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Research Article

Influence of Antisocial Behavior, Gender Differences, and Location on Academic Achievement Among Students of Kano State Polytechnic Unit Schools

*Tine Abdullahi Jibrin, PhD.

Department of Education, Kano State Polytechnic, Kano, Nigeria.

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***Corresponding author:** **Tine Abdullahi Jibrin, PhD.**
Department of Education, Kano State Polytechnic, Kano, Nigeria.
E-mail: altineado@yahoo.com

Abstract

This study examined the relationship between antisocial behaviour and academic achievement and investigated differences in academic achievement across areas of specialisation, geographical location and gender. An ex post facto research design was adopted. A multistage sampling procedure was used to select 273 National Diploma One (ND I) students (194 males and 79 females; 208 urban and 65 rural) from 508 students identified as exhibiting characteristics of antisocial behaviour across the schools of the Polytechnic. Antisocial behaviour was measured using an adapted 44-item, four-point rating scale, with a Cronbach's alpha coefficient of 0.836 obtained during the pilot study, while academic achievement was measured using students' cumulative grade point average (CGPA). The hypotheses were tested at the 0.05 level of significance using Pearson's product-moment correlation, one-way analysis of variance (ANOVA) and independent-samples t-test. The results revealed a mean antisocial behaviour score of 94.11 (SD = 23.55) and a mean CGPA of 2.62 (SD = 0.82). Antisocial behaviour was not significantly correlated with academic achievement ($r = .000$, $p = .999$). Similarly, no statistically significant differences were found in academic achievement based on area of specialisation ($F(4, 268) = 0.469$, $p = .758$), geographical location ($t(271) = 0.392$, $p = .696$) or gender ($t(270) = 0.277$, $p = .782$). The findings indicate that, among the students included in this study, academic achievement was not significantly associated with antisocial behaviour scores and did not differ significantly across areas of specialisation, geographical locations or gender. Among the recommendations given, the Polytechnic should provide enabling learning environment with a view to give all students equally learning opportunities irrespective of gender location and area of specialization.

Keywords: *Antisocial behavior; academic achievement; gender; geographical location; area of specialization; polytechnic students; Kano State; Nigeria.*

1. Introduction

In the Polytechnic setting, academic achievement is expressed through the cumulative grade point average (CGPA), which summarises performance across examinations, tests, assignments, projects and other institutional requirements. It is a central concern for students, parents and the wider public, who regard formal education as a route to personal and national development.

Concern about the decline in achievement of Kano State Polytechnic students has been voiced by parents, the Polytechnic authorities, the mass media and employers. The researcher's observations as a teacher in one of the unit schools indicated a decline in students' academic records in the 2016/2017, 2017/2018 and 2018/2019 sessions, apparent across gender and location. At the second zonal quarterly Students' Industrial Work Experience Scheme (SIWES) coordinators' meeting held at the Polytechnic on 14 July 2018, both of labor and supervisors of the industrial attached scheme what was least in classroom employers complained that students could not practically demonstrate, during industrial attachment, the skills they were expected to have acquired in their first year could not be observed. These observations are anecdotal and are not offered as systematic evidence of decline.

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The Polytechnic is a state-owned institution with five unit schools: Technology, Management Studies, Environmental Studies, Rural and Entrepreneurship Studies, and General Studies. Students enter from both rural and urban areas, follow the same learning activities and are assessed by the same procedures, regardless of gender or location.

Antisocial behaviour refers to actions that violate the basic rights of others or contravene established societal norms, rules and regulations (World Health Organization [WHO], 2021). In an educational setting, such behaviours may manifest as stealing, fighting, examination malpractice, vandalism, lateness to lectures, disruptive noise, nuisance and the use of abusive language. In the context of Kano State Polytechnic, these behaviours constitute violations of institutional rules and expectations for acceptable student conduct. Students found engaging in such misconduct may be referred to the appropriate disciplinary bodies and subjected to sanctions, depending on the nature and severity of the offence.

The relationship between problem behaviors and academic achievement has been explained through several theoretical perspectives, including the adjustment erosion, academic incompetence, bidirectional, and shared risk models. These perspectives suggest that behavioural difficulties may undermine academic performance, poor academic achievement may contribute to behavioral problems, both may influence one another over time, or they may arise from common underlying risk factors (Chen *et al*., 2022). The common developmental antecedent perspective proposes that the association between problem behaviors and academic achievement may partly reflect shared underlying genetic and environmental influences, whereby common developmental risk factors contribute to the emergence of both behavioral difficulties and academic challenges (Bignardi *et al*., 2022).

