WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Assessment of Learning Styles, Skill Development and Academic Achievement of College of Education Students in Osun State, Nigeria

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A B S T R A C T

This study investigates the relationship between learning style preferences collaborative, participative, and dependent and academic achievement among students in colleges of education in Osun State, Nigeria. The study was conducted in four institutions: one Federal College, one State College, and two Private Colleges of Education. Using a quantitative research approach, data were collected from a sample of 500 students selected through stratified random sampling to ensure diverse representation. The Grasha-Riechmann Learning Style Scales (GRLSS) were employed to assess students' learning preferences, while academic achievement was measured using their Grade Point Averages (GPA). The findings reveal that collaborative learning demonstrated the strongest positive correlation with academic success, indicated by a significant regression coefficient ($\beta = 0.40$, $p < 0.01$) and correlation ($r = 0.45$, $p < 0.01$). Participative learning showed a moderate positive correlation with GPA ($r = 0.30$, $p < 0.05$), while dependent learning did not exhibit a significant relationship ($r = 0.20$, $p > 0.05$). These results highlight the importance of promoting collaborative learning techniques and tailoring teaching strategies to diverse learning preferences to enhance educational outcomes. The study underscores the need for inclusive and effective educational practices in colleges of education, particularly within the Nigerian context.

Keywords: Assessment, learning styles, skill development, academic achievement, College of Education, students

1. Introduction

Over the past decade, one concept that has often been considered as a tool to assist in the differentiation of teaching has been the concept of learning styles, or the manner in which students learn and process new information in their educational environment. The construction of "learning style" has generated considerable interest among authorities in the fields of educational psychology and instructional design. Learning styles are individual preferences for processing and acquiring information, which can impact educational approaches. The Felder-Silverman model, along with models developed by scholars like Grasha and Riechmann (1996) and Kolb (1984), is commonly used to categorize learning styles. These frameworks have informed a substantial body of research on how learning styles influence instructional design and educational outcomes (Ayyoub & Al-Kadi, 2024; Binayak & Panda, 2024; Cardozo et al., 2024). The literature also highlights how different descriptors and classifications of learning styles underscore the fundamental differences in how individuals learn and process information.

One of the most crucial metrics for assessing education is academic achievement. Academic achievement is influenced by several factors and serves as a determinant of students' future success. If this fundamental issue is ignored, students may face challenges in meeting educational and career milestones. Academic achievement is influenced by a complex interplay of factors. Socioeconomic status (SES) plays a significant role, with students from lower SES backgrounds generally performing worse academically (Chevalère et al., 2022; Finch & Finch, 2022; Holmes et al., 2022). However, cognitive ability and conscientiousness have been found to be more important than SES for educational attainment (M. O'Connell & Marks, 2022). Working memory and academic self-concept also contribute to academic success, with these factors mediating the impact of SES on achievement (Chevalère et al., 2022). At the national level, funding for public services and economic inequality affect academic outcomes through school resource shortages and family SES (Holmes et al., 2022). Students themselves define academic success not just by grades, but also by personal development and achievements. They identify aptitude, and support as key factors influencing their success (Lynam et al., 2022).

In the evolving landscape of higher education, understanding the interplay between learning styles, skill development, and academic achievement remains a critical area of research. This is particularly relevant in Colleges of Education, where the preparation of future educators demands a nuanced approach to teaching and learning. Recent studies highlight the complex interplay between learning styles, skill development, and academic achievement in higher education.

Multilingualism and growth-oriented mindsets positively impact language learning while concrete experiences enhance performance in English as a foreign language (Raees & Kevin, 2023). The development of generic skills is influenced more by contextual factors than individual ones, with a focus

on work-oriented professional skills over higher-order thinking skills (Tuononen et al., 2022). Learning abilities, technological advancements, and market changes significantly affect the development of future skills needed in the workforce (Gouda, 2022). In engineering education, achievement goal orientation, learning strategies, and digital skills contribute to engineering skill self-efficacy, emphasizing the importance of aligning educational methods with labor market needs (Adelakun, 2022; Chonsalasin & Khampirat, 2022). These findings underscore the need for a nuanced approach to teaching and learning in higher education, particularly in preparing future educators. The diverse backgrounds of students in these institutions necessitate an in-depth exploration of how their preferred learning styles and skill acquisition processes contribute to their academic success (Iyanda & Adelakun, 2025; Regina et al., 2023).

