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THE EFFECT OF RESIDENTIAL LOCATION AND GENDER ON ACADEMIC ACHIEVEMENT IN PRACTICAL SCIENCE COURSES AMONG UNIVERSITY STUDENTS IN IMO STATE NIGERIA

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ABSTRACT

This study investigated the impact of different residential locations and gender on academic achievement in practical science courses among students of Alvan Ikoku Federal University of Education, Owerri, Imo State, Nigeria. The academic performance of male and female students residing in hostels, off-campus, and a combination of off-campus and hostel accommodations was studied. Purposively, physics students were sampled for the study due to various practical courses and workshop practices the students are engaged in. The design of the study was ex-post facto design. A total of one hundred and twenty-four (124) students and session results of five (5) physics practical courses and three (3) physics workshop courses were used in this study. Fifty-seven (57) of the students resided outside the university premises, forty-eight resided in the hostel, while the remaining nineteen (19) students resided partly in the hostel and partly outside the campus. Statistical analyses including mean, standard deviation, t-tests and anova at 0.05 alpha level were used to ascertain the relationship between living arrangements, gender, and academic outcomes. The findings indicated that students living in hostels perform significantly better in practical physics courses than those living off-campus, with gender differences not influencing academic achievement. The study highlights the importance of residential environments in enhancing academic performance in practical oriented science courses. It is recommended that students should be encouraged to reside on the campus for effective participation and performance in practical courses.

KEYWORDS: Impact, residential locations, academic achievement, ex-post facto, t-test statistics, campus

Introduction

In both developed and developing countries of the world, the student's accommodation needs are often made through hostels, dormitories, or halls of residence. These living arrangements are usually in close proximity to classroom blocks to enable convenient access to learning resources, reduce commuting stress, and enhance academic success. Students residing in the school dormitories are expected to have better comfort which may translate into improved academic performance compared to their counterparts residing outside the school environment. Recognizing this, student affairs unit in higher institutions strive to ensure that their citadel of learning is not devoid of essential facilities especially housing for their students and lecturers in most cases.

In Nigeria, economic challenges, the COVID-19 pandemic, and deteriorating national security have significantly worsened the student accommodation crisis. It seems that these have exacerbated the scarcity of dormitories and available ones are not in good shape. The frequent incidents of student kidnappings from dormitories have made some parents and guardians wary of this once-preferred students' living arrangement. Despite some

interventions, such as those from Tetfund and NDDC, which have led to the construction of a few hostels, the demand for student accommodation still far outstrips supply. Many existing hostel structures are in poor condition, and the increasing student enrollment exacerbates the accommodation crisis. This may have given rise to increases in the number of commercial buildings around higher institutions. Alvan Ikoku Federal University of Education (AIFUE) Owerri is not exempted from this accommodation problem.

Given the increasing use of off-campus housing, it becomes essential to understand how residential location influences students' academic performance, especially in practical-oriented courses like physics.

This study investigates the effect of residential location on the academic performance of physics students in practical courses at AIFUE. Specifically, the study intends to:

1. investigate the predictive relationship between residential location and academic performance in practical physics courses.
2. examine the moderating effect of gender on the association between residential location and academic performance in practical physics courses.
3. Determine the mean academic performance of off-campus and on-campus students in practical physics courses?

Research Questions

The following questions were formulated to facilitate the study.

1. Is there a significant relationship between residential location and academic performance in practical physics courses?
2. Does the strength of the relationship between residential location and academic performance in practical physics courses vary by gender?
3. Do on-campus students consistently outperform or underperform the off-campus students in practical physics courses?

Research hypothesis

HO_1: There is no significant difference between the mean academic performance of students residing on-campus and the mean academic performance of students residing off-campus.

HO_2: There is no significant difference betweenthe mean practical scores of male and female students residing in the hostel.

HO_3: There is no significant difference between the mean practical scores of male and female students residing off-campus.

Literature Review

The accommodation challenges observed at AIFUE mirror issues in other contexts. The lack of sufficient accommodation in many South African universities has forced many students to reside outside the campus and commute to attend classes (Tshimangadzo, Nkhangweleni, Nkhangweleni, and Tshifhiwa, 2020). Thus, the unpopular off-campus residential accommodation which few students used to prefer seems to gain more ground in the recent times.

