

DETERMINING THE MEAN DIFFERENCES IN STUDENTS' PERFORMANCE BASED ON TYPE OF ACCOMMODATION

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ABSTRACT

Students' residence is an essential component in any tertiary institution. It is a fundamental factor in the learning process and plays a crucial role on the academic performance of students. This study investigated academic performance with respect to type of accommodation in the Kenyan Universities, case study of the Technical University of Mombasa. Sample of 380 students were selected from Technical University of Mombasa. Out of the sample 165 were living within the university premises while 215 were staying outside the university premises. Stratified sampling and simple random sampling was used to pick the students. Z test was used to test the hypothesis that the mean performance of the students based on residence does not differ significantly. Results show that off-campus group had a higher mean in performance ($M = 56$, $SD = 6.211$) compared to their counterparts ($M = 53$, $SD = 5.55$). A density plot showed that the two types of accommodation overlap largely in terms of probability density function. Further results showed that the mean difference was statistically significant at 5% level of significance ($z = 2.0591$, $p\text{-value} = 0.03948$). Therefore, it can be concluded that there are significant differences in mean academic performance based on type of residence. The off-campus seemed to be performing better than the on-campus group. Therefore, type of accommodation affects student's performance in Public Universities.

Introduction

Students' accommodation is one of the most essential components in a university. Tertiary institutions have the responsibility of providing decent accommodation to students who gain admission to various programs offered in the institution (Kolawale & Boluwatife, 2016). According to Onclin 2014, institutions' involvement in students' accommodation is more than just useful in attracting students to reside in the school/college. He notes that accommodation influences students' retention rates, student success and student satisfaction.

At tertiary level, accommodation is a very fundamental factor. Nimako & K, (2013) identifies that, not only does accommodation enhance tertiary students learning but also suggests adequate accommodation facilities to be provided to students to enable them make the most out of their

opportunity in education. Students' accommodation can be divided into two; On-campus residence and off-campus residence. On-campus students refer to those that live in school halls of residence and off-campus is the group that resides outside campus in rental houses or private hostels.

Accommodation is a place that a student lives while studying a particular programme at an institution. It comprises of the immediate environment, health, economic, sporting and social activities that are sympathetic to academic work. Proximity between living and the learning environment should be close to facilitate the production of intellectuals that are mentally sound (health), socially integrated while religiously and sportsmanship inclined.

The growing rate of enrolment in universities has led to inadequate on-campus housing. This compels students to have no other option other than off-campus. However, some students prefer off-campus residence for various reasons like freedom.

The number of students admitted to universities usually surpasses the available accommodation available in those institutions. TUM for instance can only accommodate 800 students out of the approximately 10000 students admitted. The limited accommodation leads to off-campus residence for majority of the students.

Where a student lives could have a significant impact on the academic performance of that particular student. Students' accommodation is a major contributory factor to all round development in the country's institutions and hence cannot be ignored as a player in the overall performance of a student. Conscious efforts to provide decent accommodation to students must be affected in various policy decisions to ensure these institutions produce qualified graduates (Omatoya, 2011).

Off-campus students are prone to being subjected to disturbances that might range from deafening music, interference to gossip from co-tenants, unbearable loud noises, unstable power supply which may have a negative effect on their academics. On the other hand, on-campus students might have less, more or totally different challenges which may affect their academic performance too.

Type of accommodation might have significant impact on student's academic performance, therefore, it is reasonable to hypothesize that on-campus students tend to have a higher mean of academic performance than their off-campus counterparts.

Academic performance in tertiary institutions has been on the limelight with cases of poor performances. There have been numerous cases of students dropping out of campus due to poor academic performance. This study will help TUM administration to determine if it's of utmost importance to build more hostels in order to improve academic performance of the university.

Other tertiary institutions can use this study to generalize or base their conclusions on effect of type of accommodation to academic performance. This study determined if mean performance of students differ significantly based on accommodation type.