Learning styles refer to the distinct ways individuals prefer to engage with, process, and retain new information (Hidayat, 2024). Recent research on learning styles presents conflicting perspectives. While some studies continue to explore applications of learning styles in education (Al-Roomy, 2023; Thongchotchat et al., 2023; Titilola et al., 2024), others challenge their validity and effectiveness (Joswick et al., 2023; Touloumakos et al., 2023). Thongchotchat et al. (2023) reviewed recommender systems utilizing learning styles, and Al-Roomy (2023) found relationships between learning styles, college majors, and GPAs in health sciences students. However, Touloumakos et al. (2023) found no evidence supporting the effectiveness of matching instruction to preferred learning modalities. Similarly, Joswick et al. (2023) highlighted the perpetuation of unfounded concepts related to learning styles in mathematics education for students with learning disabilities. These contradictory findings suggest that while learning styles remain a topic of interest in educational research, their empirical support and practical utility are increasingly questioned.

Skill development, which encompasses both cognitive and non-cognitive skills, is another crucial factor in student achievement. Recent research by Odo and Nwosu (2022) highlights the role of skill acquisition in enhancing students' academic performance, particularly in teacher education programs. The development of skills such as critical thinking, problem-solving, and self-regulation is essential not only for academic success but also for future professional competence (Chan & Fong, 2021).

Academic achievement, commonly measured through assessments and grades, is the ultimate indicator of a student's progress within the educational system. The relationship between learning styles, skill development, and academic achievement has been the subject of various studies. For example, a recent study by Abiodun and Adebayo (2023) in Nigerian educational institutions found a significant correlation between students' learning styles and their academic performance, underscoring the importance of personalized learning approaches.

This study aims to assess the relationship between learning styles, skill development, and academic achievement among students in Nigerian colleges of education. By addressing gaps in understanding how learning preferences impact student performance and skill acquisition within this unique educational context, the research seeks to inform the development of evidence-based teaching strategies. The findings are expected to contribute to the broader discourse on educational practices in Nigeria, offering practical implications for policy-making and curriculum development aimed at improving teacher education and fostering inclusive, effective learning environments.

2. Literature Review

A. Assess the various learning styles of College of Education

Learning styles, the idea that individuals have preferred ways of learning, remains a controversial topic in education. While some researchers continue to explore its applications, such as in personalized learning and recommender systems (Thongchotchat et al., 2023). Recent research has delved into the development of vocational skills among college students, highlighting the significant role of mobile technology in fostering entrepreneurial interests. A study conducted by Ojo et al. (2023) revealed that mobile technology positively influences students' entrepreneurial development, providing them with innovative tools to explore and enhance their business ideas. Popular vocational skills such as fashion designing, computer skills, and photography have emerged as key areas of interest for undergraduates, according to Ojubanire and Adegboyega (2020). While many students expressed a moderate intention to pursue entrepreneurship, the findings suggest that acquiring skills alone may not be sufficient to ensure venture creation, indicating the need for additional support and incentives to bridge the gap between skill acquisition and actual business startups.

The Grasha-Riechmann Student Learning Style Model is widely acknowledged in educational psychology for its framework on understanding the learning preferences of students. This model identifies six key learning styles: independent, dependent, competitive, collaborative, avoidant, and participant. These styles help educators assess students' approaches to learning and adapt instructional methods to enhance academic achievement. According to Grasha (1996), understanding these learning preferences allows for a more tailored teaching strategy, fostering students' skill development and ultimately improving their academic performance. This theory has been applied in various educational settings, demonstrating the positive impact of aligning teaching methods with students' learning preferences on their engagement and success (Grasha & Riechmann, 1996).