In the off-campus residential accommodation, students are in a tenancy agreement with the owners of the houses. Depending on the agreement, some pay monthly while some pay yearly. Its operation is quite different from the operations of the school hostels. It is no longer news that government-owned higher institutions often go on strikes for months and most times the off-campus students end up not making use of the facilities they paid for

during the striking period. There is no monitoring system for off-campus students. The students are free to go out any time and come in any time. There is a high level of freedom from all kinds of supervision obtainable especially in the dormitories of secondary schools where some of the students are coming from. Some of these off-campus accommodations are not quite close to the school, thus the students often commute to school. Most of the students use their rooms as reading rooms and libraries, especially at night time since their residents are far from the school premises. Many educators believe that there should be close proximity between the living and learning environments in order to produce intellectuals who are socially integrated and mentally sound (Oluwaseyi, 2015).

Maina & Aji (2017), found out that academic performance was higher for students living on campus than for those living off-campus. The study recommends, amongst others, that policy makers and facility managers prioritize current management practices to improve living conditions in existing accommodation facilities on campus while planning for adequate infrastructure to cater for student accommodation needs in future.

Contrarily, other studies have it that, there is no significant difference in the academic performance of the students residing on campus and those residing outside the school environment(Fields 2011; Etikan, Kabiru, Ogunjesa, Meliz and Ismail 2017). However,the female students, express preference for campus hall of residence and also, younger students usually below the age of 19 years prefer the choice of university hall of residence than older counterparts (Etikan et al.,2017)

The primary goal of every student is to graduate, preferably with the highest possible grades. With rising global higher education enrolment, many universities, employers of labor, and higher education funding organizations are increasingly becoming concerned with creating and maintaining environments, which foster better learning conditions and achievements (Masrek and Zainol, 2015).This is important because students are the most essential asset of any educational institution and their performances are directly linked to the social and economic development of any country (Mustaq and Kharn, 2012).

There are several efforts that have been implemented to ensure tertiary education offers quality learning outcomes. Such efforts include the establishment of the Nigeria education and training policies to guide educational provision at all levels. Hence the fact that students' performance in physics at the tertiary school level is low is no longer news. This may have linked to poor enrolment often recorded in most of the higher institutions of learning. Various factors ranging from student/teacher factor to environmental factors have been identified as modifiers to academic achievement in physics. Isha(2018) found out that there is significant difference in the mean scores of students exposed topractical skills and those not exposed to practical skills. The study proved that those students exposed to practical skills perform better in sciencesthan those that were not exposed to practical skills.

Practical skills in sciences includes the ability to measure and observe quantities precisely with the appropriate measuring instruments. The ability to interpret the observation based on physical theories, laws and postulates.It is pertinent to investigate the composition of residential variable and their effects on the students' academic performance in practical courses in AlvanIkoku Federal University of education Owerri. It seems that the residential locationsof the students havea substantial effect on the academic performance of students generally and physics practical in particular. It is on this premise; the study will assess the

impact of residential location of students on the academic performance of students inpractical physics courses

In the Nigerian context, few studies have explored the influence of residential locations on academic achievement, and even fewer have specifically examined practical courses that require not less than three (3) hoursof practical engagements at the tertiary level. However, existing literature suggests that similar factors may be at play. For instance, Adewale (2016) found that students' socio-economic background and neighborhood characteristics significantly influenced their academic performance in Nigeria. These findings underscore the importance of understanding how residential locations impact educational outcomes, particularly in practical courses, which is crucial for preparing students for the workforce

Methodology

The research adopts an ex-post facto design using archival data. The study area is Alvan Ikoku Federal University of Education (AIFUE), Owerri, located in Owerri Municipality. Founded in 1962 as an Advanced Teacher Training College, it has evolved into a Federal University of Education.

The population of the study comprises all the science students in the Faculty of Sciences. A sample size of 124 physics students was purposively selected, given that over 30% of the physics curriculum involves practical activities. Data was collected using a Student Result Inventory (SRI)for seven practical courses; PHY 292, PHY391, PHY 392, PHY393, PHY394, PHY491 and PHY492. Students' personal information which includes, students' names, registration numbers, scores, and grades for each practical course were parts of the SRI.The Students Residential Location Questionnaire (SRLQ)was used to determine the students' residential locations during the course of their studies in the institution. Data analysis involved percentages, Levene's Test for Equality of Variances, t-tests for Equality of Means, and ANOVA to test the hypotheses.

