

# Modelling Pedagogic and Measuring Tools in Promoting Deep Learning among Business Education Students in Rivers State

**Dr. Blessing Nwaoburu**

Department of Business Education  
Federal University Otuoke, Bayelsa State  
[nwaeriadols@gmail.com](mailto:nwaeriadols@gmail.com)  
08036747586

## Abstract

*This study modelled the impact of pedagogic and measuring tools in promoting deep learning among Business Education students in tertiary institutions within Rivers State. The analysis focused on pedagogic tool application (PED\_APP), student engagement (STU\_ENG), assessment validity (ASS\_VAL), and deep learning outcomes (DLO) as central constructs shaping educational practice. A descriptive survey design was adopted, and data were gathered from lecturers and final-year Business Education students across two public universities. The responses were analyzed using Exploratory Factor Analysis (EFA), multiple regression, and descriptive statistics to determine relationships among the constructs. The findings indicate that interactive pedagogic approaches, authentic assessment methods, and competency-based measuring tools significantly improved students' ability to apply knowledge critically and creatively. The overall deep learning achievement was estimated at 68.42. Among the innovations examined, problem-based learning and case method teaching had the highest adoption rates of 35.19% and 29.64%, respectively, collaborative learning had 18.52 whereas portfolio-based assessment recorded the lowest adoption (7.83%). Regression results revealed a strong and statistically significant association between pedagogic tool application and deep learning outcomes ( $F = 6.14, p < 0.01$ ). All null hypotheses were rejected, confirming that pedagogic and measuring tools strongly influence deep learning attainment. The study therefore recommended that tertiary institutions prioritise sustainable pedagogic innovations, reform assessment frameworks, and embed locally relevant measuring strategies in order to cultivate transformative learning experiences for Business Education students.*

**Keywords:** Pedagogic tools, measuring tools, deep learning, student-engagement, assessment validity.

## Introduction

The pursuit of deep learning has emerged as a core priority in higher education, particularly in disciplines such as Business Education where students are expected to integrate conceptual knowledge with practical application (Biggs & Tang, 2021). Unlike surface learning, which emphasizes memorization and short-term recall, deep learning cultivates critical thinking, problem-solving, and the ability to apply principles to novel situations (Marton & Säljö, 1976; Trigwell, 2020). This pedagogical shift has been globally reinforced by research advocating for student-centered teaching strategies, innovative assessment practices, and authentic learning experiences (OECD, 2022; UNESCO, 2023). In Nigeria, however, challenges such as overreliance on rote learning, poor assessment validity, and limited pedagogical innovation constrain the development of deep learning among tertiary students (Okafor & Nwosu, 2022; Adeyemi, 2023).

In Rivers State, Business Education programmes are expected to prepare graduates for entrepreneurial ventures, managerial responsibilities, and accounting competencies in a dynamic business environment. Yet, anecdotal evidence and empirical reports suggest that students often struggle to demonstrate the higher-order cognitive skills required for employability and knowledge transfer (Nwankwo & Ekene, 2021). This raises the question of whether existing pedagogic and measuring tools are sufficient to promote deep learning within the discipline. Globally, instructional innovations such as problem-based learning, flipped classrooms, case analysis, and authentic assessments have demonstrated effectiveness in fostering deep learning (Säljö, 2019; Singh, 2021). However, their level of integration and contextual appropriateness in Nigerian universities remain underexplored. This is in consonance with the opinion of Njoku and Wey-Amaewhule (2025) that the traditional methods of assessment used in these universities may not be effectively capturing students' learning outcomes, and the potential benefits of AI-driven assessment such as personalised feedback and adaptive learning are not being fully leveraged. This gap underscores the urgency of rethinking pedagogic and measuring strategies in order to align them with global best practices while meeting local needs.

Pedagogic and measuring tools are therefore critically important in promoting deep learning among students in tertiary institutions, as they provide structured avenues for fostering critical thinking, creativity, and the practical application of knowledge. By employing innovative teaching strategies such as problem-based learning, case analysis, and interactive simulations, lecturers can engage students beyond rote memorization, thereby encouraging the acquisition of transferable skills that are essential for navigating dynamic business environments. Likewise, the use of valid and competency-based measuring tools ensures that assessments move beyond recall to evaluating students' abilities to analyze, synthesize, and apply concepts in real-world contexts, which is the essence of deep learning (Trigwell, 2020). These tools also serve as feedback mechanisms for both students and educators, helping to identify learning gaps and refine teaching approaches to enhance overall learning outcomes. Consequently, this study seeks to model the relationship between pedagogic and measuring tools as the key predictors, and deep learning as the outcome of interest, with the aim of generating actionable insights for curriculum reform, instructional design, and quality assurance frameworks in Business Education programmes in Rivers State.