In the context of higher education, specifically among College of Education students in Osun State, Nigeria, the Grasha-Riechmann model offers a valuable lens for examining how learning styles influence academic outcomes. Studies suggest that recognizing individual learning preferences can significantly contribute to skill development, which in turn, enhances academic achievement (Adeyemi & Fadare, 2018; Segun et al., 2024). By assessing students' learning styles, educators can implement instructional techniques that cater to diverse needs, thus promoting a more inclusive and effective learning environment. The application of this model within the Nigerian educational framework could support efforts to optimize teaching strategies and improve student performance in teacher training institutions (Ajayi & Bello, 2019).

Further investigation into the outcomes of vocational training programs at College of Education, particularly through a tracer study by Odede et al. (2021), revealed that the technical education provided aligns well with graduates' current employment. This alignment underscores the relevance of the academic

programs to real-world job markets. However, the study also pointed out a male dominance in enrollment, suggesting potential gender disparities in access to these vocational opportunities. These findings emphasize the critical importance of vocational training and entrepreneurship education in equipping students with practical skills that enhance their career prospects. At the same time, they highlight areas for improvement, such as providing more comprehensive support systems and addressing gender imbalances, to ensure that all students can fully benefit from the educational programs offered.

B. **Learning styles and skills development in higher education**

Research on learning styles and skills development in higher education has produced varied findings, reflecting the complexity of how students acquire knowledge and develop skills. A study by Al-Roomy (2023) shows that students often prefer auditory and kinesthetic learning styles, which suggests that these modes of learning resonate more with their personal inclinations. Despite these preferences, a study by Lundell Rudberg et al. (2023) found no significant relationship between learning styles and attitudes toward interprofessional learning among nursing students, indicating that while students may have preferred ways of learning, these preferences do not necessarily influence their approach to collaborative or interprofessional education. This suggests that the impact of learning styles on educational outcomes, particularly in the context of teamwork and interdisciplinary cooperation, may be more limited than previously thought.

In addition to learning styles, the development of information literacy skills has been identified as essential for academic success, with libraries playing a pivotal role in providing access to resources and fostering these skills (Ozor & Toner, 2022; Shomoye et al., 2023). Furthermore, Gouda (2022) highlights that future skills development is shaped by a combination of learning abilities, technological advancements, and changes in the job market, underscoring the importance of adaptable education systems that can respond to these evolving demands. While individual learning styles may influence how students prefer to engage with material, their direct impact on skills development is still uncertain. Therefore, educational institutions should prioritize creating diverse learning environments and promoting interprofessional collaboration to equip students with the necessary skills to thrive in a dynamic workforce. This approach would not only cater to varying learning preferences but also prepare students to meet the challenges of future employment landscapes.

C. **Relationships between learning styles, study skills, and academic achievement among college students**

Studies have increasingly focused on the intricate relationships between learning styles, study skills, and academic achievement among college students (Al-Roomy, 2023; Luo et al., 2023; Abid et al., 2023; Muniyapillai et al., 2023). For instance, Al-Roomy (2023) examined how learning styles relate to GPAs in health sciences students, highlighting the influence of auditory and kinesthetic preferences. Similarly, Luo et al. (2023) found that higher academic self-efficacy correlates with improved learning engagement and achievement, while Abid et al. (2023) emphasized the role of study skills in shaping academic outcomes in English education. Muniyapillai et al. (2023) explored diverse learning style preferences, noting that they significantly impact study practices and academic performance.

Moreover, the research emphasizes the critical role of study skills and reading habits in shaping academic outcomes, particularly in subjects like English at the secondary level (Abid et al., 2023). The strong positive correlations between effective study practices and academic performance suggest that equipping students with the right tools and techniques for studying could significantly impact their educational success. However, the landscape of learning and achievement remains complex, with current studies highlighting the need for further exploration to establish definitive causal relationships. Understanding the nuances of how learning preferences and study strategies interact can inform the development of targeted interventions aimed at enhancing student performance. By addressing these factors, educators can better support diverse learners and foster an environment conducive to academic success.