Results

Table 1. Academic performance across different practical physics courses among students living in three types of accommodations

	PHY	**OFF-CAMP/HOSTEL**	**HOSTEL**	**OFF-CAMP**
	292	51.3684	54.4792	48.0702
	391	52.8421	57.1458	49.9123
	392	53.8947	52.2292	47.3158
	393	55	56.4583	52.2807
	394	49.052	52.1458	44.2105
	491	56.2632	58.4561	56.4561
	492	52.5263	53.22922	49.4912
Mean		52.99238571	54.87766	49.67668571
Std Dev		2.378609648	2.510034493	3.89155135
Sample Size		7	7	7
Std Error in		1.542274181	1.584308838	1.972701536

Mean

Discussion of Findings

Mean Scores and Academic Performance

For all the seven (7) physics practical courses studied, the students operating from the off-campus residents recorded lowest mean score except for in PHY 491 (Fig 2). This probably may have been as a result usual practice of students in final year trying to boost their grade point average as they are already about to graduate. The mean scores indicate that, overall, students living in hostels have the highest average score (54.88) across the practical physics courses, followed by those living in off-campus/hostel arrangements (52.99), and finally, those living off-campus (49.68). This suggests that students residing in hostels tend to perform better academically in practical physics courses compared to their counterparts in other living arrangements.

The off-campus group shows the highest variability (Std Dev = 3.89), suggesting more inconsistency in academic performance among these students. In contrast, the hostel group has the lowest standard deviation (2.51), indicating more consistent performance. The standard error in mean (SEM) is lowest for the off-campus/hostel group (1.54), slightly higher for the hostel group (1.58), and highest for the off-campus group (1.97). This suggests that the mean score of the off-campus/hostel group is estimated with the greatest precision

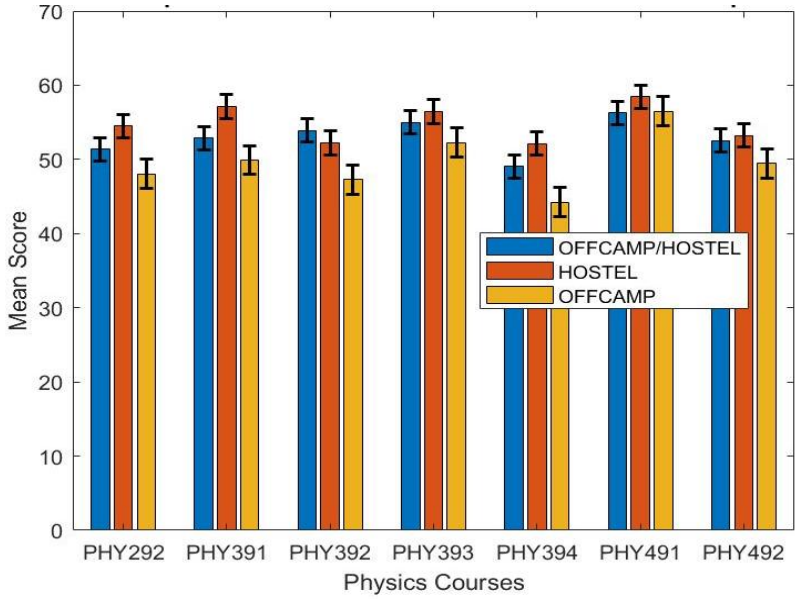

Fig 1. Comparison of mean scores across residential groups

The chart (Fig. 1) indicates that there is not much difference in the average scores among students from different living situations across the seven courses. However, there are minor fluctuations in performance between individual courses. For instance, in PHY391, students who live partly off-campus and partly in the hostel tend to have slightly higher scores than those who live off-campus only.

Table 2. Pairwise comparisons of mean differences between different living arrangements

					95% Confidence Interval	

(X) Location	(Y) Location	Mean Difference (X-Y)	Std. Error	Sig.	Lower Bound	Upper Bound
Off-campus and Hostel	Hostel	-1.92419	2.31917	0.408	-6.516	2.6672
	Off-campus	3.31579	2.26665	0.146	-1.172	7.8032
Hostel	Off-campus and Hostel	1.92419	2.31917	0.408	-2.667	6.5156
	Off-campus	5.23997*	1.67621	0.002	1.9215	8.5585
Off-campus	Off-campus and Hostel	-3.31579	2.26665	0.146	-7.803	1.1716
	Hostel	-5.23997*	1.67621	0.002	-8.559	-1.9215

* The mean difference is significant at the 0.05 level.

