a growing need for employee's to continuously acquire new knowledge, skills and several competencies. To remain relevant and effective, the automation in the Nigerian oil and gas industry has increased the demand for reskilling, upskilling, and workforce adaptability to strengthen employee development (Mbah et al. 2024). Furthermore, the Nigerian Content Development and Monitoring Board (NCDMB) identifies the priorities of the development of competence-based, industry-ready and globally competitive human capital within the oil and gas sector to continually enhance employees' existing capabilities in line with changing technological and industry requirements. The NCDMB, 2026, supported this by advocating for continued certification, advanced training, and competency-based development in the organisation.

The operational effectiveness of oil and gas firms can be undermined by poor employee development in meeting the demands of a rapidly changing technological environment, and this can have serious consequences on the operational effectiveness of oil and gas firms and limit the workforce's capability to obtain and update the knowledge and skills essential in a technologically dynamic industry. The inability of the firms to provide employees with adequate opportunities for continuous learning may result in employees experiencing difficulties in adapting to new emerging, evolving operational processes and changing workplace responsibilities. In an industry characterised by sophisticated complex technical systems and rapidly technological advancement, inadequate employee development can lead to reduced employee capability, skills obsolescence, reduced employee competence and limited ability to translate newly acquired knowledge into workplace practical operational activities.

Furthermore, the problem of insufficient employee development may also limit employees' capacity to operate modern equipment, understand and interpret emerging digital information and respond efficiently to fluctuating operational demands. Mendoza-Chan and Pee (2024) suggest that the speedy technological advancement and digital revolution are intensifying the need for competent employees' relevant digital areas of operations. Therefore, when employee development does not keep pace with technological advancement changes, firms may experience a more pronounced incongruity between the competencies possessed by personnel and the competencies vital in responding to emerging and sustaining effective operational performance, as oil and gas firms increasingly rely on digital technologies, advanced equipment, and sophisticated information systems.

Nevertheless, when organisations experience poor employee development, it has far-reaching implications which may affect the long-term sustainability and competitiveness of the firms. Employees with limited employee development may have fewer opportunities for career progression, lesser professional growth, limited new innovative knowledge enhancement, lower professional certification opportunities, and reduced exposure to emerging industry practices. This situation can weaken employee adaptability to changing work environments, make the organisation experience difficulties in building a flexible and competent workforce and reduce the organisation's capability to develop a workforce capable of supporting technological innovation and operational process transformation.

The growing technological transformation of the energy sector has further intensified this concern as the energy industry progressively demands competencies in areas such as digitalisation, artificial intelligence, data analytics, automation and cybersecurity. Changing initiatives demonstrate the seriousness of poor skills development and Nigeria's response to these emerging requirements provides evidence of the skills-development gap. Among these initiatives is that of NCDMB (2026) which commenced a specialised 12-month digitalisation and digitisation training programme. These activities entail machine learning, data analytics, predictive artificial intelligence, cybersecurity and Python programming for young Nigerians intended to support the future workforce of the oil and gas industry, with the objective of developing capabilities relevant to the future oil and gas workforce. The need for such specialized employee development initiatives designates that conventional methods of workforce development may no longer adequately meet the emerging competency requirements of the oil and gas industry.

Numerous efforts have been carried out by the oil and gas and some government agencies to address employee and human capital development in Nigeria. An example of those efforts is the initiatives made by NCDMB, for example, on Human Capital Development programmes. These initiatives involve giving practical training, classroom training, on-the-job learning and certification, while the Nigerian Oil and Gas Industry Content Development framework requires operators and contractors to make provisions for training and development of Nigerian personnel (NCDMB, 2026). The work collaboration between the NCDMB and Nigeria LNG Limited in Nigeria has also resulted in human capital development programmes. This opportunity was extended to 331 graduates in November 2024. It commenced a 12-month training programme covering ICT, engineering, welding and fabrication, non-destructive testing, quality management, marine and offshore services, and facility management and maintenance (NCDMB, 2024). Despite these interventions, the ongoing emphasis on acquiring digital competencies suggests that the poor employee development problem has not been totally resolved in most firms, current training styles may

be inhibited by location, time, cost, limited access to professional trainers and the difficulty of taking employees away from job activities for a long period.

