**RESEARCH ARTICLE**

# Learning Style Differences between High and Low Achievers in Public and Independent Secondary Schools in Lagos State, Nigeria

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### ABSTRACT

This study explored the learning styles prevalent among high and low achievers in 14 public and independent senior secondary schools in Lagos State, Nigeria. The study utilised a survey design to elicit information from 414 participants across three local government areas of the state, using a random sampling technique and the English Language Achievement Test (ELAT) instrument. The collected data were analysed using t-test analysis. The findings showed no significant difference in the learning style preferences of high and low achieving students in secondary schools for visual and auditory styles, while there was a significant difference in tactile learning style. Low achievers had a higher preference for the tactile learning style (M = 17.96) than high achievers (M = 16.24). The study also revealed that the most prevalent learning style among high and low achieving students in public and independent secondary schools is visual, followed by auditory, while tactile/kinesthetic is the least prevalent learning style. Based on the findings in this study, a number of recommendations were articulated for teachers, curriculum developers and learners.

**Keywords:** High achievers, learning styles, low achievers, public and independent schools.

## 1. INTRODUCTION

The present study investigated the learning styles of high- and low-achieving students in three Local Government Areas (LGAs) of Lagos State, Nigeria. The authors view learning as a multidimensional process that occurs throughout life, with education serving as a key vehicle for its execution (Bolaji *et al.*, 2020). They define learning as a relatively permanent change in behavior, and thus infer that learning has occurred when such a change is observed in a learner. It is also argued that learning may occur implicitly (without conscious awareness) or explicitly (with deliberate effort) (Driscoll, 2002; Olson & Ramírez, 2020), and Dryer *et al.* (2016) support the view that learning results from experience in a particular situation. The authors emphasized, through their data collection instruments, that learning is the catalyst for behavioral change (Dryer *et al.*, 2016). However, the focus of this paper is not strictly on learning itself, but on one of the key factors that enhances the outcome of that change. While several

studies have examined the learning environment as an influence on the relatively permanent change in behavior, this paper centers on learning styles as a distinctive factor impacting cognitive processing differences among learners, thus justifying the need for this study.

Learning styles refer to the various ways individuals learn, which are presumed to optimize their ability to process information. It involves specific methods that individuals favour when engaging with and absorbing information (Shirazi & Heidari, 2019). Learning styles cannot be fully understood without reference to the cognitive, affective, and psychomotor domains of education (Dryer *et al.*, 2016). Defined as a set of beliefs, preferences, and behaviours, learning styles help individuals navigate different learning situations (Sarbazvatan *et al.*, 2018), impacting how learners organize, select, and modify their learning environments (Mozaffari *et al.*, 2020). Importantly, learning styles are not related to intelligence but

rather how an individual's brain works to efficiently learn and store information (Awang *et al*., 2017).

Reid (1987) categorises learning styles into three primary types according to the VAK (Visual, Auditory, Kinesthetic) model, classifying learners as visual, auditory, or kinesthetic based on their preferred methods of processing information (Reid, 1987). A study conducted by Miller (2001) revealed that 29% of students identified as visual learners, 34% as auditory learners, and 37% as kinesthetic learners (Miller, 2001). Another approach categorises learners based on brain hemisphere dominance, with some learners being right-brain (global) learners and others left-brain (analytic) learners (Miller, 2001). Global learners prefer broad concepts and social contexts, while analytic learners focus on detailed information and impose structure on their learning (Sarbazvatan *et al*., 2018).

Learning styles are shaped by hereditary factors, environmental influences, and the surrounding context. Each classroom encompasses a variety of learning styles, and individual intellectual strengths and weaknesses affect how easily students can learn when information is presented in a specific manner (Zargar & Ganai, 2014). Research has shown that students' learning styles are closely related to their achievement levels, with high achievers often having different preferences than low achievers (Aliakbari & Qasemi, 2012; Kim, 2011; Park, 1997). For instance, gifted students tend to prefer visual and kinesthetic learning and more structured environments compared to their non-gifted counterparts (Hands, 2019).