The mean difference in academic performance between Hostel students and Off-campus students is 5.23997. The standard error is 1.67621. The p-value is less than 0.05, indicating that this difference is statistically significant. The 95% confidence interval ranges from 1.9215 to 8.5585, confirming the significant difference. This suggests that Hostel students perform significantly better than Off-campus students. The findings imply that living arrangements has the capacity to impact on academic performance in practical physics courses. Hostel living seems to be associated with higher and more consistent academic achievement. This could be due to factors such as better study environments, greater academic support, and fewer distractions compared to Off-campus living. These insights could inform university policies and student support services, encouraging students to choose living arrangements that foster academic success

Table 3. T-test results comparing academic performance of on-campus and off-campus students

Groups	degree of freedom	p-value	t-statistic
On-campus			
Off-campus	10.2557	0.013649	2.9715

With the p-value of 0.013649 (Table 3), the null hypothesis that there is no significant difference between the mean academic performance of students residing on-campus and those residing off-campus is rejected. The results suggest that the location of residence has a statistically significant effect on students' academic performance in the physics

Table4. Descriptive statistics for male and female students across different practical physics courses

	Gender	N	Mean	Std. Deviation	Std. Error Mean
PHY29	Male	63	51.2381	11.1032	1.39887
2	Female	61	50.8689	10.08543	1.29131
PHY39	Male	63	51.6984	12.37406	1.55898
1	Female	61	54.6721	12.3271	1.57832
PHY39	Male	63	49.746	11.84438	1.49225
2	Female	61	50.7213	12.63346	1.61755
PHY39	Male	63	52.9683	11.83893	1.49156
3	Female	61	55.7049	10.68542	1.36813

PHY39	Male	63	47.5873	14.66688	1.84785
4	Female	61	48.4754	15.06166	1.92845
PHY49	Male	63	56.8413	10.67739	1.34522
1	Female	61	57.7869	9.39524	1.20294
PHY49	Male	63	51.9524	10.45795	1.31758
2	Female	61	50.8361	11.89283	1.52272

Female students generally have higher mean scores in most courses (PHY391, PHY392, PHY393, PHY394, PHY491), while male students have higher mean scores in PHY292 and PHY492 (Table 4). The variability in scores, indicated by the standard deviation, is generally similar between genders across most courses, with some courses showing slightly higher variability among female students (e.g., PHY392, PHY394).

These differences suggest that gender may play a role in academic performance in practical physics courses, and universities might consider these findings when developing targeted support programs to address the unique needs of male and female students

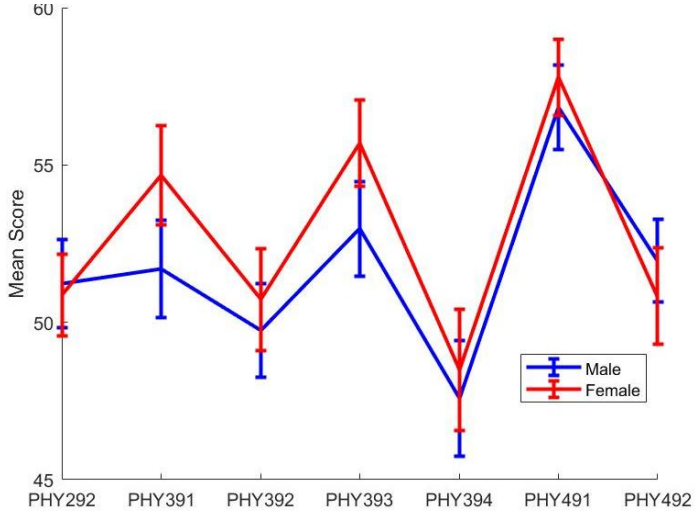

Fig. 2.The plot of mean scores of male and female versus the practical courses.

