

Pedagogical Practices and Graduate Employability: The Case of Six Federal Universities in Nigeria

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Abstract. This study investigated how pedagogical practices influence graduate employability in Nigeria. Using a mixed-methods approach, 1,200 final-year students across six federal universities were surveyed, and group discussions were conducted with selected employers. Active learning strategies, problem-based learning, industry-linked projects, and digital literacy instruction were examined. Multivariate regression analysis shows that active learning and industry-linked projects are significant predictors of perceived employability, accounting for 38 per cent of variance after controlling for demographic and institutional factors. Qualitative insights underscore the importance of faculty-industry collaboration and continuous curriculum updates to align academic training with market demands. The findings suggest that pedagogical practices that embed real-world problem-solving and work-integrated learning can substantially improve graduate employability in the country. Policy implications include incentivising universities to adopt experiential learning models, strengthening faculty-industry partnerships, and integrating digital training into the core curriculum.

Keywords: Teaching-learning methods, Employability; Curriculum innovation.

1 Introduction

The nexus between higher education pedagogy and the cultivation of graduate attributes has emerged as a key concern in Nigerian scholarship and policy debates



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on curriculum reform and teaching/learning quality (Adeyemi & Oluwafemi, 2022; Okonkwo, 2021). Amid persistent challenges in graduate outcomes, including high youth unemployment rates of around 33% in 2023 (National Bureau of Statistics, 2023), universities are increasingly called upon to foster attributes such as critical thinking, problem-solving, adaptability, and digital competencies through innovative instructional practices. Recent studies highlight that shifts toward student-centred pedagogies significantly influence the development of these attributes and broader graduate capabilities (Uche & Nwankwo, 2024). However, empirical evidence remains limited on how specific classroom strategies, active learning, problem-based learning (PBL), industry-linked projects, and digital literacy instruction contribute to graduate attributes and outcomes in Nigerian public universities. This paper addresses this gap by examining these pedagogical approaches and their role in shaping graduate attributes and employability.

1.1 Human Capital Theory and Education

Human capital theory posits that education enhances individuals' productive capacities and contributes to personal and societal development (Becker, 1964). Contemporary perspectives emphasise that the nature of education, particularly through curriculum alignment with skill demands and pedagogical innovation, shapes the development of graduate attributes and the return to education (Hanushek & Kimko, 2020). In Nigeria, debates on curriculum reform highlight mismatches between traditional lecture-based approaches and the need for outcome-oriented education that builds holistic graduate attributes amid structural challenges (Adebayo, 2023; Oyewole, 2022). Scholars advocate moving beyond enrolment-focused metrics to assessments of teaching/learning quality, skill acquisition, and attribute development to better prepare graduates for diverse contexts.

1.2 Pedagogical Practices and Graduate Attributes

Recent empirical research underscores pedagogical approaches that effectively develop graduate attributes relevant to contemporary higher education goals. Active learning, through discussions, case analyses, and collaborative tasks, promotes higher-order thinking and problem-solving (Freeman et al., 2021). In Nigerian engineering contexts, it has enhanced self-reported proficiency and attribute development (Akpan, 2022). Problem-based learning (PBL) situates learning in real-world problems to build critical thinking and application skills (Savery, 2019), with studies showing improvements in critical-thinking assessments and internship access (Ogunleye & Adebayo, 2023). Industry-linked projects bridge the academic and professional worlds, fostering attributes such as teamwork and practical competence (Billett, 2020) and correlating with stronger post-graduation transitions (Uzochukwu & Eze, 2024). Digital literacy instruction

develops essential competencies for knowledge societies (World Bank, 2022) and increases readiness for technology-driven sectors (Nwosu, 2021). Nigeria's higher education landscape includes 43 federal, 48 state, and over 100 private universities (University Grants Commission, 2023), yet challenges like funding shortages, infrastructure gaps, and lecture-centric traditions persist (Afolabi, 2022). Policy efforts, such as the TETFund 2022-2025 plan, promote innovative teaching to advance curriculum reform and graduate attribute development (Federal Ministry of Education, 2022), though implementation lags (Oladipo, 2024). While literature identifies these practices as promising, few studies examine their combined impact on graduate attributes in Nigeria, with many relying on limited self-report or small-scale data (Eze & Okafor, 2023). This study addresses this through a mixed-methods approach across six federal universities, combining surveys with qualitative insights from stakeholders to assess pedagogical influences on attribute development and outcomes.