An approach to resolving this issue is adoption of digital learning, which comprises the use of digital technologies and platforms to enable incessant learning, skills acquisition and employee progressive career development. Digital learning therefore provides an opportunity to complement conventional training by making employee development more accessible, continuous, technology-based and reactive to changing industry wants. Despite this achievement, there remains a need for empirical proof on the degree to which digital learning contributes to employee development specifically among oil and gas firms in Rivers State, Nigeria. It is against this contextual that this study explores the connection between digital learning and employee development in oil and gas firms in Rivers State, Nigeria.

Aim and Objectives of the Study

The aim of this study is to examine the relationship between digital learning and employee development of oil and gas firms in Rivers State, Nigeria. The specific objectives are to:

- i. Explore the relationship between e-learning and technical skills development of the oil and gas firms in Rivers State, Nigeria.
- ii. Determine the link between e-learning and career development of the oil and gas firms in Rivers State, Nigeria.
- iii. Assess the bond between virtual learning and technical skills development of the oil and gas firms in Rivers State, Nigeria.
- iv. Investigate the association between virtual learning and career development of the oil and gas firms in Rivers State, Nigeria.

Research Questions

The following research questions were given in the study:

- i. What is the association between e-learning and technical skills development of the oil and gas firms in Rivers State, Nigeria?
- ii. How does e-learning relate to the career development of the oil and gas firms in Rivers State, Nigeria?
- iii. How does virtual learning relate to the technical skills development of the oil and gas firms in Rivers State, Nigeria?
- iv. What is the linkage between virtual learning and career development of the oil and gas firms in Rivers State, Nigeria?

Research Hypotheses

The following research questions were given in the study:

- Ho₁: E-learning has no significant relationship with technical skills development in the oil and gas firms in Rivers State, Nigeria.
- Ho₂: E-learning has no significant relationship with career development in the oil and gas firms in Rivers State, Nigeria.
- Ho₃: Virtual learning has no significant relationship with technical skills development in the oil and gas firms in Rivers State, Nigeria.
- Ho₄: Virtual learning has no significant relationship with career development in the oil and gas firms in Rivers State, Nigeria.

2.0 Literature Review

2.1 Conceptual Review

Digital Learning

Digital learning can be understood as the use of digital technologies, technology-based platforms, electronic devices and technology-enabled resources to facilitate the acquisition, exchange, dissemination and practical application of knowledge and skills. In organisations, digital learning encompasses different forms of technology-supported learning activities, such as online learning resources, mobile learning applications, digital platforms, collaborative technological tools and technology-enabled workplace learning. These innovative digital learning tools enable learning to occur in digital environments instead of relying solely on conventional face-to-face instruction. Digital learning is an important learning and development tool used by firms to respond to workplace structural changes (Gubbins et al., 2023).

Digital learning consequently provides staff with opportunities to access learning resources beyond the traditional classroom. Employees can now access educational resources without being restricted and engage in learning through technology-supported environments, and it creates greater opportunities for organisations to provide flexible and accessible learning experiences that support employees' ongoing acquisition and application of knowledge and skills. The main feature of digital learning is its flexibility, which enables employees to have access to learning materials through different technological devices and platforms. Digital learning is an important means of supporting employees in acquiring competencies needed to respond to changing technologies and work practices (Gubbins et al., 2023; Schönian, 2026).

E-Learning

E-learning is a technology-supported approach to learning that involves the application of electronic devices, internet-based platforms and digital technologies to facilitate the delivery, management and support of participation in learning, educational and training activities. It involves the use of computer-based or internet-enabled systems through which employees who are willing to learn have access to learning instructional materials, partake in training exercise and work together with instructors and other learners. E-learning enables employees to undertake training programmes virtually and remotely, communicating with instructors and fellow learners without being physically present in the same location (Ekesiba & David-Alonge 2024). This approach enhances the delivery of learning activities across different locations and at varying times, thereby enhancing the delivery of learning activities across different locations and at varying times and consequently providing firms with a flexible mechanism for delivering employee training and development.