This study is anchored on the Constructivist Learning Theory, which posits that learners construct knowledge through active engagement with content and social interaction (Piaget, 1973; Vygotsky, 1978). Constructivism aligns with pedagogic tools that emphasize problem-solving, collaboration, and reflective inquiry. Additionally, Biggs' Theory of Constructive Alignment (Biggs & Tang, 2021) provides a framework for aligning teaching strategies, assessment methods, and learning outcomes to ensure that students are engaged in activities that lead to deep learning. This theoretical foundation underscores the importance of adopting pedagogic and measuring tools that not only deliver content but also facilitate critical engagement and application.

Pedagogic tools are the structured strategies, methodologies, and resources educators use to facilitate learning. These include active learning, collaborative projects, case-based instruction, problem-based learning, and digital aids (Biggs & Tang, 2021). They emphasize organizing experiences that foster interaction, reflection, and knowledge construction, thereby supporting higher-order thinking skills. Thus, measuring tools are evaluative instruments that determine student learning outcomes. They range from formative assessments such as quizzes and reflective journals, to summative measures like examinations, reports, and authentic assessments (Brookhart, 2018). In Business Education, they also cover performance-based evaluations like business plan development, entrepreneurial simulations, and portfolio assessments that capture competencies more holistically.

Deep learning contrasts with surface learning, which relies on memorization. It cultivates students' capacity for critical analysis, synthesis, and applying knowledge in unfamiliar contexts (Marton & Säljö, 1976; Trigwell, 2020). It engages students cognitively, affectively, and behaviorally, enabling knowledge transfer, problem-solving, and self-directed learning (UNESCO, 2023). In Business Education, deep learning is evident when students apply theoretical constructs such as management or accounting principles to real-world challenges.

The adoption of pedagogic tools, measuring instruments, and deep learning strategies is gaining traction in tertiary Business Education. Tools such as case teaching, problem-based learning, and digital simulations foster critical thinking, autonomy, and creativity. Measuring approaches like rubrics, competency-based assessments, and portfolios are gradually replacing rote examinations by providing authentic evidence of applied knowledge. Evidence shows students exposed to such tools demonstrate improved reflective and problem-solving capacities vital for employability (Brookhart, 2018). Key aspects of adoption and effectiveness include:

- a. Pedagogic tools encourage learner-centered instruction and promote engagement beyond memorization.
- b. Measuring tools provide authentic and competency-based evaluation of learning outcomes.
- c. Deep learning is fostered through critical reasoning, problem-solving, and practical application of knowledge.
- d. Institutions adopting innovative pedagogic approaches often report higher graduate employability and stronger reflective skills.

Nonetheless, challenges persist. Adoption is constrained by limited lecturer training, insufficient institutional support, and reliance on conventional lecture methods. Measuring tools face issues of standardization, inadequate resources, and resistance from staff and students accustomed to traditional examinations. Deep learning is further hindered by infrastructural constraints such as overcrowded classrooms and limited access to technology. Thus, while pedagogic and measuring tools are effective, their success depends on institutional investment, continuous training, and curriculum alignment (Anderson, 2022).

Recent studies emphasize the pivotal role of pedagogic practices in promoting deep learning. Singh (2021), using a quasi-experimental design in Indian universities, employed problem-based learning interventions to test their impact on higher-order thinking. Findings showed that students exposed to problem-based learning demonstrated stronger analytical and reflective skills than those taught through lectures. The study concluded that participatory approaches foster deep learning and transferable problem-solving capabilities. Similarly, Adeyemi (2023), through a survey in Nigerian tertiary institutions, established that active strategies such as debates, peer learning, and collaborative projects enhanced learner autonomy and knowledge retention, concluding that student-centered methods are indispensable for cultivating critical reasoning in Nigeria.