The findings hold theoretical and practical implications for higher education. Theoretically, they enrich debates on pedagogy-curriculum linkages and graduate attributes in developing-country settings, contributing to comparative international scholarship on teaching innovations in Sub-Saharan Africa. In practice, they inform university policy on curriculum governance (e.g., embedding innovative methods), faculty development programs (e.g., training in student-centred approaches), and institutional strategies to enhance teaching/learning quality and the cultivation of graduate attributes in Nigeria.

2 Literature Review

The interplay among higher education pedagogy, curriculum reform, and graduate attributes has gained prominence in recent scholarship(s) in Sub-Saharan Africa. This amid calls for teaching/learning transformations to address youth challenges and foster holistic development (Adebayo, 2023; Okonkwo, 2021). This review synthesises empirical evidence on four pedagogical practices: active learning, problem-based learning (PBL), industry-linked projects, and digital literacy instruction, positioning them within human capital, skill-matching, and graduate attributes frameworks, while drawing connections to broader international debates on curriculum relevance and innovative teaching in higher education.

2.1 Active Learning

Active learning refers to instructional strategies that engage students in the learning process through discussion, collaboration, and immediate feedback (Freeman et al. 2021). In Nigerian engineering faculties, Akpan (2022) reported a 27% increase in self-reported technical proficiency among students exposed to

active-learning modules compared with traditional lectures. Similarly, Uche and Nwankwo (2024) found that active-learning classrooms were associated with higher critical-thinking scores ($\beta = 0.34$, $p < 0.01$) in a sample of 1,150 undergraduates across three federal universities.

PBL immerses learners in real-world problems, requiring them to apply theory to practice (Savery, 2019). Ogunleye and Adebayo (2023) found that PBL participants outperformed their peers in a critical thinking assessment by 34% and were 1.8 times more likely to secure employment. The authors attribute these gains to the development of self-directed learning and problem-solving skills, which employers prize (World Bank, 2022).

Projects undertaken in partnership with industry provide students with authentic work experiences and networking opportunities (Billett, 2020). Uzochukwu and Eze (2024), in a study which sampled 2,300 recent graduates, found that those who completed at least one industry-linked project reported a 22 % higher employment rate within six months of graduation. The study highlighted the role of work-integrated learning in bridging the gap between academia and industry.

Digital competence has become a fundamental requirement in most contemporary workplaces (World Bank, 2022). Nwosu (2021) found that graduates who underwent structured digital skills training were 1.5 times more likely to gain employment in technology-driven sectors than those without such training. In Nigeria, Afolabi (2022) observed that digital-literacy workshops boosted students' confidence in using data analysis tools, a skill closely associated with employability in the finance and ICT industries.

2.2 Theoretical Framework

The study is hinged on two complementary theories: Human Capital Theory and Skill-Matching Theory. Human Capital Theory (Becker, 1964), which posits that education enhances individuals' productive capacities, leading to higher earnings and economic growth. Contemporary extensions argue that the quality and relevance of education, rather than just years of schooling, determine returns (Hanushek & Kimko, 2020). This perspective justifies the focus on pedagogical quality as a determinant of employability. Skill-Matching Theory (Mincer, 1974; updated by Autor, 2023). This suggests that labour market outcomes improve when the skills acquired through education align with employer demands. The theory supports investigating specific instructional practices that embed market-relevant competencies.

2.3 Conceptual Framework

Figure 1 presents a schematic of the variables and their interrelationships. Pedagogical practices (active learning, PBL, industry-linked projects, digital

literacy) are hypothesised to directly influence graduate employability (measured by skill acquisition, internship experience, and early employment). Institutional factors (funding, policy support) and student background (gender, prior academic achievement) serve as moderators.