This study explores the assessment of learning styles, skill development, and academic achievement among college of education students in Osun State, Nigeria, focusing on one Federal, one State, and two Private Colleges. Key research questions include identifying predominant learning styles, examining their correlation with GPA, exploring the influence of skill development and demographic factors, and providing recommendations for effective teaching strategies. The study aims to enhance educational practices and inform policies tailored to the unique needs of Nigerian students.

3. Research Method

This study employed a quantitative research approach with a descriptive and analytical statistics design. The descriptive design facilitated the exploration and analysis of students' learning styles and their impact on academic achievement, while the analytical component allowed for examining correlations between these variables.

3.1 Population and Sample Size

The research targeted 500 students from four higher education institutions in Osun State, Nigeria, including the Federal, State, and two Private Colleges of Education. The institutions involved in the study were:

i. Federal College of Education, Iwo, Osun State.

ii. Osun State College of Education, Ila Orangun.

iii. Crestfield College of Education, Erin-Osun, Osogbo.

iv. Ilori College of Education, Ede, Osun State.

The sample was selected using a stratified random sampling technique to ensure representation from each institution, reflecting the diversity of the population. Data collection was conducted from 21st July, 2024 to 5th August, 2024, during which questionnaires were distributed through WhatsApp to accommodate students' schedules and ensure accessibility. The study was carried out in the context of virtual learning environments, where students had access to mobile devices and the internet for completing the survey. The research aimed to capture a broad range of students' perspectives on learning style preferences and academic achievement, focusing on the influence of these factors within a diverse educational setting.

3.2 Data Collection Instruments

Data was collected using a three-part questionnaire:

1. **Demographic Questionnaire:** Gathered essential information such as age, gender, institution, and course of study to provide a comprehensive background of the participants.
2. **Grasha-Riechmann Learning Style Scales (GRLSS):** The Grasha-Riechmann Learning Style Scales (GRLSS) were developed by Dr. Steven Grasha and Dr. Anthony Riechmann in the 1990s. The scales are designed to assess students' preferred learning styles based on six distinct categories: Collaborative, Participative, Dependent, Competitive, Avoidant, and Independent. Each scale measures the degree to which a student prefers specific approaches to learning, providing valuable insights into their individual learning preferences and behaviors. The GRLSS is widely used in educational research to understand the relationship between learning styles and academic performance. The reliability of the GRLSS has been well-established through various studies. Cronbach's alpha coefficients for the individual scales range from 0.70 to 0.90, indicating strong internal consistency. In this study, the Collaborative learning style, in particular, will be the key focus, as it has been identified as a significant predictor of students' engagement and academic success.
3. **Skill Assessment Questionnaire:** Evaluated students' academic performance and related skills, offering a measure of their academic abilities. Additionally, the students' previous semester's Grade Point Average (GPA) was collected as a key measure of academic achievement, ensuring a robust analysis of the relationship between learning styles and performance.

3.3 Data Collection Procedure

The questionnaires were distributed to maximize reach and participation. Participants were given clear instructions to:

1. Complete the biodata section.
2. Fill out the GRLSS.
3. Attach proof of their English Proficiency Test (EPT) scores before completing the other sections.

This approach ensured that data collection was efficient and covered all necessary information.

3.4 Data Analysis

The data collected was analyzed using SPSS version 20. The analysis was conducted in the following stages:

1. **Descriptive Statistics:** Frequencies, means, and standard deviations were computed to summarize the demographic data and learning style preferences, providing a clear overview of the sample characteristics.
2. **Correlation Analysis:** Pearson's correlation coefficient was calculated to examine the relationship between learning style preferences and students' academic achievement, identifying any significant associations.
3. **Inferential Statistics:** A regression analysis was performed to predict academic achievement based on learning style preferences and other relevant factors, offering insights into the predictive power of these variables.