Studies indicate that student performance can be improved by adapting instructional methods to accommodate individual learning styles (El-Sabagh, 2021; Hands, 2019). Educators have argued that identifying learning styles and providing corresponding instruction enhances learning outcomes (Kang, 1999; Matte-Gagné & Bernier, 2011). When students understand their learning styles, they can adapt better to the learning environment and maximize their potential. In accordance with these findings, the study explores the relationship between students' learning preferences and their levels of achievement, examining how these factors shape their ability to overcome learning challenges and maximize their academic success.

### 1.1. Research Hypotheses

The research hypotheses that guided this study were as follows:

1. Was there a significant difference in the learning styles observed among high and low achieving students?
2. What was the degree of difference in learning style preferences among students in public and independent schools?

### 1.2. Significance of the Study

The study provided insights into how each category of learners learns most effectively. The findings indicate that learners can build upon their unique learning styles to study more efficiently. The study offers empirical data that reveal the impact of effective teaching methods on high and low achieving students in both public and independent secondary schools in Nigeria. Moreover, it contributes to the understanding of how teachers can explore diverse learning styles to meet students' needs in a classroom environment characterised by flexibility and responsiveness. The outcomes of the study enhanced the knowledge of educational praxis in teaching and learning, enriching the understanding of educational practitioners, curriculum developers, and teacher educators, particularly in relation to instructional and curriculum delivery for both high and low achieving students in secondary schools.

## 2. Method

### 2.1. Research Design

The data were collected using a survey design, as the researchers aimed to elicit relevant information from the sample by asking questions pertinent to the characteristics of the population of which the sample was a part. The focus of the study was on high and low achieving students in Senior Secondary Two (SS 2), which is equivalent to Year 11 in the Australian school system, from public and independent senior secondary schools in three local government districts in Lagos State, Nigeria.

### 2.2. Research Variables

Two types of variables were examined in the study: independent and dependent variables. The independent variable was learning styles, categorized at three levels (visual, auditory, and kinesthetic) using the VAK learning styles model. The dependent variable was achievement level, classified into two categories: high and low.

### 2.3. Sampling Procedure and Samples

A simple random sampling technique was used to select 14 secondary schools (both public and independent) representing areas of both low and high socio-economic status using the English Language Achievement Test (ELAT). Students who scored 70% and above were considered high achievers, those scoring between 40% and 69% were classified as middle achievers, and students scoring 39% and below were regarded as low achievers. This classification aligns with the common grouping of learners into high achievers (fast learners), middle achievers (average learners), and low achievers (slow learners).

In most secondary schools, scores of 80% and above are referred to as exceptional, 70%–79% as very good, 60%–69% as good, 50%–59% as fair, 40%–49% as average, and scores below 39% are classified as below average or fail. In total, 414 students were sampled: 213 high-achieving students and 201 low-achieving students. The sample comprised 209 male students and 180 female students. Table I presents the 14 schools sampled across the three LGAs, along with the number of students selected from each school. For ethical considerations, the three LGAs are represented by the initials of their names to ensure data anonymity.

### 2.4. Research Instruments

#### 2.4.1. Learning Style Preference Questionnaire

The questionnaire was adapted from the Learning Style Preference (Gappi, 2013). Research that identifies and

TABLE I: Lists of Schools, Type, Local Government Areas (LGAs) and the Number of Students Used for Data Collection

| Local government demographics | Number of schools | Number of students | |
|---|---|---|---|
| | | High achieving schools | Low achieving schools |
| • A – Local Government Area | **Public schools (7)** | 1) 13 | 1) 20 |
| • K–LGA area | **Total Score:** 201 | 2) 15 | 2) 20 |
|   Government Area | | 3) 17 | 3) 12 |
| • AK–Local Government Area | | 4) 15 | 4) 15 |
| | | 5) 15 | 5) 18 |
| | | 6) 12 | 6) 20 |
| | | 7) 2 | 7) 16 |
| | **Independent Schools (7)** | 8) 19 | 8) 09 |
| | **Total Score:** 213 | 9) 11 | 9) 20 |
| | | 10) 13 | 10) 5 |
| | | 11) 18 | 11) 15 |
| | | 12) 13 | 12) 15 |
| | | 13) 24 | 13) 06 |
| | | 14) 13 | 14) 1 |