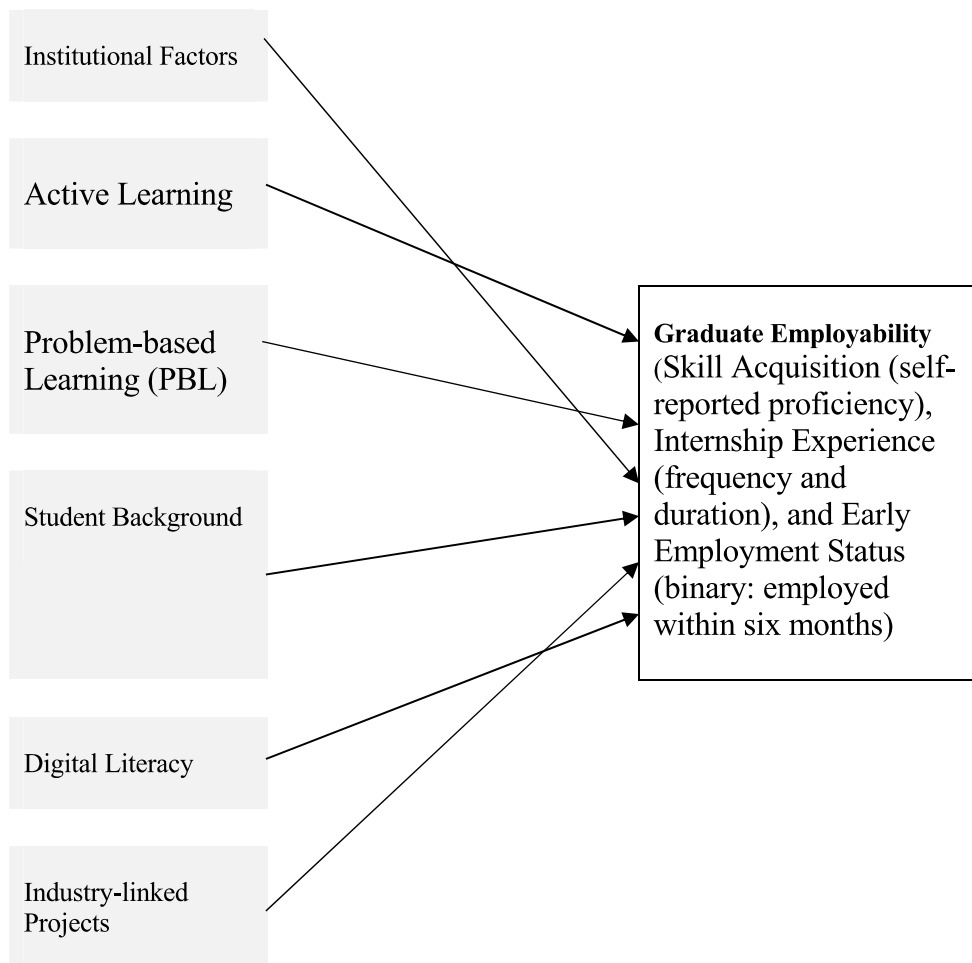


Figure 1. Conceptual Framework

3 Methodology

3.1 Research Design

A mixed-methods explanatory sequential design was adopted for this study. Quantitative data were collected first through a structured questionnaire to

examine relationships between pedagogical practices and graduate employability. Subsequently, key informant interviews were conducted with selected respondents to the questionnaire and industry recruiters. The purpose was to explain and contextualise the quantitative findings (Creswell & Plano Clark, 2021).

3.2 Samples and Sampling Procedure

The target population comprised final-year undergraduate students from six federal universities in Nigeria. These institutions were University of Ibadan, Obafemi Awolowo University, University of Nigeria, Nsukka, Ahmadu Bello University, University of Lagos, and Federal University of Technology, Minna. The universities were chosen to represent major geopolitical zones. They also maintain established industry liaison offices that support access to students and employers. A sample of 1200 respondents was targeted using weighted stratified sampling. Allocation reflected each university’s estimated final-year enrolment and disciplinary profile. Larger institutions received proportionally more respondents. Smaller or specialised universities received fewer, with emphasis on their core fields. Within each university, respondents were distributed across the following: Table 1: indicated Sciences, Engineering, Social Sciences, and Arts/Humanities. This distribution mirrored the institution’s actual academic composition.