Academic performance is usually measured in cumulative grade point average (CGPA) in universities (Gupta & Maksy, 2014). CGPA is the overall students' academic performance where the average of all examinations' grade for all semesters during the tenure in school. It is believed that a higher CGPA is an indication of better learning. This study will calculate a CGPA from the secondary data and use it as a measure of academic performance. While looking at a comparison of non-residents and resident's students' academic performance (Afful & Patricia, 2010) concluded with a z-test, that there were no statistically significant differences in the mean academic

performance between the two groups. The study was based at University of Education, Winneba in West Africa. Other studies have also evidence of an increase in cumulative GPAs of students in on campus housing than the off-campus students. This was because students in on-campus were able to benefit from university provided resources such as information technology and other extra-curricular activities (Araujo & Murray, 2010). From a Chi-test done by Justice Stephen Tetteh Zotorvie, 2017, Ghana, a case study of Ho Technical University, the type of accommodation did not have a significant effect on students' performance. No study has been done in Kenya that can be used to generalize the subject in any of the Kenyan universities.

Methodology

The study used quantitative research approach. The findings from the sample will be used to infer that the population has the same characteristics. This type of approach is used since it enables the researcher to examine the relationship between variables and make conclusions based on the findings.

Two sample Z-test hypothesis test: The hypothesis tested is;

H_0 : There is no mean differences in academic performance due to type of accommodation, $\mu_1 = \mu_2$

H_1 : There is mean differences in academic performance due to type accommodation, $\mu_1 \neq \mu_2$

At $\alpha = 0.05$ level of significance.

Two sample Z-test assumptions

- i. The samples from each population must be independent of one another.
- ii. The populations from which the samples are taken must be normally distributed and the population standard deviations must be known, or the sample sizes must be large (i.e. $n_1 \geq 30$ and $n_2 \geq 30$).

The test statistic:

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \quad (1)$$

Where:

\bar{x}_1 = Mean for on-campus students

\bar{x}_2 = Mean for off-campus students

s_1^2 = Standard deviation for on-campus students

s_2^2 = Standard deviation for off-campus students

n_1 = Number for on-campus students

n_2 = Number for off-campus students

Calculation of sample Standard deviation

$$S_x^2 = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}} \quad (2)$$

Where:

x_i = Specific CGPA of a particular student in particular group (on-campus or off-campus)

\bar{x} = mean of the particular group.

n = number of data points in a group

Decision Rule:

This is a two-tailed test, using a Z statistic and a 0.05 level of significance.

H_0 to be Rejected if $p\text{-value} \leq 0.05$

Results and Discussion

Descriptive Statistics: Descriptive measures such as the mean, standard deviation and coefficient of variation were computed. Table 1 presents the descriptive results.

Table 1 Descriptive Statistics

	Min	Max	Mean		Std. Deviation	Skewness		Coefficient of variation
			Statistic	Std. Error	Statistic	Statistic	Std. Error	
On-Campus	41.09	63.87	53.2984	1.54088	5.55573	-0.204	.616	10.42%
Off-Campus	36.76	67.95	56.1157	.79742	6.22807	-0.647	.306	11.10%

Table 1 presents descriptive statistics. The minimum mean mark for the on campus group was 41 indicating that none from the sample had had a fail in any unit that would have resulted in a minimum of less than 40 (which is the pass mark). The on-campus sample had a maximum of 63 which was above average. On-campus sample had a mean of 53 implying that generally the sample had an average performance. The low standard deviation of 5.55, implies that most of the data points tend to be close to the mean.

The off-campus type off residence sample had a minimum of 36 which means that some students had an average performance that is below the pass mark. The group also reported a maximum of 67 which is better than then on-campus type of residence. Generally, the group seems to be performing better than their counterparts which are evident by their higher mean of 56.

The skewness is close to zero though negative which implies that the data set was almost symmetrical and normal. The coefficient of variation shows that the off campus performance was more spread than the on campus data performance.

Empirical cumulative distribution: An empirical cumulative distribution plot for mean performance.