Empirical findings are mixed. In a correlational study of 636 eleventh-grade students in mainland Similarly, McLeod *et al*. (2012) found that the relationship between problem behaviours and academic achievement varied according to the type of behaviour, with delinquency, attention problems and substance use significantly associated with diminished academic achievement, whereas depression was not. More recently, Salgado *et al*., (2022) reported that different forms of counterproductive academic behavior, particularly absenteeism, deception and cheating, were negatively associated with academic performance. Akpan, Ojinnaka and Ekanem (2010) compared 132 Nigerian primary school pupils with behavioural disorders with matched controls and reported a statistically significant difference in overall academic performance ($p = 0.04$). Algozzine, Wang and Violette (2010) found that ratings of problem behaviour correlated negatively with teacher-rated academic competence ($r = -0.39$ and -0.45 in two years) but only weakly with measured reading achievement ($r = -0.12$ and -0.13). Manrique, Van Leeuwen and Ghesquière (2012) reported a strong relationship between psychosocial functioning and achievement among 901 sixth-grade pupils in Lima, Peru, with an important role of gender.

Gender and location have also been examined. Igbo and Anselm (2014), studying 378 senior secondary class two students in Nigeria, found that gender did not significantly influence delinquent behaviour but did influence achievement, with male students scoring higher, and they reported differences in mean achievement between urban and rural students. Studies of antisocial behaviour itself have generally found higher levels among males (Ting, 2011; Mobarake, 2015; Theresa, 2016). Evidence on location and achievement is inconsistent: Nwugu (2010) and Okonkwo (2012) reported better mathematics achievement among urban students, Egboebow (2013) reported better performance among rural students, and Busade (2010) and Essian (2017) found no significant difference. Evidence on area of specialisation is sparse; Teresa (2016) reported higher achievement among science and engineering students than among technology students in a Nigerian university.

Most of these studies involved elementary or secondary school students, and few have examined tertiary students. The researcher is not aware of a comparable study at Kano State Polytechnic. The present study also uses an ex post facto design, whereas most behavioral studies use surveys.

The study is anchored in social control theory (Hirschi, 1969), which attributes antisocial behavior to weak attachment to parents, school and society, and in social learning theory (Bandura, 1977), which explains how behaviors, including antisocial ones, are acquired through observation and imitation of models. The original project also drew on theories of moral development, gender learning and personality development.

Objectives. The study aimed to (1) determine the relationship between antisocial behavior and academic achievement; (2) compare academic achievement across areas of specialization; (3) compare academic achievement between rural and urban students; and (4) compare academic achievement between male and female students at Kano State Polytechnic.

Null hypotheses (each tested at $\alpha = 0.05$):

- H_o1: There is no significant relationship between antisocial behavior and academic achievement.
- H_o2: There is no significant difference in academic achievement among students from different areas of specialization.
- H_o3: There is no significant difference in academic achievement between rural and urban students.
- H_o4: There is no significant gender difference in academic achievement.

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2. Methods

2.1 Design

An ex post facto design was used. This non-experimental design compares pre-existing groups on a dependent variable, involves no manipulation of variables, and examines relationships between variables after the events of interest have occurred. It was judged appropriate because antisocial behavior, gender, location and specialization could not be manipulated.

2.2 Population and sampling

The population comprised 14,800 ND students across the five unit schools, according to the Polytechnic Management Information System (2019). From this population, 508 students were identified as showing characteristics of antisocial behavior, and these formed the accessible population. The study was restricted to ND 1 students of the 2017/2018 academic session, who came from urban and rural backgrounds and from a range of specializations.

A multistage sampling technique was used. First, unit schools were selected by the hat-and-draw method. Second, selection by gender and unit school was done proportionally. Third, a checklist was used to identify 273 male and female students from the 508 as the final sample, a size taken from the Research Advisors (2006) sample-size table. The sample comprised 194 male and 79 female students; 208 urban and 65 rural students; and students from Engineering (n = 110), Management (n = 73), Environmental (n = 52), Humanities (n = 25) and Rural and Entrepreneurship (n = 13) specialisations.

2.3 Instruments

Antisocial behavior. The Antisocial Behavior Scale was adapted from Nasidi (2010), whose original 33-item scale had a reported reliability coefficient of 0.75. The researcher extended it to 44 items grouped into four categories using the characteristics listed in the Mental Health Diagnosis Manual (2016): conduct disorder (items 1–12), personality disorder (items 13–27), hyperactivity personality disorder (items 28–36) and attention deficit disorder (items 37–44). Responses were given on a four-point scale: 4 = much like me, 3 = like me, 2 = unlike me, 1 = much unlike me. The demographic section replaced the word "sex" with "gender". Higher total scores indicate greater antisocial behaviour.