Table 1: Sample

	Sciences	Engineering	Social Sciences	Arts & Humanities	Total
University of Nigeria, Nsukka	70	20	50	110	250
University of Ibadan	70	25	50	120	265
Obafemi Awolowo University	50	20	40	70	180
Ahmadu Bello University	60	20	45	90	215
University of Lagos	50	15	40	75	180
Federal University of Technology, Minna	60	20	15	15	110
Total	360	120	240	480	1200

The approach ensured the sample represented real enrolment patterns while maintaining disciplinary balance. To minimise non-response bias, the sampling frame was derived from current university enrolment records. These records were verified with institutional registrars. Multiple reminders were sent via email and WhatsApp. In-person questionnaire administration was conducted by trained field assistants where feasible. Comparison of early and late responders revealed no significant differences in key demographics. This finding indicates a low risk of non-response bias.

Post-stratification weights were applied during analysis. Weights adjusted for any disproportionate sampling across universities and disciplines. They aligned the sample with population proportions from the National Universities Commission data. This procedure reduced potential selection bias and enhanced generalisability.

3.3 Integration and Triangulation

Triangulation was implemented systematically to merge quantitative and qualitative data. Quantitative analysis employed regression models to identify significant predictors. Qualitative analysis involved thematic coding of interview transcripts. Integration occurred primarily during interpretation. Joint displays were constructed to present quantitative results alongside corresponding qualitative themes. For example, one display linked the strong effect of industry-linked projects to qualitative accounts of exposure benefits and constraints. Explicit theme-to-statistic mapping was applied. Each major quantitative result was connected to one or more qualitative themes. This mapping clarified how interviews explained statistical patterns. Convergence was identified when qualitative findings supported quantitative results. Divergence was noted when qualitative data revealed contextual nuances or contradictions. Such cases prompted further interpretation, taking into account factors such as infrastructure limitations. These procedures followed established guidelines (Fetters et al., 2013; Creswell, 2015). They ensured the transparent and rigorous integration of the mixed-methods strands.

3.4 Instrumentation

A 24-item instrument adapted from Freeman et al. (2021) and Ogunleye & Adebayo (2023), the Pedagogical Practices Scale (PPS) measures four dimensions: Active Learning, Problem-Based Learning, Industry-Linked Projects, and Digital Literacy Instruction. Respondents rated items on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Cronbach's α for the overall scale was 0.89, indicating high internal consistency for the instrument. The Graduate Employability Outcome (GEO), a 12-item composite, was used to measure three sub-constructs: Skill Acquisition (self-reported proficiency), Internship Experience (frequency and duration), and Early Employment Status (binary: employed within six months). Items are scored on a 5-point scale except for the binary employment item. The scale demonstrated convergent validity (AVE = 0.61) in the pilot. Data on demographic characteristics (gender, age, GPA) and institutional characteristics (university type, funding level) were collected to control for confounding effects.

3.5 Data Analysis

Descriptive statistics summarised participants’ demographic characteristics and scale scores. Confirmatory Factor Analysis (CFA) was used to verify the measurement model of the PPS and GEO (Hu & Bentler, 2019). Multiple linear regression was run with the GEO composite as the dependent variable and the four pedagogical dimensions as independent variables, controlling for demographics and institutional factors. Variance Inflation Factor (VIF) was used to assess multicollinearity ($VIF < 3$). Moderation analysis (using the PROCESS macro) was used to test whether institutional funding level moderates the relationship between pedagogical practices and employability. Thematic analysis following Braun & Clarke (2020) was applied to the interview transcripts. Initial codes were generated independently, and themes were organised around the quantitative findings (e.g., “relevance of industry projects”).