measures perceptual learning styles relies primarily on self-report questionnaires, where students select their preferred learning styles (Dunn *et al.*, 1995; Dunn *et al.*, 1993; Reid, 1987). The findings from Dunn *et al.* (1993) verify that most students accurately identify their learning strengths, particularly when an element is strongly preferred or rejected (Dunn & Griggs, 2000). Therefore, the Learning Style Preference Questionnaire was deemed suitable for this study. The questionnaire was divided into two sections (A and B). Section A was designed to elicit background information such as name, gender, school type, and school name. Section B consisted of twenty-four statements regarding individual learning preferences. The scoring procedure was Yes = 5 points, No = 1 point. The reliability coefficient, calculated using the Cronbach's alpha method after administering it to a sample of fifty-six SS2 students, yielded a value of 0.50.

### 2.4.2. English Language Achievement Test (ELAT)

This instrument consisted of a fifty-item multiple-choice test with four options (A–D), developed by the researchers based on the SS2 English Language curriculum. Each item had one correct option (the key) and three distractors. ELAT was administered to fifty-six randomly selected SS2 students. The Kuder-Richardson Formula 20 was used to establish the internal consistency of the instrument, resulting in a reliability coefficient of 0.74.

### 2.5. Data Analysis Procedure

The t-test comparison analysis was employed to analyse the collected data to reveal whether there were differences in learning styles according to achievement level, gender, and school type.

## 3. Results and Discussion

This chapter presents the statistical analysis results of the data obtained from the study on the prevalent learning styles among high- and low-achieving students in selected public and independent secondary schools in Lagos State, Nigeria. The data represents the outcomes from a dataset of 414 students across three LGAs in Lagos, Nigeria.

### 3.1. Hypothesis One

Table II shows that the difference in visual learning style preference between low- and high-achieving students in both public and independent schools in Lagos State is $-0.445$; $p > 0.05$. Since the p-value was greater than the 0.05 alpha level, null hypothesis 1 was therefore not rejected. Hence, there was no significant difference in the visual learning style preferences of low- and high-achieving students. Although the difference was not significant, high-achieving students preferred the visual learning style (M = 28.25) more than low-achieving students (M = 27.95). Table II also shows that the difference in auditory learning style preference between low- and high-achieving students is 1.53; $p > 0.05$. Since the p-value was greater than the 0.05 alpha level, null hypothesis 1 was therefore not rejected. Hence, there was no significant difference in the auditory learning style preferences of low- and high-achieving students. Though the difference was not significant, low-achieving students preferred the auditory learning style (M = 26.60) more than high-achieving students (M = 25.38). Lastly, Table II shows that the difference in tactile learning style preference between low- and high-achieving students is 2.23; $p < 0.05$. Since the p-value was less than the 0.05 alpha level, null hypothesis 1 was rejected. Hence, there was a significant difference in the tactile learning style preferences of low- and high-achieving students. Low-achieving students preferred the tactile learning style (M = 17.96) more than high-achieving students (M = 16.24).

### 3.2. Hypothesis Two

Table III shows that the difference in visual learning style preference between private and public secondary school students is $-0.862$; $p > 0.05$. Since the p-value was greater than the 0.05 alpha level, null hypothesis 2 was not rejected. Hence, there was no significant difference in the visual learning style preference between independent and public secondary school students. Although the difference was not significant, public secondary school students preferred the visual learning style (M = 28.40) compared to independent secondary school students (M = 27.82). Table III also indicates that the difference in auditory learning style preference between private and public

TABLE II: T-Test Showing the Differences in the Learning Styles Prevalent among High and Low Achieving Students in Secondary Schools

| Learning style | Level of achievement | N | Mean | SD | $t_{obs}$ | df | $P_{value}$ | Decision |
|---|---|---|---|---|---|---|---|---|
| Visual | Low | 201 | 27.95 | 6.57 | −0.445 | 412 | 0.657 | Not significant |
| | High | 213 | 28.25 | 7.06 | | | | |
| Auditory | Low | 201 | 26.60 | 8.10 | 1.53 | 412 | 0.128 | Not significant |
| | High | 213 | 25.38 | 8.17 | | | | |
| Tactile | Low | 201 | 17.96 | 7.86 | 2.23 | 412 | 0.026 | Significant |
| | High | 213 | 16.24 | 7.80 | | | | |