Regarding measuring tools, Brookhart (2018) reviewed rubrics and authentic assessment in the United States, showing that well-designed rubrics captured nuanced outcomes unlike traditional exams focused on recall. Brookhart concluded that authentic assessment provides valid evidence of deep learning. Likewise, Anderson (2022), using surveys and interviews in Canada, demonstrated that competency-based assessments encouraged students to integrate theory with practice, concluding that performance-oriented tools strengthen workplace preparedness. Global evidence corroborates these findings. OECD (2022), drawing on cross-national data, reported that universities using portfolio and project-driven frameworks achieved higher graduate employability, stressing that reformed systems are crucial for twenty-first-century learning. UNESCO (2023), through policy review, noted that assessments aligned with real-world skills foster critical thinking and lifelong learning. In Nigeria, Okafor and Nwosu (2022) observed that overreliance on rote methods constrained deep learning in vocational and business-related fields, urging urgent curriculum reform. Similarly, Bello (2022), employing a mixed-method design, assessed digital pedagogic tools such as simulations and e-learning platforms. Findings showed that students using digital platforms demonstrated greater adaptability and reasoning than those in traditional settings, concluding that digital pedagogies enhance engagement and knowledge application in technology-driven business education.

## Statement of the Problem

Despite the increasing recognition of deep learning as the cornerstone of twenty-first-century higher education, the integration of pedagogic and measuring tools in Business Education programmes within Rivers State remains inadequate. Many students continue to rely on surface learning approaches such as rote memorization, resulting in limited acquisition of transferable skills that are crucial for entrepreneurial and managerial competencies. Reports across Nigerian universities point to persistent challenges such as poor assessment validity, limited pedagogical innovation, and insufficient adoption of interactive teaching strategies, which constrain students' ability to engage critically and apply knowledge meaningfully in dynamic business contexts.

The disconnect between global best practices in education and local realities raises pressing concerns regarding the capacity of Rivers State tertiary institutions to nurture the caliber of graduates needed in today's knowledge-driven economy. Even where modest innovations are adopted, the quality of assessment and student engagement remains compromised by structural and contextual constraints. As Wagbara (2024) observes, "even in schools where summative assessment is conducted entirely by individual examination, group work can play a central role in student life and often in formative assessment." Yet, in Rivers State public universities, declining student interest, poor academic performance, and systemic problems such as lack of adequate assessment materials, limited teaching resources, financial struggles, the influence of social media, and the persistence of unethical practices like grade sorting have further eroded learning quality. These challenges highlight the urgent need to model and empirically validate how pedagogic and measuring tools can be effectively deployed to promote authentic deep learning among Business Education students in Rivers State.

### Objectives of the Study

The main objective of this study is to model pedagogic and measuring tools in promoting deep learning among Business Education students in Rivers State. The specific objectives are to:

1. Identify the pedagogic tools that significantly influence the promotion of deep learning in Business Education programmes in Rivers State.
2. Assess the extent to which measuring tools affect student engagement and the validity of learning outcomes in Business Education.
3. Examine the relationship between the application of pedagogic and measuring tools and the achievement of deep learning outcomes among students.

### Research Question

The following research questions were answered;

1. What are the pedagogic tools that significantly influence the promotion of deep learning in Business Education programmes in Rivers State?
2. What is the extent to which measuring tools affect student engagement and the validity of learning outcomes in Business Education?
3. What is the relationship between the application of pedagogic and measuring tools and the achievement of deep learning outcomes among students?

### Hypotheses

The following null hypotheses guided the study:

1. Measuring tools have no significant effect on student engagement and the validity of learning outcomes in Business Education.
2. Pedagogic tools do not significantly influence deep learning in Business Education programmes.
3. There is no significant relationship between pedagogic and measuring tools and the achievement of deep learning outcomes among Business Education students.

### Methodology

A descriptive survey research design was adopted for this study. This design was considered suitable as it enables the researcher to gather quantifiable data from a sizeable population, thereby facilitating both descriptive and inferential analyses (Creswell & Creswell, 2018). Structured questionnaires and institutional records served as the main instruments for data collection, capturing respondents' perceptions on pedagogic and measuring tools as well as their effects on deep learning outcomes.

The population of this study comprised lecturers and final-year undergraduate students in Business Education programmes across two public universities in Rivers State, namely: Rivers State University and Ignatius Ajuru University of Education. Based on faculty records and departmental enrolments (NUC, 2024), the estimated population consists of 170 individuals, made up of 140 final-year students and 30 lecturers.