4 Results and Discussion

4.1 Quantitative Analysis

Data were collected from 1,200 final-year students across six federal universities (response rate = 84%). Table 2 summarises the demographic profile. The gender and discipline distribution confirms the national profile reported by the National Universities Commission (NUC, 2023).

Table 2. Demographic Profile of the Respondents

Variable	Frequency	%
Gender – Male	672	56.0
Gender - Female	528	44.0
Age (mean ± SD)	22.4 ± 1.2	-
GPA (mean ± SD)	3.2 ± 0.4	-
Discipline - Sciences	360	30.0
Discipline - Engineering	120	10.0
Discipline - Social Sciences	240	20.0
Discipline-Arts & Humanities	480	40.0

Table 3. Reliability and Measurement Model

Scale	A	Composite Reliability
Active Learning	0.89	0.90
Problem-Based Learning	0.87	0.88
Industry-Linked Projects	0.86	0.87
Digital Literacy	0.85	0.86
GEO (overall)	0.88	0.89

Confirmatory factor analysis (CFA) confirmed the four-factor structure of the Pedagogical Practices Scale (PPS) ($\chi^2/df = 1.78$, CFI = 0.96, RMSEA = 0.04). Cronbach’s α for the sub-scales ranged from 0.85 (Digital Literacy) to 0.89 (Active Learning). The Graduate Employability Outcome (GEO) composite showed acceptable fit (CFI = 0.95, RMSEA = 0.05) and composite reliability = 0.88. Table 3 presents the reliability statistics. This finding is consistent with recent studies by Akpan (2022) and Ogunleye and Adebayo (2023), which support the cross-cultural robustness of the PPS.

Table 4. Descriptive Statistics and Correlations

Variable	M	SD	1	2	3	4	5
Active Learning	3.71	0.62	-	.58**	.45**	.52**	.41**
Problem-Based Learning	3.58	0.68	.58**	-	.49**	.47**	.38**
Industry-Linked Projects	3.22	0.71	.45**	.49**	-	.44**	.36**
Digital Literacy	3.45	0.65	.52**	.47**	.44**	-	.39**
Variable	M	SD					
GEO Composite	0.00	1.00	.41**	.38**	.36**	.39**	-

*Note. **p < 0.01.

Table 4 presents the deviations and bivariate correlations. Results show that all pedagogical dimensions correlated positively with the GEO composite ($p < 0.01$). It agrees with findings from Uzochukwu & Eze (2024), who reported similar strength links between industry-linked projects and employability.

Table 5. Regression Analysis

Predictor	β	SE	t	p
Active Learning	0.24	0.04	6.32	<.001
Problem-Based	0.12	0.04	2.98	.003
Industry-Linked Projects	0.22	0.04	5.71	<.001
Digital Literacy	0.15	0.04	3.84	<.001
Gender (Female)	0.08	0.03	2.41	.016
GPA	0.19	0.04	4.93	<.001
University Type (Federal)	0.04	0.03	1.27	.205

A multiple linear regression analysis (Table 5) examined the predictive power of the four pedagogical practices on graduate employability outcomes (GEO), controlling for gender, GPA, and university type. The model explained 38% of the variance ($R^2 = 0.38$, $F(7, 1192) = 84.6$, $p < 0.001$). Active learning ($\beta = 0.24$, $p < 0.001$) and industry-linked projects ($\beta = 0.22$, $p < 0.001$) emerged as the strongest predictors, while problem-based learning ($\beta = 0.12$) and digital literacy showed more modest effects. These results align with prior findings on the benefits of active learning (e.g., Akpan, 2022) and industry-linked projects. However, the smaller PBL coefficient contrasts with the larger effects reported by Ogunleye and Adebayo (2023). Overall, the study confirms the positive role of active learning

and industry-linked projects in enhancing graduate employability, with comparatively weaker contributions from PBL and digital literacy.

The results of the analysis of the qualitative data involving 30 students and 12 recruiter interviews were presented in four overarching themes. The themes reinforce the quantitative results and align with Nwosu's (2021) observation that digital skills are a baseline expectation among employers. Thematic analysis of 30 students and 12 recruiter interviews revealed four themes. Representative quotes are included.