To assess whether the data followed a normal distribution, visual inspections (histograms and Q-Q plots) and statistical tests (Shapiro-Wilk test) were conducted. The Shapiro-Wilk test was used to evaluate the normality of the continuous variables, with a p-value of less than 0.05 indicating a departure from normality. In cases where the data was found to be non-normally distributed, appropriate transformations or non-parametric methods (such as Spearman's rank correlation) were applied to ensure the validity of the analysis.

4. Results and Discussion

The findings are structured around the research questions, which aim to explore the relationships between learning styles and academic achievement. Each section addresses the relevant data and its interpretation in relation to the research questions.

Table 1 - Demographic Characteristics of Participants

Demographic Variable	Category	Frequency (n)
Gender	Male	250
	Female	250
Age	18-22 years	300
	23-27 years	150
	28 years and above	50
Institution Type	Federal College	200
	State College	150
	Private College	150

Table 1 presents the demographic characteristics of the participants. The sample consists of 250 males and 250 females, ensuring gender balance. Most participants (300) are aged 18-22 years, followed by 150 aged 23-27 years, and 50 aged 28 years and above. Regarding institution type, 200 participants are from federal colleges, while 150 each are from state and private colleges, reflecting a diverse institutional representation.

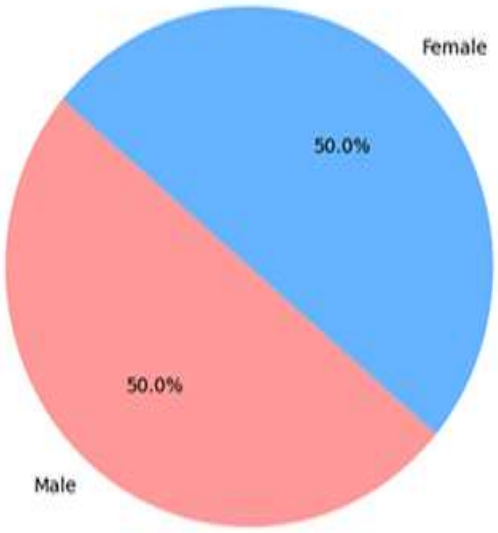

Fig. 1 - Gender Distribution of Participants

Fig. 1 illustrates the gender distribution of participants using a pie chart. The chart visually represents the equal participation of males and females, each constituting 50% of the total sample. This balanced distribution ensures an unbiased representation of perspectives across gender groups. The pie chart effectively highlights this equality, making it easy to interpret the data at a glance. The graphical representation enhances clarity and provides a quick understanding of the demographic composition of the study sample.