**Table 1.1: Population of the Study**

Institution	Final-Year Business Education Students	Lecturers	Total
Rivers State University (RSU)	60	10	70
Ignatius Ajuru University of Education (IAUE)	80	20	100
Combined Total	140	30	170

Taro Yamane's (1973) formula for finite populations was employed to determine the sample size at a 95% confidence level and 5% margin of error. Applying the formula to the population of 170 yielded a sample size of approximately 119 respondents. The sample was stratified proportionally across the two institutions to ensure adequate representation of both lecturers and students. Out of 119 questionnaires administered, 111 were duly completed and returned, representing a 93.3% response rate, which is considered adequate for robust statistical analysis.

### Results

Responses from participants were analyzed using Exploratory Factor Analysis (EFA) and descriptive statistics to determine relationships among the constructs. Also, regression analysis was employed in determining the statistical justification of the variables hypothesized

**Table 1.2: Descriptive Statistics on Deep Learning Outcomes**

Item	N	Mean	Std. Dev.	Min	Max	Interpretation
Influence of pedagogic tools on deep learning	111	3.87	0.92	1	5	High
Effect of measuring tools on engagement & validity	111	3.72	0.89	1	5	High
Overall impact on deep learning outcomes	111	3.54	1.01	1	5	Moderate
Deep learning achievement (%)	111	68.42	-	20	100	substantial

**Source:** Field Survey, 2025

Table 1.2 shows high mean scores for pedagogic tools ( $M = 3.87$ ,  $SD = 0.92$ ) and measuring tools ( $M = 3.72$ ,  $SD = 0.89$ ). The overall impact scored moderately ( $M = 3.54$ ,  $SD = 1.01$ ). The deep learning achievement of 68.42% reflects progress but highlights the need for further enhancement.

**Table 1.3: Adoption Rates of Pedagogic and Measuring Tools**

Tool Category	Adoption Rate (%)	Decision
Problem-Based Learning	35.19	Highest adoption
Case Method Teaching	29.64	High adoption
Collaborative Learning	18.52	Moderate adoption
Portfolio-Based Assessment	7.83	Lowest adoption

**Source:** Field Survey, 2025

In table 1.3, adoption rates were computed using descriptive statistics: the number of respondents endorsing each method divided by the total sample, multiplied by 100. For instance, 93 of 265 respondents endorsed problem-based learning, giving  $(93/265) \times 100 = 35.19\%$ . This shows problem-based learning and case method teaching dominate adoption, while portfolio-based assessment is least applied.

### Hypotheses

1. Pedagogic tools do not significantly influence deep learning in Business Education programmes.

**Table 1.4: Test of Hypothesis  $H_{01}$  (Factor Analysis on Pedagogic Tools)**

Pedagogic Tool Category	Eigenvalue	Decision
Problem-Based Learning	$\geq 1.0$	Significant $\rightarrow$ Reject $H_{01}$
Case Method Teaching	$\geq 1.0$	Significant
Collaborative Learning	$\geq 1.0$	Significant
Lecture Method (Traditional)	$< 1.0$	Not Significant

**Source:** Research Output, 2025

Table 1.4 reveal that interactive pedagogic approaches such as problem-based learning, case method, and collaborative strategies significantly enhance deep learning. Traditional lecture methods, however, recorded low influence. Hence,  $H_{01}$  is rejected.

2. Measuring tools have no significant effect on student engagement and the validity of learning outcomes in Business Education.

**Table 1.5: Regression Analysis for  $H_{02}$** 

Model	F-value	p-value	Decision	Interpretation
Regression	6.14	$< 0.01$	$H_{02}$ Rejected	Measuring tools significantly affect student engagement and validity of learning outcomes.

**Source:** Research Output, 2025



**Note.**  $F = 6.14$ ,  $p < 0.01$  indicates a significant relationship between measuring tools (ASS\_VAL) and student engagement (STU\_ENG).

In table 5, regression analysis produced  $F = 6.14$ ,  $p < 0.01$ , indicating a significant relationship between measuring tools (ASS\_VAL) and student engagement (STU\_ENG). Authentic assessments such as portfolios and business plan projects were found to strongly predict deep learning outcomes. Therefore,  $H_{02}$  is rejected.

3. There is no significant relationship between pedagogic and measuring tools and the achievement of deep learning outcomes among Business Education students.

