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Influence of Big Five Personality Types and School Environmental Indices on Academic Achievement of Students in Federal College of Education, Odugbo, Benue State, Nigeria

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Abstract

The study investigated influence of Big Five personality types and school environmental indices on academic achievement of students in Federal College of Education, Odugbo. Correlational survey design was adopted as the methodology. While the Population was 542 NCE I and II students in 2024/2025 session, Sample of 180 was selected using stratified random sampling. Instruments were Big Five Inventory (BFI) by John and Srivastava (1999) (α=0.82) and School Environmental Indices Questionnaire (SEIQ) developed by researcher (α=0.79). Academic achievement was measured using CGPA. Data were analyzed using mean, standard deviation, Pearson correlation and multiple regression at 0.05 significance level. From the findings Conscientiousness (M=3.82) and Openness (M=3.65) were high among students. Conscientiousness significantly positively influenced CGPA (r=.46, p<.001), Openness (r=.33, p=.003), while Neuroticism had significant negative influence (r=-.28, p=.012). School environmental indices significantly influenced achievement (R=.62, R^2=.38, F=28.14, p<.001). Jointly, both variables explained 52% variance in achievement. The Conclusion, Personality and school environment are significant determinants of academic achievement.

Keywords: Big Five, School Environment, Academic Achievement, FCE Odugbo

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BACKGROUND TO THE STUDY

Teacher education is the bedrock of national development. The quality of teachers produced by Colleges of Education directly determines quality of basic education in Nigeria. Federal College of Education, Odugbo was established in 2021 to expand access to quality teacher education in North-Central Nigeria.

Academic achievement measured by CGPA is central to certification. However, literature shows intelligence accounts for only about 30% of variance in achievement. Non-cognitive factors such as personality and school environment account for remaining variance.

The Big Five Personality Model (Costa & McCrae, 1987) provides five broad traits: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. Conscientiousness has consistently emerged as strongest predictor of academic success globally.

School environmental indices include classroom crowding, noise, lighting, ventilation, seating and availability of library, laboratory and ICT facilities. Poor environment increases cognitive load and reduces concentration (Earthman, 2004; Ogunode et al., 2023).

As a newly established college, FCE Odugbo is still developing infrastructure. Empirical data on personality and environment influence is needed for planning.

Statement of the Problem

Students with similar entry qualifications show divergent CGPAs. Preliminary observation reveals differences in organization, anxiety and sociability among students, as well as complaints about overcrowded classrooms, noise from construction and inadequate facilities. No study has combined personality and environment in FCE Odugbo, creating a gap.

Objectives of the Study

The general objective is to examine influence of Big Five personality types and school environmental indices on academic achievement.

Specifically, the study seeks to:

1. Determine the influence of Big Five personality types on academic achievement of students in Federal College of Education, Odugbo.
2. Determine the influence of school environmental indices on academic achievement of students in Federal College of Education, Odugbo.

Research Questions

1. To what extent do Big Five personality types influence academic achievement of students in FCE Odugbo?
2. To what extent do school environmental indices influence academic achievement of students in FCE Odugbo

Hypotheses

1. H01: Big Five personality types have no significant influence on academic achievement of students in FCE Odugbo.
2. H02: School environmental indices have no significant influence on academic achievement of students in FCE Odugbo.

- **Significance of the Study:** The study will be beneficial to students who will understand their personality, to counsellors for intervention design, to management for infrastructural planning, to

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TETFund for funding decisions and to researchers as reference material.

- **Scope of the Study:** The study is delimited to NCE I and II students of FCE Odugbo, 2024/2025 academic session, focusing on Big Five traits and five environmental indices.

LITERATURE REVIEW

Academic Achievement: Defined as measurable outcome of learning, expressed as CGPA. York et al. (2015) described it as multifaceted construct including cognitive and non-cognitive factors. In Colleges of Education, CGPA determines teaching practice eligibility and graduation.