TABLE III: T-Test Showing the Differences in the Learning Styles Prevalent among Students in Public and Private Secondary Schools

| Learning style | School type | N | Mean | SD | $t_{obs}$ | df | $P_{value}$ | Decision |
|---|---|---|---|---|---|---|---|---|
| Visual | Private | 210 | 27.82 | 6.67 | −0.862 | 412 | 0.389 | Not significant |
| | Public | 204 | 28.40 | 6.97 | | | | |
| Auditory | Private | 210 | 25.84 | 8.45 | −0.318 | 412 | 0.751 | Not significant |
| | Public | 204 | 26.10 | 7.85 | | | | |
| Tactile | Private | 210 | 16.38 | 7.74 | 1.83 | 412 | 0.068 | Significant |
| | Public | 204 | 17.79 | 8.22 | | | | |

secondary school students is −0.318; p > 0.05. Since the p-value was greater than the 0.05 alpha level, null hypothesis 2 is also not rejected. Therefore, there is no significant difference in auditory learning style preference between private and public secondary school students. Although the difference was not significant, public secondary school students preferred the auditory learning style (M = 26.10) compared to private secondary school students (M = 25.84). Table III further indicates that the difference in tactile learning style preference between independent and public secondary school students is −1.83; p > 0.05. Since the p-value was greater than the 0.05 alpha level, null hypothesis 2 was also not rejected. Hence, there is no significant difference in tactile learning style preference between independent and public secondary school students. Although the difference was not significant, public secondary school students preferred the tactile learning style (M = 17.79) compared to private secondary school students (M = 16.38).

## 4. Discussion

As seen in Table II on visual results, although the difference was not found to be significant, high-achieving students preferred the visual learning style (M = 28.25) more than low-achieving students (M = 27.95). The implication of this outcome, based on the administered test materials, revealed that colourful outlines, charts, diagrams, videos, flashcards, highlighters, textbooks, and pictures were more useful and highly effective learning tools for high-achieving students in secondary schools than for low-achieving students. This finding negates the position of Park (1997), which suggested that high achievers were the least visual among exceptional, average, and low achievers. In addition, other researchers have highlighted a significant relationship between students' achievement levels and their preferred learning styles (Park, 1997; Zargar & Ganai, 2014).

Moreso, the study's results revealed no significant difference in auditory learning style preference between low- and high-achieving students. Although the difference was not significant, low achievers preferred the auditory learning style (M = 26.60) more than high achievers (M = 25.38). This suggests that lectures, group discussions, audiotapes, recorded lectures, videos, and songs may be more appropriate and relevant learning tools for low achievers in secondary schools than for high achievers.

The study also showed a substantial difference in tactile learning style preference between low- and high-achieving students. Low achievers preferred the tactile learning style (M = 17.96) more than high achievers (M = 16.24). This implies that tracing diagrams, studying in short blocks, taking lab classes, role-playing, using flashcards for memorisation, using memory games, taking field trips, studying with others, and using textured examples (or touching models) would be more effective for engaging low achievers than high achievers in secondary schools.

The overall results of the study showed that most senior secondary school students preferred the visual channel ($M_{high}$ = 28.25, $M_{low}$ = 27.95). The second most preferred perceptual channel was auditory (M = $M_{high}$ = 25.38, $M_{low}$ = 26.60), while tactile was the least preferred perceptual channel ($M_{high}$ = 16.24, $M_{low}$ = 17.96). In summary, both high- and low-achieving students demonstrated the greatest preference for visual learning styles and preference for auditory learning styles compared to tactile learning styles. These findings contrast with those of Park (1997) and Reid (1987), who found that students generally preferred tactile/kinesthetic learning models (Zargar & Ganai, 2014).