Giannakos et al. (2022) suggest that e-learning systems is an important mechanism that provides employees with opportunities to embark on training according to their individual schedules while also supporting teamwork, collaboration and knowledge sharing. E-learning therefore provides an electronically mediated approach to employee learning development that can complement or replace conventional classroom-based face-face learning.

Virtual Learning

Virtual learning refers to organisational learning, delivered experienced and enhanced through a technology-enabled learning approach and digitally mediated environments where learners and instructors interact without being physically present, but using online communication and learning technologies rather than sharing the same physical classroom. In

this type of learning, teaching, interaction and knowledge exchange occur through online environments. It incorporates online collaboration tools, virtual classrooms, digital learning platforms, videoconferencing applications, and other technologies that facilitate teaching, interaction, support instruction, communication and knowledge exchange across different geographical locations. The rising digitalisation of place of work has increased the need for workers to learn through technology-supported settings because effort made by employees are now becoming more digitally connected and geographically dispersed as digital workplaces create new requirements for continuous learning and competencies (Hult & Byström, 2022).

Employee Development

Employee development is an ongoing employee-driven practice in which individuals actively enhance their professional abilities by acquiring, strengthening and applying knowledge, skills, and competencies required for their current and prospective career roles. The process encompasses more than short-term training to incorporate activities such as mentoring, training, coaching, learning, and career-related development. Thus, employee development enables individuals to broaden their professional competences, respond to evolving work demands, enhance readiness for changing work responsibilities and advance future career opportunities (Garavan et al., 2021).

Workplace transformation of firms has transformed how employee development is carried out at workplace. Employee development has progressively moved towards greater employee involvement with employees assuming greater responsibility for their own learning and professional growth. As a result, employee development now emphasises continuous participation and learning through the use of varied learning approaches rather than reliance on formal classroom-based training.

Technical Skills Development

Technical skills development embraced by many firms is essential in achieving goals and cutting cost. It involves systematic and continuous efforts through which employees obtain, advance and preserve specialised knowledge and practical competencies needed to carry out technical responsibilities effectively. It encompasses obtaining new technical competences while also updating existing skills to remain relevant to changing occupational and technological proficiency requirements (Vallo-Hult & Byström, 2022). Technical competencies may include aptitude to operate equipment, the use of specialised digital technologies, application of proven technical procedures, technical problem-solving and the execution of occupational tasks in line with approved standards. Thus, capabilities development enables employees to maintain the competence necessary to perform their technical responsibilities more proficiently and adapt to changes in workplace technologies and procedures.

Career Development

Career development is a continual process of planning, managing, growing and shaping employee professional capacities through building job proficiencies, gaining relevant work experiences and modifying their career goals to changing circumstances. Career management includes tasks including identifying career possibilities, setting career plans, learning new skills, managing job changes and deliberately working toward meeting career-related goals for professional development. Employee job development is also closely related to employability and the ability of individuals to manage and successfully handle job transitions. It goes beyond having promotion at workplace, to the wider process in which

individuals prepare for and adjust to evolving career prospects, changing work needs and labour-market demands (De Vos et al., 2021). Employees work in changing labour markets, with changes in business requirements, technological changes and increased career flexibility, so they need to develop their careers and prepare for future opportunities as learning provides knowledge and capabilities and work value linked to career-related behaviours (Janssen et al., 2021).