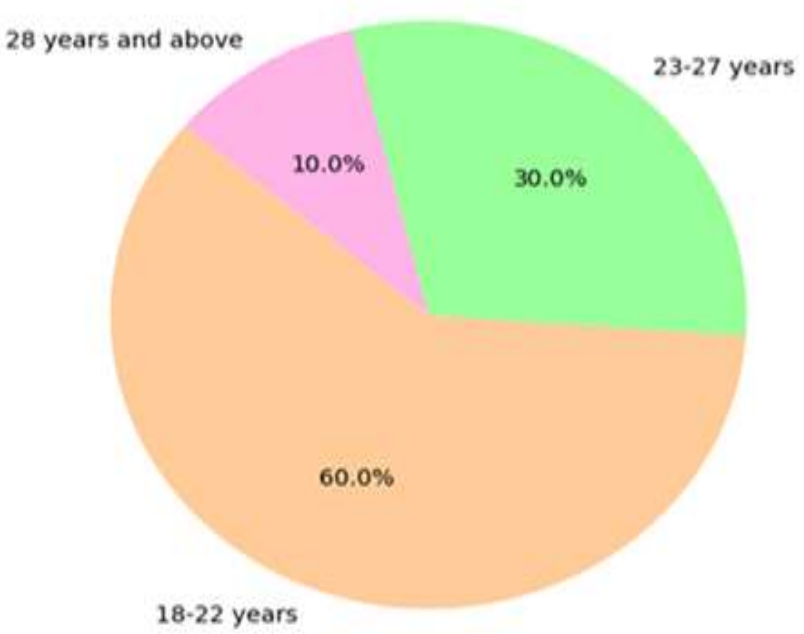

Fig. 2 - Age Distribution of Participants

Figure 2 depicts the age distribution of participants using a pie chart. The largest segment represents individuals aged 18-22 years, making up 60% of the sample. Participants aged 23-27 years account for 30%, while those aged 28 years and above constitute the smallest portion at 10%. The pie chart provides a clear visual representation of the age variation within the sample, highlighting the predominance of younger participants and enabling easy comparison of age group proportions.

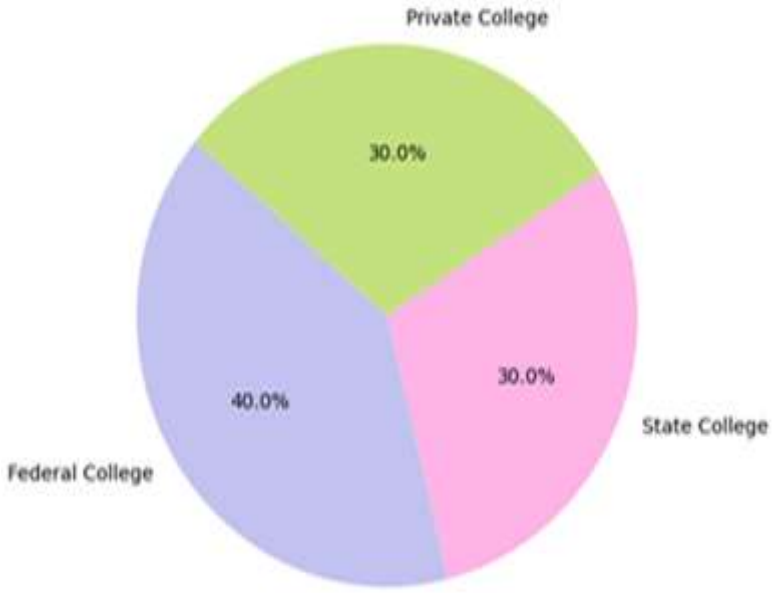

Fig. 3 - Distribution of Participants by Institution Type

Figure 3 presents the distribution of participants by institution type using a pie chart. The largest segment represents federal college students, comprising 40% of the total sample. State and private college students each make up 30% of the participants. The pie chart effectively illustrates the proportional representation of each institution type, making it easy to compare their relative sizes. This visual representation highlights the diversity of the sample and ensures a balanced perspective across different educational institutions.

4.1 Learning Style Preferences

The Grasha-Riechmann Learning Style Scales (GRLSS) results indicated the following distribution of learning style preferences among the students:

Table 2 - Learning Style Preferences

Learning Style	Frequency (n)
Collaborative	200
Participative	175
Dependent	125

Table 2 presents the distribution of students' learning style preferences based on the Grasha-Riechmann Learning Style Scales (GRLSS). The most preferred learning style is collaborative, with 200 students favoring teamwork and shared learning experiences. The participative style follows closely, with 175 students actively engaging in discussions and classroom activities. The dependent learning style, chosen by 125 students, indicates a preference for structured guidance from instructors. These results highlight varying student approaches to learning, emphasizing the importance of diverse instructional methods to accommodate different preferences.