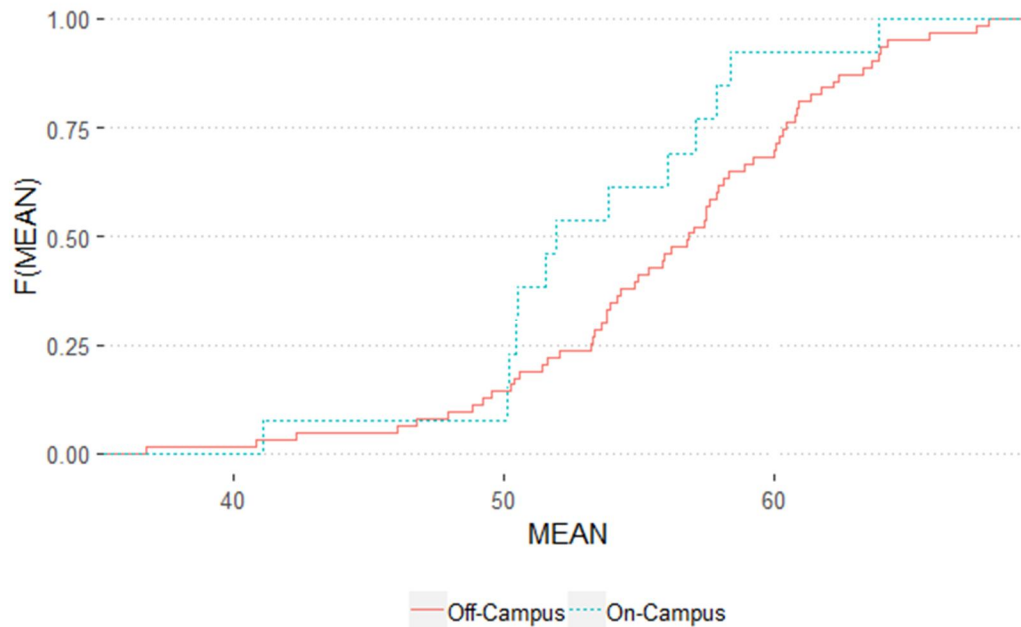


Figure 1

The cumulative distribution function (CDF) shows the empirical cumulative distribution function of the data. It simply gives the probability that a value is less than or equal to a certain value, higher than a certain value or between two values. The CDF above shows that 50% of on-campus attained a mean performance of 50 while 50% of off-campus attained a mean performance of a above 55. Looking at 75% mean performance for both groups, again off-campus has a higher (60) than the other group (approx. 55). This generally means that students residing outside university are performing better than those residing inside the university.

Box plot: A boxplot showing the spread of data in both type of accommodation is given by Figure 2.

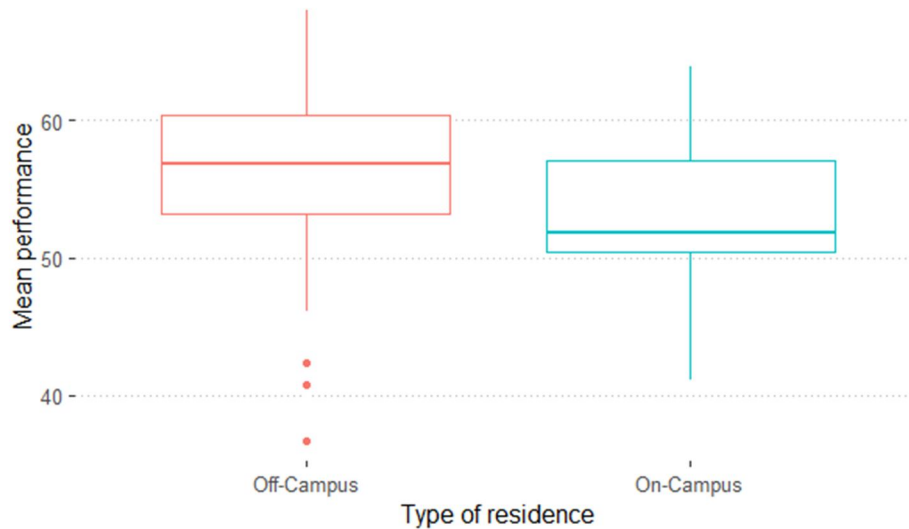


Figure 2

The boxplot illustrates visually the spread of the data based on type of accommodation. From the boxplots comparing the mean academic performance of between on-campus and off-campus, it can be seen that the median mean academic performance of off-campus is higher. Although the off-campus is showing a better performance than their counterparts, there is a point below (an outlier) the pass mark i.e. 40.