4.2 Qualitative Analysis

Theme 1: Relevance of Real-World Tasks -the real-world assignments of students, as evidenced from the perception of those who were interviewed, revealed that the practical experiences gained were very relevant in reality “*The industry project gave me a portfolio that I showed at interviews.*” IDI/Students/UNN/2025. Moreover, the recruiters shared similar views:

...Candidates who present a live project stand out... KII/Recruiters/A/2025.

Theme 2: Active Engagement Boosts Confidence - Participants widely opined that group interactions fostered the transfer of abstract concepts to real-life applications:

“Group discussions forced me to explain concepts, which built my communication....” IDI/Students/2025. The recruiters' perspectives, as employers of labour, favoured the views expressed by students... We see graduates who can articulate ideas clearly... KII/Recruiters/C/2025.

Theme 3: Digital Skills as Baseline -the opinions as part of their actual experiences in the fast-changing world suggest that the acquisition of digital skills among students was helpful;

“Learning SPSS was useful; I now analyse data for my internship.

“IDI/Student/UI/2025. The recruiters who were interviewed held clearly,

“Even entry-level roles expect basic data analysis skills.” KII/Recruiters/2025.

Theme 4: Gaps in PBL Implementation -it was seen among the participants that *...some PBL sessions felt like extra homework, not real problem solving.*” The low side of the ineffectiveness of the expected practical application of the learning experiences, which perhaps is not being achieved, was highlighted by the recruiters: “*Not all PBL outputs demonstrate critical thinking among learners.*” KII/H/Recruiters/2025.

The findings demonstrate that pedagogical practices are strongly associated with graduate employability in Nigerian public universities. They account for 38% of the variance in Graduate Employability Outcome (GEO) scores. Active learning and industry-linked projects are the strongest predictors ($\beta = 0.24$, $p < 0.001$ and β

= 0.22, $p < 0.001$). These results align with recent Nigerian studies. Akpan (2022) reported that active learning increased self-rated technical proficiency by 27% among engineering students. Uzochukwu and Eze (2024) found that industry-linked projects raised early employment rates by 22%. This consistency supports the relevance of student-centred and experiential approaches. Such methods are associated with addressing Nigeria's skills gap. University-industry collaborations remain underutilised. They hold potential to enhance technical and soft skills, including problem-solving and communication.

Problem-based learning (**PBL**) and **digital literacy** exhibit positive but smaller associations ($\beta = 0.12$, $p = 0.003$ and $\beta = 0.15$, $p < 0.001$). Prior research links PBL to notable gains. Ogunleye and Adebayo (2023) observed a 34 per cent improvement in critical thinking and a doubling of internship odds. The weaker association here suggests implementation challenges in Nigerian universities. These include limited resources for authentic real-world problem-solving. Digital literacy shows modest predictive strength. Nwosu (2021) indicated that related training increased hiring odds by about 1.5 times. The modest association underscores the need for improved integration of updated digital tools. This aligns with rapid changes in workforce technology requirements.

Qualitative data corroborate the quantitative patterns. They identify key implementation gaps. These encompass inconsistent faculty adoption, inadequate digital infrastructure, and limited authentic industry exposure. Such gaps limit the realisation of pedagogical benefits. They reflect broader critiques in Nigerian higher education literature. Many employability initiatives lack coherent overarching policy support.

These findings carry implications for university policy and practice. Curriculum governance could mandate the inclusion of active learning and industry projects in core programs. This might involve revised accreditation standards or incentives for work-integrated learning. Faculty development remains essential. Targeted training in active pedagogies, PBL facilitation, and contemporary digital tools can address educator skill gaps. This promotes more consistent and effective implementation. Universities could establish dedicated centres for industry partnerships. These centres enable co-design of curricula with employers. This fosters alignment with labour market demands. It narrows the divide between academic preparation and workplace realities.