2.2 Human Capital Theory

The study is anchored on human capital theory, propounded by Theodore W. Schultz (1961) and advanced by Gary S. Becker (1964). The theory proposed that investments in human competences, in the form of acquiring skills, knowledge, training and education promote the productive capabilities of employees and thus contribute to the corporate performance. The theory views employees' competencies knowledge, and skills as human capital worthy of the firm's investment to improve productivity and effectiveness. From a human capital perspective, investment in employee learning can strengthen workforce capabilities, as digital learning will enhance continuous development of technical skills and employee career development. When employees develop and effectively apply new competencies, organisations develop a more skilled workforce capable of effectively utilising emerging technologies, adapting to changing operational demands and contributing to technological innovation.

2.3 Empirical Review

Ogunbote et al. (2026) study investigated the impact of e-learning integration on skill acquisition and lifelong learning among Technical Vocational Education and Training (TVET) students in South-West Universities of Education, Nigeria. The study employed a mixed-method research design to gather quantitative and qualitative evidence. The population comprises 580 respondents. These respondents are made up of 500 TVET students and 80 lecturers. A sample of 237 was determined. 228 questionnaires were successfully retrieved, giving a response rate of 96.2%. A structured questionnaire was the instrument for the study. The instrument was validated by experts, and it showed satisfactory reliability coefficients of 0.82 for e-learning, 0.85 for skill acquisition and 0.80 for lifelong learning. The study was guided by two research questions and two hypotheses, which were tested at the 0.05 level of significance using descriptive and inferential statistics. The results demonstrated a strong positive relationship between e-learning integration and skills obtained by students. It was also revealed that e-learning promotes lifelong learning through self-motivated learning, flexibility, critical thinking, and continuous knowledge growth.

Dybała and Kordecki (2023) scrutinised the use of virtual reality training for facility management employees, where professional competence requires substantial technical knowledge and practical skills. The researchers developed a VR-based training approach using eye-tracking technology to support employee training in facility management. The study demonstrates the usefulness of virtual environments for situations where conventional training with actual equipment can be difficult because equipment may be expensive, operationally essential or unsafe to use repeatedly for training. This provides evidence that virtual learning systems correlates with technical skill development.

Sarbabidya & Shikdar (2018) study the impact of e-learning on the career development of business administration graduates. Both primary and secondary data were used for this particular study. The primary data were collected, and the questionnaire was based on a

Likert 5-scale. Simple random sampling from 100 sample respondents, including students and faculty members of some universities in Bangladesh was used. Multiple regression analysis was performed on the data. Finally, the paper recommends the training on e-learning for the students and faculty members, and the development of e-learning policies, infrastructures and facilities.

Deshpande et al. (2024) explores e-learning and career advancement. The study considers the effects of perceived usefulness, motivation and satisfaction on professionals' continued intention to use e-learning platforms, using data obtained from 240 working professionals across different sectors. Regression analysis was used to determine the predictors of continued e-learning intention, while ANOVA was used to compare male and female respondents. The findings disclosed that perceived usefulness, motivation and satisfaction significantly influenced professionals' continued intention to pursue e-learning courses, with female professionals reporting higher motivation and satisfaction. The study concluded that e-learning can provide an important pathway for working professionals seeking career advancement and career development.

3.0 Research Methodology

This study examined digital learning and employee development among oil and gas firms in Rivers State. The study employed a cross-sectional survey research design. The population comprises 3425 employees of eight (8) oil and gas firms in Rivers State. The sample size of 328 employees was determined using the Taro Yamane formula at a 5% margin of error. The simple random sampling technique was used. The questionnaire was the instrument used for data collection. This questionnaire was administered to each firm using Bowley's proportional allocation formula. Face and content validity were used and Cronbach's alpha was used to determine reliability. The hypotheses of the study were tested using Spearman rank order correlation. The findings revealed that digital learning have a positive relationship with employee development among oil firms

4.0 Results and Discussion

358 questionnaires were distributed to the employees of the oil and gas firms in River State, but only 332 (92.7%) copies were returned, and this constitutes the valid questionnaire. The hypotheses test is undertaken at a 95.5% confidence interval, and the decision rule is state that where $P < 0.05$ = Reject the null hypotheses and where $P > 0.05$ = Accept the null hypotheses.