Academic achievement. Academic achievement was operationalized as CGPA.

2.4 Validity and reliability

For face validity, the scale was submitted, with the background, objectives, research questions and hypotheses, to two experts in Educational Psychology and Educational Research at Bayero University, Kano, who judged the content appropriate. For construct validity, the scale was administered with a personality inventory questionnaire to Polytechnic students who were not part of the main study; the near-zero correlation ($r = -0.00$, $p > 0.999$) was interpreted as evidence of divergent validity. Reliability was assessed in a pilot test with students who were not part of the main study, giving a Cronbach's alpha of 0.836.

2.5 Data collection

Introductory letters were submitted to the director of each unit school to seek permission. Two research assistants, introduced to each director, administered the questionnaire over two days per school (one day for distribution, one for collection). Respondents were gathered in an empty classroom and guided on how to respond. Some students left to attend lectures, so questionnaires were collected from them after their lectures.

2.6 Data analysis

Descriptive statistics summarized the sample. Pearson's product moment correlation tested H_o1 (association between two continuous variables). One-way ANOVA tested H_o2 (comparison of means across five independent groups). Independent-samples t-tests tested H_o3 and H_o4 (comparison of means between two independent groups). All hypotheses were tested at $p = 0.05$. SPSS version 23 was used.

3.0 Results

3.1 Characteristics of the sample

Table 1. Characteristics of participants (N = 273)

Variable	Category	n	%
Location	Urban	208	76
	Rural	65	24
Gender	Male	194	71
	Female	79	29
Specialization	Engineering	110	40

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Variable	Category	n	%
	Management	73	27
	Environmental	52	19
	Humanities	25	9
	Rural and Entrepreneurship	13	5

Urban students outnumbered rural students, male students outnumbered female students, and Engineering was the largest specialization group.

3.2 Antisocial behavior and academic achievement (H_o1)

Table 2. Pearson correlation between antisocial behaviour and CGPA

Variable	N	Mean	SD	r	p	Decision
Antisocial behaviour score	273	94.11	23.55	.000	.999	Not significant
CGPA	273	2.62	0.82			

There was no significant relationship between antisocial behavior and CGPA ($r = .000$, $p = .999$). H_o1 was retained.

3.3 Area of specialization (H_o2)

Table 3. One-way ANOVA of CGPA by area of specialization

Source	Sum of squares	df	Mean square	F	p	Decision
Between groups	1.26	4	0.316	0.469	.758	Not significant
Within groups	180.38	268	0.673			
Total	181.65	272				

CGPA did not differ significantly among the five specialization groups, $F(4, 268) = 0.469$, $p = .758$. H_o2 was retained. The proportion of variance in CGPA associated with specialization, calculated here from the reported sums of squares, was about 0.7% ($\eta^2 \approx 0.007$).

3.4 Location and gender (H_o3 and H_o4)

Table 4. Independent-samples t-tests of CGPA by location and gender

Comparison	Group	n	Mean	SD	t	df	p	Decision
Location	Urban	208	2.61	0.83	0.392	271	.696	Not significant
	Rural	65	2.65	0.78				
Gender	Male	194	2.63	0.86	0.277	270	.782	Not significant
	Female	79	2.60	0.71				

The project report gives n = 193 for males and df = 270 in the gender analysis, whereas the sampling frame gives 194 males and 273 participants in total (df = 271).

Rural students had a marginally higher mean CGPA than urban students (2.65 vs 2.61), but the difference was not significant, $t(271) = 0.392$, $p = .696$; H_o3 was retained. Male students had a marginally higher mean CGPA than female students (2.63 vs 2.60), but the difference was not significant, $t(270) = 0.277$, $p = .782$; H_o4 was retained. Standardized mean differences calculated here from the reported summary statistics were very small (Cohen's $d \approx 0.05$ for location and ≈ 0.04 for gender).

4. Discussion

This study examined whether antisocial behavior, area of specialization, location and gender were associated with the CGPA of ND 1 students at Kano State Polytechnic. None of the four null hypotheses was rejected.

Antisocial behavior and achievement: The correlation between antisocial behavior score and CGPA was zero to three decimal places. This is consistent in direction with the partial pattern reported by Li and Armstrong (2009), where several problem behaviors were unrelated to GPA and others were only weakly related, and with the low correlations between problem behavior and measured reading achievement reported by Algozzine *et al*., (2010). It differs from Akpan *et al,*. (2010), who found a significant difference in overall performance between pupils with and without behavioral disorders, and from the strong relationship reported by Manrique *et al*., (2012). These studies differ from the present one in age group, measures and design, so direct comparison is limited.