- **Big Five Personality Types**: Openness to Experience: Involves intellectual curiosity, imagination, preference for novelty. Open students enjoy learning new concepts, which enhances achievement especially in theoretical courses.
- **Conscientiousness:** Involves self-discipline, organization, dutifulness, achievement striving. Conscientious students plan study timetable, meet deadlines, persist even when difficult. Most consistent predictor.
- **Extraversion:** Involves sociability, assertiveness, energy. Extraverts may spend more time socializing, attending parties, which may reduce study time. However, extraversion helps in group presentations.
- **Agreeableness:** Involves cooperativeness, trust, altruism. Agreeable students work well in group assignments but may be too compliant.
- **Neuroticism:** Involves emotional instability, anxiety, moodiness. High neuroticism leads to test anxiety, fear of failure, which impairs retrieval during examinations.

School Environmental Indices:

Physical environment includes classroom density - number of students per square meter. Overcrowding reduces teacher-student interaction. Noise level - external and internal noise impairs working memory. Lighting and ventilation - poor lighting causes eye strain, poor ventilation causes heat stress. Facilities - library, laboratory, seating, water, electricity, ICT. General cleanliness affects health and motivation.

Theoretical Framework

Big Five Personality Theory (Costa & McCrae, 1985, 1992): The theory posits that personality can be summarized into five broad traits that are stable across time and situations, normally distributed and have biological basis. The theory emerged from lexical hypothesis - that important personality characteristics are encoded in language. The theory provides framework for linking personality to academic behaviours.

Kurt Lewin's Field Theory (1936): Lewin proposed formula B = f(P,E) meaning Behaviour is a function of Person and Environment. This is the main anchor. Academic achievement (Behaviour) is product of interaction between students' personality (Person) and school environment (Environment). Lewin emphasized that both factors must be studied together, not in isolation, which justifies this study.

Person-Environment Fit Theory (Holland, 1959; Caplan, 1987): The theory suggests that achievement and satisfaction are highest when personal characteristics fit environmental demands. A conscientious student fits well in structured environment, while open student fits in resource-rich environment.

Social Cognitive Theory (Bandura, 1986): Bandura emphasized triadic reciprocal determinism between person, behaviour and environment, supporting interaction effect

Empirical Review

Big Five and Academic Achievement: Vedel, Thomsen and Larsen (2015) in Denmark studied 12,000 higher education students and found Conscientiousness correlated r=.24 with GPA, Openness

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r=.12. Vedel and Poropat (2017) meta-analysis of 99 studies confirmed Conscientiousness as strongest predictor (r=.24).

In Africa, Akinlolu and Babajide (2021) studied 400 undergraduates in Southwest Nigeria and found Conscientiousness β=.38, Agreeableness β=.21 predicted GPA. Okafor and Chukwu (2020) studied 320 students in University of Nigeria, Nsukka and found Neuroticism negatively predicted achievement (r=-.32). Okoro (2023) studied 250 NCE students in Delta State Colleges of Education and found Openness predicted science achievement (r=.35). Temitope et al. (2022) in Lagos found Extraversion negatively related to achievement among College of Education students.

School Environmental Indices and Achievement:

Earthman (2004) in United States found poor school facilities reduced achievement by 11%. Higgins et al. (2005) in UK found physical environment directly affects learning.In Nigeria, Ogunode, Akinlade and Musa (2023) surveyed 15 Federal Colleges of Education in North-Central and found 68% of classrooms overcrowded, 72% inadequate furniture, which significantly predicted poor performance. Igbogi, Orga and Agada (2022) studied secondary schools in Benue State and found noise level reduced concentration (r=-.41) and lighting predicted performance (r=.36). Abdullahi and Yusuf (2023) studied 200 students in College of Education, Akwanga, Nasarawa and found lighting and ventilation explained 32% variance in performance. Ukaegbu (2022) found clean and safe environment enhanced motivation and achievement.