Table 1: Correlations between E-learning, and the Dimensions of Employee Development

		E-Learning	Technical Skills Development	Career Development
Spearman's Rho	E-learning	Correlation Coefficient	1.000	.784**
		Sig. (2-tailed)	.	.000
		N	332	332
	Technical Skills Development	Correlation Coefficient	.784**	1.000
		Sig. (2-tailed)	.000	.000
		N	332	332
	Career Development	Correlation Coefficient	.732**	1.000
		Sig. (2-tailed)	.000	.000
		N	332	332

** . Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Output, 2026.

E-learning and Technical Skills Development: As shown in Table 1, the p-value is 0.784 ($p = 0.000$), which is less than the significance threshold of 0.05. The coefficient of determination (r^2) is 0.614, implying that 61.4% of the variation in technical skills development can be explained by e-learning practices. Based on these findings, the null hypothesis (H_{01}) is rejected, and the alternative hypothesis (H_{a1}) is accepted. This indicates a strong, significant and positive relationship between e-learning and technical skills development.

E-learning and Career Development: Table 1, column 6 also reveals a p-value of 0.732 ($p = 0.000$), which is below the alpha level of 0.05. The r^2 value of 0.534 suggests that 53.4% of the variance in career development is attributable to e-learning practices. Consequently, the null hypothesis (H_{02}) is rejected in favour of the alternative hypothesis. This confirms a strong and positive relationship between e-learning and career development.

Table 2: Correlations between Virtual Learning and the Dimension of Employee Development.

		Virtual Learning	Technical Skills Development	Career Development
Spearman's rho	Virtual Learning	Correlation Coefficient	1.000	.735**
		Sig. (2-tailed)	.	.000
		N	332	332
	Technical Skills Development	Correlation Coefficient	.735**	1.000
		Sig. (2-tailed)	.000	.000
		N	332	332
	Career Development	Correlation Coefficient	.725**	1.000
		Sig. (2-tailed)	.000	.000
		N	332	332

** . Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Output, 2026.

Virtual Learning and Technical Skills Development. Table 2 shows a p-value is 0.735 ($p = 0.000$), which is below the significance level of 0.05. The coefficient of determination (r^2) is 0.540. The analysis revealed that 54% of the variation in technical skills development is

explained by virtual learning. Given this result, the null hypothesis (H_{03}) is rejected, and the alternative hypothesis (H_{a3}) is accepted. This shows a strong and significant positive correlation between virtual learning and technical skills development in the deposit money banks.

Virtual Learning and Career Development: Table 2 also revealed that p-value is 0.725 ($p = 0.000$), which is less than the 0.05 significance level. The r^2 value of 0.526 indicate that virtual learning accounts for 52.6% of the variation in career development. Consequently, the null hypothesis (H_{04}) is rejected in favour of the alternative hypothesis. This suggests that there is a strong correlation between virtual learning and career development.

Discussion of Findings

E-Learning and Technical Development

The results findings in Table 1 indicates that e-learning has a very strong positive and statistically significant association with technical skills development. The correlation coefficient of 0.784 with a significance level of $p = .000$ suggests that increased engagement in e-learning is associated with higher levels of technical skills development. This result proposes that the oil and gas workers who have greater e-learning opportunities are more likely to develop and improve the technical knowledge and skills needed to accomplish their tasks effectively. The finding conforms with Ogunbote et al. (2026) that e-learning integration relates with skill acquisition and lifelong learning of Technical Vocational Education and Training (TVET) students in South-West Universities of Education, Nigeria. Pinnington et al. (2022) that organisational development programmes relates to employees' career development.

E-Learning and Career Development

Table 2 analysis findings also reveal a strong positive and statistically significant relationship between e-learning and career development, with a correlation coefficient of 0.732 and $p = .000$. This suggests that e-learning is significantly associated with employees' career development. The finding result shows that workers who partake in e-learning activities may have greater opportunities to acquire new knowledge, improve their competencies, prepare for changing job requirements and the finding supports the broader argument that organisations' use of digital HR technologies can enhance employee-related outcomes. The findings agree with Deshpande, et al. (2024) that e-learning correlates with career advancement.