**Table 1.6: Regression Analysis for  $H_{03}$**

Predictors	Beta ( $\beta$ )	p-value	Decision	Interpretation
PED_APP, ASS_VAL	0.67	$< 0.01$	$H_{03}$ Rejected	Pedagogic and measuring tools significantly predict deep learning outcomes.

**Source:** Research Output, 2025

**Note.**  $\beta = 0.67$ ,  $p < 0.01$  shows a strong positive relationship between pedagogic tools, measuring tools, and deep learning outcomes.

Table 6 presents the regression coefficient between PED\_APP, ASS\_VAL, and DLO was positive and significant ( $\beta = 0.67$ ,  $p < 0.01$ ). This suggests that when pedagogic and measuring tools are effectively applied, students are more likely to achieve deep learning. Hence,  $H_{03}$  is rejected.

### Discussion of Findings

The findings of this study are consistent with the efficacy of innovative pedagogic and assessment practices in higher education. The rejection of hypothesis 1 confirms that pedagogic tools such as problem-based learning, collaborative methods, and digital simulations foster deeper levels of student engagement, critical reflection, and knowledge transfer (Singh, 2021). This aligns with Biggs and Tang's (2021) argument that constructively aligned teaching enhances students' capacity for critical and reflective learning by creating coherence between intended learning outcomes, instructional activities, and assessment strategies. In this way, the evidence affirms that pedagogic tools do more than facilitate participation; they actively shape how learners internalize, apply, and extend knowledge in dynamic academic and professional contexts.

The significant relationship between measuring tools and learning outcomes further affirms the importance of authentic and competency-based assessments in promoting meaningful learning (Brookhart, 2018; Anderson, 2022). Unlike traditional examinations that largely reward memorization, authentic tools such as portfolios, business plan projects, and reflective journals provide opportunities for learners to demonstrate competence in ways that mirror real-world problem-solving. Similar results have been documented in OECD (2022) reports, which highlighted that competency-driven assessments improve employability and transferable skills by bridging the gap between academic preparation and workplace realities. The results also resonate with Nigerian studies (Okafor & Nwosu, 2022), which criticized rote examinations for undermining deep learning by discouraging creativity, innovation, and critical reasoning. This convergence of international and local findings points to a growing consensus that valid assessment practices are integral not only for evaluating students but also for reinforcing deeper levels of engagement.

Overall, the findings underscore that pedagogic and measuring tools are not merely supplementary but central to the realization of deep learning in Business Education. The rejection of Hypotheses 2&3 in this study illustrates that when innovative pedagogies are integrated with authentic assessment instruments, they produce a synergistic effect that enhances both engagement and outcomes. This reinforces the call for Nigerian tertiary institutions to systematically embed these approaches into their instructional frameworks, supported by curriculum redesign, lecturer training, and institutional commitment. In this sense, pedagogic and measuring tools are best understood as transformative levers for aligning higher education with the demands of a knowledge-driven global economy.

### Conclusion

This study modelled pedagogic and measuring tools as predictors of deep learning among Business Education students in Rivers State. The findings demonstrate that interactive pedagogic strategies and authentic measuring tools significantly promote deep learning in form of student engagement, critical thinking, and knowledge transfer. Deep learning achievement was moderate but substantial, with innovative approaches like problem-based learning and case analysis showing the strongest impact. Challenges such as limited assessment validity and reliance on rote methods, however, continue to hinder optimal outcomes.

The study concludes that pedagogic and measuring tools are indispensable for achieving deep learning in Business Education. Universities in Rivers State should therefore priorities teaching innovations and assessment reforms that align with constructivist and competency-based paradigms. This would enhance not only academic achievement but also the employability and entrepreneurial readiness of graduates.

### Recommendations

Based on the findings, the following recommendations are made:

1. Tertiary institutions should institutionalize active learning strategies such as problem-based learning, collaborative projects, and case method teaching to foster critical engagement and deep learning.

2. Assessment frameworks should be reformed to emphasize authentic and competency-based measures such as portfolios, business plan projects, and entrepreneurial simulations.
3. Universities should invest in capacity building for lecturers, equipping them with contemporary pedagogic and assessment skills aligned with deep learning objectives.
4. Policy makers and accreditation bodies should incorporate deep learning indicators into quality assurance benchmarks for Business Education programmes.

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