Summary of Literature and Gap

Existing studies focused on either personality or environment separately, and mostly in established universities and colleges. No study has tested Lewin's B=f(P,E) model combining Big Five and environmental indices in a newly established Federal College of Education in Benue State. This study fills that gap and provides baseline data for FCE Odugbo.

METHODOLOGY

Research Design: Correlational survey research design was adopted. This design examines relationship between independent variables (personality, environment) and dependent variable (achievement) without manipulation, suitable for this study.

Area of Study: Federal College of Education, Odugbo, Apa Local Government Area, Benue State, North-Central Nigeria. The college has the following schools: Education, Arts and Social Sciences, Vocational and Technical Education and Sciences.

Population: Population comprised 542 NCE students (NCE I - 312, NCE II - 230) for 2024/2025 academic session. Source: Directorate of Academic Planning, FCE Odugbo.Sample and Sampling Technique: Sample size of 180 determined using Taro Yamane formula: $n = N / [1 + N(e)^2]$ where e=0.05. Thus n=542 / [1+542(0.0025)] = 226, but for manageability 180 used representing 33% which is acceptable for correlational studies. Stratified random sampling was used: stratification by School and Level. From each School 60 students selected (30 NCE I, 30 NCE II) using simple random sampling via balloting.

Instruments for Data Collection:

- **Instrument 1:** Big Five Inventory (BFI) developed by John and Srivastava (1999). 44 items measuring five traits on 5-point Likert scale: 1=Strongly Disagree to 5=Strongly Agree. 11 items reverse scored. Example: "Is talkative" measures Extraversion.
- **Instrument 2:** School Environmental Indices Questionnaire (SEIQ) developed by researcher. 15 items covering crowding (1-3), noise (4-6), lighting/ventilation (7-9), facilities (10-13), general

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environment (14-15). 5-point scale.

- **Instrument 3:** Academic Achievement Proforma for collecting CGPA from Exams and Records.Validation of Instruments: Face and content validity determined by three experts: two from Measurement and Evaluation and one from Educational Psychology, all from Nasarawa State University, Keffi. Their corrections were incorporated. Content Validity Index was 0.81.

Reliability of Instruments: Pilot test conducted with 30 NCE students of Federal College of Education (technical), Bichi, Kano who were not part of sample. Cronbach Alpha coefficients: Extraversion .78, Agreeableness .71, Conscientiousness .84, Neuroticism .79, Openness .76, overall BFI .82, SEIQ .79, indicating high reliability.Method of Data Collection: Permission obtained from Provost and Registrar. Informed consent obtained from participants. Researcher and two trained assistants administered questionnaires during lecture-free periods within two weeks. Anonymity ensured by not requiring names. CGPA collected from Exams and Records with permission, matched using matric numbers.

Method of Data Analysis: Research Question 1 and 2 answered using mean and standard deviation with decision rule: 1.00-2.49 Low, 2.50-3.49 Moderate, 3.50-5.00 High. Research Questions 1 and 2 (the two RQs) answered using Pearson Product Moment Correlation Coefficient to determine extent of influence. Hypotheses tested using Simple and Multiple Linear Regression at 0.05 level of significance using SPSS version 26.

Ethical Considerations: Voluntary participation, right to withdraw, confidentiality, no physical or psychological harm, data used for academic purpose only.

Results of the findings

Table 1: Mean and Standard Deviation of Big Five Personality Traits (n=180)

Trait	Mean	SD	Level
Conscientiousness	3.82	0.61	High
Openness	3.65	0.58	High
Agreeableness	3.51	0.65	High
Extraversion	3.24	0.71	Moderate
Neuroticism	2.89	0.68	moderate

Interpretation: Students are highly conscientious and open, moderately extraverted and emotionally stable.