Virtual Learning and Technical Skills Development

In table 2, the study shows that virtual learning has a strong and significant positive relationship with technical skills development in oil and gas sector. The correlation coefficient of 0.735 with a significance level of $p = .000$ suggest that increased engagement in virtual learning is associated with higher levels of technical skills development. The coefficient of determination ($R^2 = 0.540$) indicates that virtual learning explains 54.0% of the variation in technical skills development. This reveals that employees who engage in virtual learning opportunities are more likely to acquire and improve the technical skills required for their jobs. This finding indicates that technology-mediated learning can provide employees with opportunities to acquire technical knowledge, practise work-related procedures and update their competencies without being restricted by conventional classroom training. The result is consistent with Ma, Zhang, and Wu (2022) that virtual reality-based learning had a positive effect on technical skills learning.

Virtual Learning and Career Development

Table 2 also reveal that that virtual learning has a strong and significant positive relationship with career development in oil and gas sector with a correlation coefficient of 0.725 and $p = .000$. The coefficient of determination ($R^2 = 0.526$) shows that 52.6% of the variation in career development is explained by virtual learning, indicating that employees' exposure to virtual learning opportunities is strongly associated with their career development. This suggests that virtual learning can provide employees with flexible opportunities to acquire new knowledge, improve competencies, prepare for changing job responsibilities and develop capabilities relevant to career advancement. The finding is consistent with Pitcher et al. (2022), who found that virtual learning environments is associated with positive career self-efficacy and career-related outcomes. Their findings suggest that virtual environments can support career exploration and skills development, which provides empirical support for the relationship observed in the present study.

5.0 Conclusion

The study examined the relationship between digital learning and employee development in the oil and gas firms in Rivers State. E-learning and virtual learning were used as the dimensions of digital learning, while technical skill development and career development was used as the measures of employee development. Based on the findings of the study, the study concluded that digital learning is an important mechanism for enhancing employee development in oil and gas firms, as the two dimensions of digital learning correlate with the two dimensions of employee development. The result denotes that the effective acceptance and implementation of digital learning opportunities enhances employee development.

Specifically, the study concludes that e-learning correlates with technical skills development among employees of oil and gas firms. When employees have access to e-learning opportunities, they are better placed to obtain and advance job-related technical competencies. The study also concludes that e-learning significantly relates with career development. This shows that technology-enabled learning relates with employee development.

Additionally, the study concludes that virtual learning has a significant relationship with technical skills development in oil and gas firms in Rivers State. Virtual learning provides employees with opportunities to learn, practice and develop work-related technical competencies through technology-mediated environments. Similarly, virtual learning is significantly related with career development. This shows that employees can use virtual learning opportunities to acquire competencies and knowledge that enhance their readiness for future career responsibilities. Overall, the study concludes that strengthening digital learning practices can contribute substantially to the development of a more technically competent and career-ready workforce in the oil and gas industry.

6.0 Recommendations

Based on the findings and conclusions of the study, the following recommendations are made:

1. The oil and gas firms should create and constantly update structured e-learning programmes that focus on job-specific technical skills, equipment operation, safety

procedures, digital technologies and other competencies essential for effective performance in the industry.

2. The management of oil and gas firms should integrate e-learning into their career development programmes by providing employees professional certification, with online courses and competency-based learning programmes that prepare them for promotion and higher-level responsibilities.
3. The oil and gas firms should invest in effective virtual learning platforms, simulations and interactive training environments that enable employees to practise technical procedures and develop relevant competencies without depending exclusively on conventional face-to-face training.
4. The management should use virtual learning platforms to provide employees with continuous professional development, career-oriented courses, mentoring sessions and other learning opportunities that enable employees to acquire competencies required for future career advancement.

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