The middle 50% of the data for off-campus seems to be performing better with a maximum of slightly above 60 and a minimum that is shy by few points to 55. Similarly, the 50% of on-campus sample have a lower maximum of 55 compared to the other group and a minimum of 50. On-campus type of residence students seem to be performing slightly poorer than their colleagues who reside outside campus.

Density plot: A density visualizing the distribution of mean performance data based on type of residence.

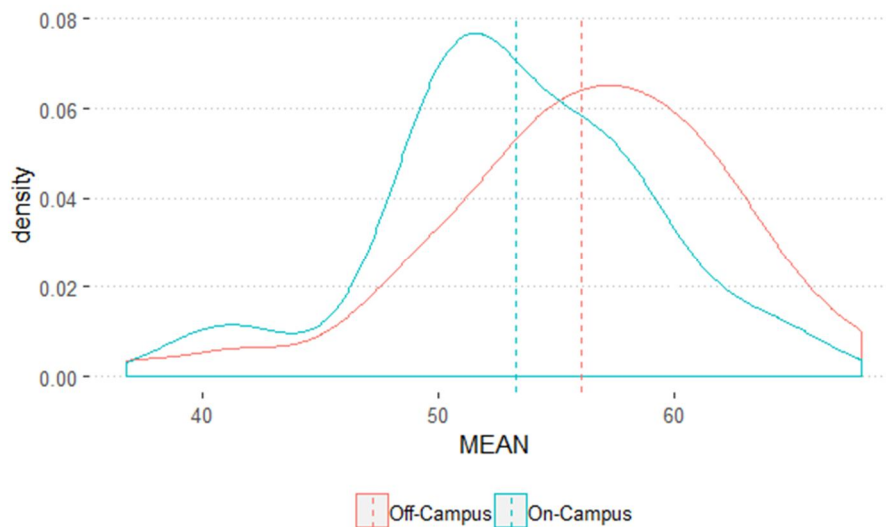


Figure 3

The y-axis on the density plot for the two types of residence under investigation shows possible estimates of the mean performance. The two dashed vertical lines are the mean for each group. The plot simply estimates the probability of sampling a student with a particular mean academic performance in an independent replication of data collection.

The probability of a student who resides inside the university having a mean academic performance of slightly above 50 can be estimated from the chart to be 8%. The probability of a randomly selected student from off-campus residence of having a mean academic performance of slightly above 50 is less than 4%. When it comes to mean academic performance of 60 the on-campus student has better chances of 6% compared to their counterpart with a probability of slightly above 2%.

Normal plot: A normal plot showing the distribution of sample mean performance data against a normal distribution

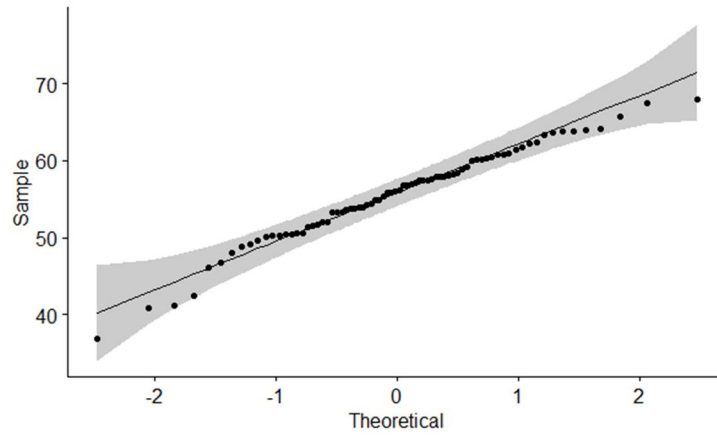


Figure 4

The quantile-quantile plot shows the correlation between mean academic performance of the sampled students and the normal distribution. As all the points fall approximately along the 45 degrees reference line, a positive strong correlation exists between the two. We can therefore, assume that the mean academic performance data is normally distributed. This normality assumption test justifies the use of z-test as a test of mean differences on this study.