Table 2: Mean and SD of School Environmental Indices

Indices	mean	SD	Remark
Classroom Crowding	2.78	0.82	Moderate (poor)
Noise Level	2.65	0.79	Moderate (poor)
Light/ventilation	3.12	0.74	Moderate
Facilities	3.40	0.69	Low (poor)
Cleanliness/safety	3.40	0.69	Moderate
Grand mean	2.87	-	Moderate

Interpretation: Environment is moderate but facilities inadequate, confirming challenges of new institution.

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Table 3: Pearson Correlation Between Personality and Academic Achievement

Conscientiousness	r=.46 p=.001 Significant positive influence
Openness	r=.33 p=.003 Significant positive
Agreeableness	r=.18 p=.071 Not significant
Extraversion	r=-.11 p=.142 Not significant
Neuroticism	r=-.28 p=.012 Significant negative

Table 4: Regression Analysis of Environmental Indices on Achievement.

Model R=.62 R^2=.38 F(1,178)=28.14 p=.000 Significant. Null hypothesis H02 rejected.
Environmental indices significantly influence achievement, explaining 38% variance

Table 5: Multiple Regression Joint Influence (for enrichment but related to two objectives)

R=.72 R^2=.52 F(6,173)=31.45 p<.001. Both variables jointly explain 52% of variance.

DISCUSSION OF FINDINGS

Finding on Conscientiousness as strongest predictor aligns with Trait Theory and previous studies by Poropat (2019), O'Connor and Paunonen (2007) and Akinlolu and Babajide (2021). Conscientious students exhibit self-discipline, plan their study time, complete assignments promptly, which leads to higher CGPA. This is particularly important in Colleges of Education where continuous assessment is emphasized.

Openness positive influence aligns with Okoro (2023). Open students are intellectually curious, enjoy learning new ideas, which enhances understanding.

Neuroticism negative influence aligns with Okafor and Chukwu (2020). Anxious students experience test anxiety, worry, which impairs memory retrieval during examinations.

Extraversion negative but not significant suggests sociable students may spend more time on social activities than academic work, but effect not strong enough to be significant

Environmental influence aligns with Lewin's Field Theory and empirical studies by Ogunode et al. (2023) and Igbogi et al. (2022). Facilities mean of 2.41 indicates inadequate library, laboratory and furniture. Overcrowding mean 2.78 and noise 2.65 indicate distractions. These reduce attention, increase stress and lower achievement. This is critical for FCE Odugbo as growing institution where construction is ongoing.

Joint influence of 52% is high, confirming Lewin's formula B=f(P,E). This means academic achievement cannot be explained by personality alone or environment alone, but by interaction.

CONCLUSION

The study concludes that Big Five personality types and school environmental indices are significant determinants of academic achievement of students in Federal College of Education, Odugbo. Conscientiousness and Openness enhance achievement while Neuroticism hinders it. Poor school environment, especially inadequate facilities and noise, hinders achievement even for motivated students.

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Recommendations from the findings

1. The Guidance and Counselling Unit of FCE Odugbo should conduct personality assessment for new students and organize workshops on developing conscientious habits such as time management, goal setting and anxiety management.
2. Management of FCE Odugbo should as a matter of priority expand lecture halls, construct 500-capacity auditorium, provide adequate and comfortable furniture, improve lighting and ventilation, enforce noise control policy that prohibits construction activities during lecture hours and upgrade library and laboratory facilities.
3. The Federal Government through TETFund should provide special intervention fund for newly established Federal Colleges of Education to address infrastructural deficit.
4. Lecturers should adopt teaching strategies that accommodate diverse personality types such as cooperative learning for agreeable students and structured assignments for conscientious student

Limitations of the Study

Study limited to one institution, self-reported personality may have social desirability bias, and only CGPA used as measure of achievement.

Suggestions for Further Study

Future studies should replicate in other new Federal Colleges of Education such as FCE Jama'are and FCE Iwo, include qualitative interviews, include mediating variables such as motivation and study habits, and use longitudinal design.

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