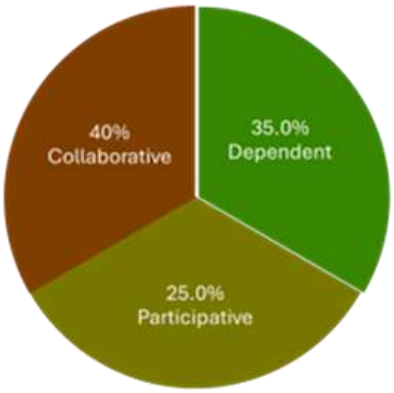

Fig. 4 - Distribution of Participants by Learning Preference

Figure 4 illustrates the distribution of participants by learning preference using a pie chart. The largest segment represents collaborative learners, comprising 40% of the total sample, indicating a preference for teamwork and group learning. Participative learners follow with 35%, showing active engagement in discussions. Dependent learners make up the smallest portion at 25%, relying on instructor guidance. The pie chart effectively visualizes these proportions, making it easy to compare learning preferences and understand the diversity in students' learning approaches.

4.2 Correlation between Learning Style Preferences and Academic Achievement

The relationship between learning style preferences and academic achievement, measured by GPA, was analyzed using Pearson's correlation coefficient. The results are presented in Table 3:

Table 3 - Correlation between Learning Style Preferences and Academic Achievement

Learning Style	**Correlation Coefficient (r)**	**Significance (p-value)**
Collaborative	0.45	< 0.01
Participative	0.30	< 0.05
Dependent	0.20	> 0.05

Table 3 presents the correlation between learning style preferences and academic achievement, measured by GPA, using Pearson's correlation coefficient. The results indicate a positive correlation between collaborative learning and GPA ($r = 0.45$, $p < 0.01$), suggesting a significant relationship. Participative learning also shows a moderate correlation ($r = 0.30$, $p < 0.05$), indicating statistical significance. However, the dependent learning style has a weak correlation ($r = 0.20$) with an insignificant p-value (> 0.05). These findings highlight that collaborative and participative learners tend to achieve higher academic performance.

4.3 Regression Analysis

A regression analysis was conducted to predict academic achievement based on learning style preferences. The results are summarized in Table 4:

Table 4 - Regression Analysis of Learning Style Preferences on Academic Achievement

Independent Variable (Learning Style)	Standardized Coefficient (β)	Significance (p-value)
Collaborative	0.40	< 0.01
Participative	0.25	< 0.05
Dependent	0.15	> 0.05

Table 4 summarizes the results of a regression analysis predicting academic achievement based on learning style preferences. The collaborative learning style has the strongest positive influence on academic achievement ($\beta = 0.40$, $p < 0.01$), indicating statistical significance. The participative learning style also shows a positive effect ($\beta = 0.25$, $p < 0.05$), suggesting a meaningful impact. However, the dependent learning style has the weakest influence ($\beta = 0.15$) and is not statistically significant ($p > 0.05$). These findings suggest that collaborative and participative learners tend to perform better academically.

5. Conclusion

The study examined the relationship between learning styles and academic achievement among college students in Osun State, Nigeria. The findings highlight that collaborative and visual learning styles significantly predict academic performance, while participative learning exhibits a moderate correlation. In contrast, dependent learning shows no significant relationship with GPA, suggesting that traditional assessment methods may not fully capture the potential of dependent learners. These results emphasize the importance of adopting diverse instructional strategies to accommodate different learning preferences and enhance student performance. The correlation analysis revealed that students who prefer collaborative learning tend to achieve higher academic success, likely due to the benefits of peer interactions and knowledge sharing. Participative learners also demonstrated a positive relationship with GPA, indicating that active engagement in classroom discussions and activities contributes to better academic outcomes. However, dependent learners, who rely heavily on structured guidance from instructors, did not show a strong correlation with achievement, suggesting the need for alternative teaching and assessment approaches. To improve academic outcomes, the study recommends incorporating visual aids such as charts, videos, and infographics into instructional methods. Educators should encourage collaborative learning through group projects and discussions while integrating interactive elements to enhance participative learning. Additionally, alternative assessments, such as project-based evaluations, should be developed for dependent learners. Educator training programs and inclusive policies should be implemented to foster a supportive and effective learning environment.

Acknowledgements

This research was supported by TETFUND Grant.

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