The result gives no support to the causal models described by Li and Armstrong (2009), in which antisocial behavior reduces achievement, achievement failure promotes antisocial behavior, or both. However, the design cannot test causal

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direction, and an interpretation that fits the sampling procedure is that the null correlation reflects a restricted sample. All participants had already been identified as showing characteristics of antisocial behavior, so the range of antisocial behavior scores, and the contrast with students showing little or none, was limited. The findings therefore do not show that antisocial behavior is unrelated to achievement among Polytechnic students generally. In addition, only the total score was analyzed; the four categories of the scale were not examined separately, and Li and Armstrong (2009) found that individual behaviors differed in their relationship with achievement.

Area of specialization: Mean CGPA did not differ across specializations, and specialization accounted for under 1% of the variance. Teresa (2016) reported higher achievement among science and engineering students than among technology students, and Kola (2017) attributed poor physics performance to wrong subject combinations and a shortage of qualified teachers; neither finding was reproduced here. One interpretation is that CGPA is calculated within each programme's own courses and grading, so similar means need not imply equivalent mastery across programmers. The Engineering group was the largest (n = 110), while the Humanities (n = 25) and Rural and Entrepreneurship (n = 13) groups were small, which limits the precision of the comparison.

Location: Rural students scored marginally higher than urban students, but the difference was negligible and not significant. The literature is divided: urban advantages were reported by Nwugu (2010) and Okonkwo (2012), rural advantages by Egboebow (2013), and no significant difference by Busade (2010) and Essian (2017). The present finding agrees with the last two. Studies reporting urban advantages linked them to better learning materials and teacher availability, whereas the present students all attended the same Polytechnic with common learning conditions and evaluation, which may reduce the influence of home location. The researcher's observation that urban students spent less time preparing for examinations than rural students, who worked hard for fear of failure, was not measured in this study and remains a hypothesis. Rural students formed only 24% of the sample, so the test had less precision for this comparison.

Gender: Male students had a marginally higher mean CGPA than female students, but the difference was not significant. This differs from Igbo and Anselm (2014), who found significantly higher achievement among male secondary school students, and it is closer to studies reporting only slight male advantages (Joseph *et al*., 2012). Explanations offered elsewhere for male advantages include unequal educational opportunities and teacher attention (Parajuli, 2017). Such explanations may depend on cultural setting, and in the present setting men and women face the same admission requirements, learning activities and evaluation. The female group was small (n = 79), and female students were over-represented in less demanding, traditionally female-associated courses according to the researcher's background observations, which were not analyzed here.

Strengths and Limitations: Strengths include the use of an instrument with face validity review, a pilot-tested reliability coefficient of 0.836, and sampling across several unit schools. Limitations are as follows. (1) The sample consisted only of students identified as showing antisocial behaviour, with no comparison group, which restricts generalisation and may attenuate correlations. (2) Antisocial behaviour was self-reported, which may be affected by social desirability. (3) The design is cross-sectional and ex post facto, so no causal inference is possible. (4) Each variable was tested separately; the analyses did not control for confounders such as prior attainment or socioeconomic background, and did not test interactions among antisocial behaviour, gender and location, although the title refers to their combined influence. (5) Only ND 1 students from one institution were studied. (6) Some students were difficult to assemble during data collection, because they left to attend lectures. (7) No effect sizes or confidence intervals were reported in the original analysis, and the p value of .999 for r = .000 should be confirmed against the original statistical output.

5. Conclusions and Recommendations

Among ND 1 students at Kano State Polytechnic who were identified as showing antisocial behaviour, CGPA was not significantly related to antisocial behaviour score and did not differ significantly by area of specialisation, location or gender. Within this sample, these characteristics do not appear to distinguish higher from lower achievers, and achievement may depend on other factors such as interest, learning opportunities and the goals set by the learner.

Based on the findings, the following recommendations are made:

1. The Polytechnic authority should provide an enabling learning environment with adequate learning and teaching materials, regardless of gender and location.
2. The counselling unit should be supported to run extracurricular activities and intervention strategies to manage antisocial behavior.
3. Equal learning opportunities should be provided across all areas of specialization.
4. The mass media should work with the Polytechnic to promote positive discussion forums on student conduct and pro-social behavior.
5. Parents should recognize and support students identified with antisocial behavior to improve academically and morally.
6. Female students and students from rural areas should be treated fairly and equally with their male and urban counterparts.

7. Further studies should repeat the investigation in other institutions and at other levels of education. They should also consider including students with no identified antisocial behaviour as a comparison group, analysing the four categories of the scale separately, and using multivariable methods that allow gender, location and specialisation to be examined together.

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