The Test Statistics: Z test was used to test the hypothesis that the mean performance between the two groups is statistically significant.

Table 2 Two-sample z-Test

Z-statistic: -2.0591					
On mean	Off mean	p-value	Mean Difference	95% Confidence Interval	
				Lower	Upper
53.29842	56.08603	0.03948	-2.78761	-5.4409380	-0.1342656

NB: on refers to On-campus group while Off-refers to Off-campus group.

A z-test for means was conducted comparing the mean academic performance between the on-campus group ($M=53.3$, $SD=5.6$) and the off-campus ($M=56$, $SD=6.2$). The results were statistically significant at 5% level of significance ($z = -2.0591$, $p\text{-value} = 0.03948$). Therefore, the off-campus exhibiting a higher mean in academic performance than the on-campus can be attributed to type of accommodation. One can conclude that the two groups differ in means as far as academic performance is concerned.

Conclusion

At 5% level of significance, the z-test results were statistically significant implying that where a student resides i.e. whether inside university or outside the university halls of residence, affects their mean academic performance. Therefore, it can be concluded that students residing outside the university perform better than those living within the university. This may imply that the university environment does not create an enabling environment for personal studies. The students may not be comfortable in the halls of residence

Recommendation and Further Research

From this research it can be recommended that an assessment on the state of the university hostels need to be done. A survey should be done to investigate the challenges facing students living within the halls of residence. The study only covered two types of accommodation i.e. within campus and outside campus, another type of residence, home (students that stay with their family) should be considered and ANOVA used to determine if there are mean differences in performance between the three groups.

One possible way to improve the significance of the study using ANOVA is to use RCBD-ANOVA such that the three types of accommodation are blocked by either department to determine if variation in performance due to type of accommodation can be attributable to department.

Also, a research ought to be done to investigate the causes of poor performance among students residing inside the university.

REFERENCES

- Adu-Gyamfi, S. B. (2014). Accommodation Reforms, Its Effects on students:. *Global Journal of Human-Social Science*, **4**, 1-4.
- Afful, B., & Patricia. (2010). A Comparative Study of Residential and Non-Residential Students Academic Performance at the University Of Education, Winneba,. *Academic Leadership Journal*, **8(1)**, 2-7.
- J, P. d. (2010). Estimating the Effects of Dormitory Living on Students' Performance. *The Social Science Research Network Electronic library*, **2**, 2-9.
- Kolawale, O., & Boluwatife, A. (2016). Assessment of the factors influencing students' choice of residence in Nigerian tertiary institutions. *Journal of Education and Practice*, **4(1)**, 1-10.
- Lavrakas, P. J. (2008). *Target Population*. Retrieved from SAGE Research Methods: <http://methods.sagepub.com/reference/encyclopedia-of-survey-research-methods/n571.xml>
- Nimako, S. G., & K., B. F. (2013). Relative Importance of Students Accommodation Quality in Higher Education. *Current Research Journal of Social Sciences.*, **5**, 1-5.
- Onclin, W. (2014). *How Student Accomodation Impacts the International Student's Experience*. Retrieved from European Association for International Education: <https://www.eaie.org/blog/student-accommodation-impacts-experience/18/>

- Roche, C. R. (2010). Student housing: trends, preferences and needs. *Contemporary Issues in Education Research*, 7(1), 45-50.
- Wordaski, J. S., & Laura, H. M. (2011). Research Methods for Evidence-Based Practice. In SAGE, & Google books, *Research Methods for Evidence-Based Practice* (p. 126). SAGE Publishers.
- Zotorvie, J. S. (2017). Students' Accommodation and Academic Performance: The case of Ho Technical University. *European Scientific Journal*, 2, 1-5.