Generally, the Plot (Fig. 2) shows increase in mean scores of both male and female as they progress from 200 level course to the 400level courses.The chart suggests that there is a general trend for both male and female students to have higher mean scores in the higher-level courses (PHY491 and PHY492) compared to the lower-level courses. However, there are some variations between individual courses. For example, in PHY391, male students have a slightly higher mean score than female students, while in PHY393, female students have a slightly higher mean score

Table 5. T-test values, comparing academic performance of male and female students in on-campus resident

Groups	degree of freedom	p-value	t-statistic
Males on-campus			
Females off-campus	7.4978	0.89644	-0.3464

With the p-value of 0.89644 (Table 5), the null hypothesis ($H0_2$), that there is no significant difference between the mean academic performance of male and female students residing in the hostel is not rejected. The results suggest that the gender of the students does not have

statistically significant effect on the performance in practical courses for the science students residing in the hostel

Table 6. T-test values, comparing academic performance of male and female students in off-campus resident.

Groups	degree of freedom	p-value	t-statistic
Males on-campus Female on-campus	7.8449	0.6482	-0.4731

Given the p-value of 0.6482(Table 6), the null hypothesis ($H0_2$), that there is no significant difference between the mean practical scores of male and female students residing in the off-campus is not rejected. This also suggests that gender of the students does not have statistically significant effect on the performance in practical courses for the science students that were resident off- campus.

Table7. The ANOVA statistics comparing interaction between and within groups

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	729.088	2	364.544	4.979	0.008
Within Groups	8858.687	121	73.212		
Total	9587.775	123			

Since the p-value, 0.008is less than the common significance level of 0.05 (Table7), the null hypothesisis rejected. This suggests that there is a statistically significant difference in academic performance between the different groups (e.g., Off-campus, Hostel, Off-campus/Hostel).The significant F-statistic indicates that the group membership (e.g., living arrangements) has a meaningful effect on academic performance. There is evidence to suggest that the differences in mean scores between these groups are not due to random variation but are statistically significant. The ANOVA test shows that students' living arrangements significantly impact their academic performance in practical physics courses, with a p-value of 0.008 (Table7) indicating that these differences are unlikely to have occurred by chance.

The analysis of academic performance in practical physics courses reveals significant insights into the impact of living arrangements and gender on student achievement. Across the seven practical courses studied, students residing in hostels consistently outperformed their peers in other living arrangements, particularly those living off-campus. The mean scores indicate that students in hostels achieve the highest academic performance, while those off-campus generally record the lowest scores, except for the final year course PHY 491, where off-campus students performed comparably to those in hostels. This suggests that the structured environment of hostel living may offer advantages, such as reduced distractions and better access to academic resources, contributing to better academic outcomes.

The analysis also highlights significant variability in the academic performance of students living off-campus, as evidenced by the higher standard deviation compared to other groups. This variability may be attributed to factors such as differences in living conditions, commuting challenges, and varying levels of study discipline among off-campus students.

Furthermore, the pairwise comparison of mean differences between different living arrangements confirms that students in hostels significantly outperform those in off-campus settings, with the mean difference being statistically significant at the 0.05 level. This outcome is in line with the finding of Maina and Aji (2017). The finding highlights the importance of a conducive living environment in enhancing academic performance, particularly in demanding subjects like practical physics.

In terms of gender, the results show that female students generally achieve higher mean scores than their male counterparts in most of the practical physics courses, with exceptions in PHY292 and PHY492. However, the t-tests comparing the academic performance of male and female students in both hostel and off-campus settings reveal no statistically significant differences. This suggests that while there may be observed differences in mean scores, gender does not have a significant impact on academic performance in practical physics courses when considering the same living arrangements.

The findings indicate that both living arrangements and gender influence academic performance in practical physics courses, with hostel living being particularly beneficial. Universities should consider these insights when developing policies and support services aimed at optimizing student success. Encouraging students to reside in environments that foster academic excellence, such as hostels, could lead to improved academic outcomes. Additionally,

while gender differences in performance exist, the lack of statistical significance suggests that other factors, such as individual study habits and access to resources, may play more critical roles in determining academic success.

Recommendations

Based on the findings, the following recommendations are proposed:

1. Infrastructure expansion: The university should prioritize the construction and rehabilitation of hostels to accommodate more students and reduce reliance on off-campus housing.
2. Monitoring and support for off-campus students: A support system should be established to monitor and assist off-campus students, including shuttle services and off-campus study centers.
3. Policy implementation: Higher education policy-makers should enforce regulations ensuring that universities provide adequate and safe student housing, especially for first-year and younger students.
4. Practical course planning: Physics departments should consider scheduling practical classes at times convenient for off-campus students to ensure full participation.
5. Further research: More research should be conducted to explore how gender, age, and socio-economic factors interact with residential location to affect academic outcomes.

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