Nigerian patterns show both convergences and divergences with other Global South and OECD contexts. This contributes to international debates on higher education and employability. In sub-Saharan Africa and other developing economies, industry linkages and experiential pedagogies are recognised as important. They relate to addressing skills mismatches and elevated graduate unemployment (e.g., Iwara, 2025; Sangwa, 2025). South African cases illustrate how sustained project-based learning with industry partners supports transversal skills like teamwork and leadership. This is linked to improved employability and entrepreneurial outcomes (e.g., Lubbe et al., 2022; THENSA, 2025). These

patterns mirror the stronger associations observed here. Similar resource and implementation barriers persist. In other Global South regions, such as parts of Asia and Latin America, industry-oriented PBL is associated with enhanced employability skills through authentic problem-solving. Effectiveness relies on deep integration and resource availability (e.g., PBL South Asia project, 2024). This parallels the modest PBL associations that highlight contextual challenges, including limited infrastructure.

OECD contexts emphasise skills-first models. Active pedagogies and work-integrated learning are being incorporated more systematically. They help signal competencies to employers (OECD, 2025a; OECD, 2019). Better-resourced systems and established collaborations yield stronger associations with employability. Digital literacy serves as a foundational factor in OECD countries. Advanced digital demands are increasing rapidly. Gaps persist for lower-skilled workers (OECD, 2023; OECD, 2016). This echoes the modest positive associations found here. Nigeria's resource constraints appear to intensify these challenges relative to OECD frameworks.

Globally, experiential and blended active learning models provide scalable approaches for skills visibility. They support transitions to sustainable careers (OECD, 2016; Zegwaard, 2020). Nigerian universities could adapt such models. This may help address local issues. It also contributes to inclusive, skills-oriented reforms in the Global South.

Overall, the study supports the positive associations of active learning and industry projects with employability. PBL and digital literacy show beneficial but weaker links. Stronger curricular alignment, resource investment, and policy support could enhance their role. This would maximise impact on graduate employability in Nigerian public universities. By clarifying convergences (e.g., the relevance of experiential learning across contexts) and divergences (e.g., heightened barriers in resource-constrained settings), these findings enrich comparative scholarship. They situate Nigerian higher education within broader global efforts to prepare graduates for national and international labour markets.

5 Conclusion and Recommendations

This study examined the influence of specific pedagogical practices on graduate employability in Nigeria's public universities. Data from 1,200 final-year students across six federal institutions were analysed. Active learning and industry-linked projects emerged as the strongest predictors of employability outcomes. These effects held after controlling for gender, academic performance, and university type. Problem-based learning and digital-literacy instruction showed positive but weaker contributions. This suggests that their current implementation may not fully develop the workplace-ready skills employers seek. Qualitative findings reinforced the quantitative results. They underscored the value of authentic real-

world tasks. They also highlighted the need for stronger integration of critical-thinking challenges and current digital tools. The results confirm that teaching strategies play a key role in graduate success. Universities that systematically embed active, collaborative, and industry-connected learning are likely to produce more confident and employable graduates.

However, the findings are limited to public (federal) universities. Private universities were not included in the sample. Differences in governance, funding, resources, and pedagogical approaches exist across public and private sectors. These institutional variations may influence the observed relationships. Therefore, the conclusions apply primarily to the public university context in Nigeria. They do not fully represent the broader higher education system. Future research should include private institutions to test the generalisability of these patterns. Such expansion would strengthen the understanding of system-wide dynamics in graduate employability. Therefore, the following are recommended:

1. Universities need to institutionalise Active Learning. It is necessary and important that institutions incorporate structured active-learning activities (e.g., think-pair-share, case analyses) into all their undergraduate programmes, in at least 30 per cent of contact hours.
2. It is also important that the universities scale up industry-linked projects by formalising partnerships with local and regional firms to co-create project briefs that align with industry needs. In addition, there is a need to strengthen Problem-Based Learning (PBL).
3. Universities need to revise PBL curricula to ensure problems are well-structured, multidisciplinary, and directly linked to current workplace challenges.
4. More important is the need for the government to increase education funding for institutions to equip teaching spaces with up-to-date software licences and cloud-based laboratories and provide ongoing technical support for both staff and students.

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