Contrary to the findings of Dunn et al. (1993), who reported that 20% to 30% of the school-age children they studied were auditory learners, while 40% were visual, and 30% to 40% were tactile/kinesthetic or some combination, the results of this study suggest otherwise. Furthermore, the findings differ from Cody's (1983) study, which found that the learning styles of gifted, average, and underachieving students were very different from each other (Cody, 1983). These discrepancies may be attributed to cultural differences. The cultural background of the students used

in past studies may differ greatly from that of the students in this study. It could be argued that culture impacts learning styles, as it influences our daily lives, how we process information, how we communicate with others, how we solve problems, our thinking preferences, and how we make connections with other subjects.

The results obtained from the study indicated that there was no significant difference in the learning styles prevalent among students in public and private secondary schools. Specifically, no considerable difference in the visual learning style preference of independent and public secondary school students. This implies that using real visual resources can make instructional content visually useful and effective for both high and low achievers who are visual learners in public and independent secondary schools. Although the difference was not significant, public secondary school students preferred the visual learning style (M = 28.40) compared to independent secondary school students (M = 27.82).

Regarding auditory learning (as shown in Table III), there was no significant difference in auditory learning style preference between independent and public secondary school students. This implies that both high and low achieving students who are auditory learners in public and independent secondary schools will benefit greatly from using digital, visual and auditory resources techniques such as word association to remember facts and lines. Although the difference in their auditory learning style preference was not found to be significant, public secondary school students preferred the auditory learning style (M = 26.10) compared to independent secondary school students (M = 25.84).

Furthermore, the results from the study indicated that there was no significant difference in tactile learning style preference between private and public secondary school students. This implies that both high and low achievers who are tactile learners in both public and independent secondary schools will acquire information fastest when participating in science labs, drama presentations, field trips, dances, or other active activities. Although the difference was not found to be significant, public secondary school students preferred the tactile learning style (M = 17.79) compared to independent secondary school students (M = 16.38).

The results established that students from both public and independent secondary schools showed the greatest preference for the visual learning style (M = public: 28.40, private: 27.82) and a greater preference for the auditory learning style (M = public: 26.10, private: 25.84) than for the tactile learning style (M = public: 17.79, private: 16.38). In terms of the non-significant differences observed among learning style preferences (visual, auditory, and tactile) of high and low achieving students in independent and public secondary schools, several factors could be responsible. These factors may include similarities in culture, age, learning environment, and gender. In addition, as shown in the analysed data, there seems to be no clear distinction in the instructional methodologies used in both public and independent secondary schools. Despite the study's finding of no significant difference, public secondary school students demonstrated a greater preference for visual, auditory, and

tactile learning styles than independent secondary school students.

## 5. Conclusion and Recommendations

The findings from this study have important implications for educational practice, both now and in the future. The common learning style for both high and low achievers was visual learning. Therefore, teachers should be encouraged to use more visual resources to provide effective instruction for their students. Additionally, teachers are encouraged to explore differentiated approaches that are visually supported to meet the diverse learning needs of their students. Teachers should engage in designing cross-curricular learning priorities to facilitate experiential and interactive learning for visually driven students. An emphasis on total physical response activities (Renshaw & Asher, 1982), which synchronize verbal statements with body movements, should be considered for any newcomer in a beginning level class (Bolaji *et al.*, 2018; Fedewa & Ahn, 2011; Renshaw & Asher, 1982; Watson *et al.*, 2017).

Based on the results of the study, the following recommendations are made:

- Teachers should deepen their understanding of how to design a rich teaching context with adequate visual resources to accommodate the diverse learning styles of students and redesign classroom environments to be flexible and responsive.
- Professional development on differentiating pedagogy and creating an inclusive classroom setting is essential for teachers to effectively cater to the diverse abilities in 21st-century classrooms.
- Policymakers and educational agencies need to develop a performance graduate standard similar to that of the Australian Institute for Teaching and School Leadership (AITSL) to guide graduate teachers in understanding their learners and how they learn.

### Conflict of Interest

The authors declare that they do not have any conflict of interest.

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