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## An empirical evaluation on the comparison between students' preference and choice of polytechnic education over university in Nigeria

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### Abstract

Every national growth rests on education. To promote overall national development, no area or degree of education should be overlooked. Education experts define polytechnic education as an educational system that focuses a significant emphasis on practical training and technological know-how. In Nigeria, the prejudice and discrepancies between polytechnic and university education have taken on a national significance. This study compared student preferences for university education over polytechnic education in Nigeria. Both admitted and prospective students from several polytechnics and universities in Delta State are included in the study's participants. The sample was chosen using a stratified sampling strategy. The Mann Whitney U test and the chi-square test of independence were used in the data analysis. This study showed that the public significantly prefers university education to polytechnic education ( $W = 215.0$   $p = 0.041$ ). The study also discovered that choosing a university degree over a polytechnic education depends on a number of different factors ( $\chi^2 = 36.03$ ,  $p = 0.000$ ). Finally, the study shows that most students and prospective students prefer university admission (89%) mainly because B.Sc is more valuable in terms of salary and promotions in any industry or organization (93%). In conclusion, the question on what the University graduates have that the Polytechnic graduate does not have is the value employers place on BSc over HND.

**Keywords:** Polytechnic; University; Education; Disparity; National Development; Mann-Whitney U-test

### 1. Introduction

In Nigeria, universities and polytechnics are considered to be the highest tiers of tertiary institutions. Higher National Diplomas (HND) are awarded by polytechnic institutions, whereas Bachelor's degrees in the right academic fields—such as science, the arts, engineering, etc.—are given by universities. The curriculums of polytechnics and universities are both created with an emphasis on various levels of manpower development. Up until recently, the admittance standards for polytechnics were set lower than those for universities, giving the impression that polytechnics were less prestigious than universities. The main purpose of polytechnics is technical education. Technical education is the area of education that fosters the acquisition of fundamental and scientific knowledge as well as practical and applied skills. Obimah (2017).Stephen (2015) stated that it is evident that the Nigerian concept of polytechnic education system is defective. It also shows that polytechnic education has been evidently undermined in Nigeria. Therefore, it can be concluded that Nigeria has reached a crossroads as far as polytechnic education is concerned, where critical decision as to whether or not polytechnics are still needed must be taken at this point in time in the educational life of this country. The Nigerian society sees polytechnic education as inferior to university education, hence discriminating against the polytechnic products, particularly the HND holders. Also, candidates seeking admission to the tertiary institutions only see polytechnics as their last resort.

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Polytechnic provide technical degree programs and take a very pragmatic approach. On the other hand, universities place equal emphasis on academic and practical lessons. Instead of the courses offered by universities, polytechnics provide the industry-specific courses that enable students to get meaningful employment in a short amount of time. Imonigie and Omozuawo (2017) claim that employers and the general public favor university graduates over polytechnic graduates to the point where it is starting to affect our technological development and advancement in terms of the roles played by the various technical personnel cadres in our technological advancement. Employers think polytechnic education is just for people who lack the intelligence to succeed in academics. Additionally, technical personnel with a polytechnic education have lower pay compared to university graduates, who receive higher pay. According to Asibeluo (2015), graduates of polytechnic institutions are typically forced to work as department or unit heads under university graduates. Even in the institutions that produced them, such as the various state and federal government owned polytechnics, polytechnic graduates (HND holders) are not permitted to lead a department where there is an equivalent B.Sc/B.Eng. holder, let alone become the rector of such institutions, unless they have completed additional coursework in a university. The author added further that since the polytechnic are the primary bedrock of technology incubation and development, if they go into extinction it therefore means that, the Country will be set back technologically in a manner that all the perceived merits in the arguments and in the eyes of those who see the disparity as wholesome and appropriate will not be able to justify.

In Nigeria, the prejudice and discrepancies between polytechnic and university education have taken on a national significance. The mismatch between university and polytechnic education has given rise to numerous problems and conflicts. University grads are frequently preferred over Polytechnic graduates and frequently earn more money than them. Due to this mismatch, Polytechnics are commonly attended by those who have repeatedly failed to get admission to universities. For this reason, it is uncommon to see advertisements for scholarships from multinational corporations in polytechnics. These companies may have developed the misconception that polytechnics only attract less intelligent students, but this is not always the case. What does a graduate of a university have that a graduate of a polytechnic school does not, and why do students genuinely prefer one institution over the other? The purpose of this study is to assess if polytechnic education in Nigeria is preferred by students over university education.

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## 2. Literature review

Okafor (2012) pointed that generally, the choice of a higher education institution is affected by parents, friends, and variation of one population to another. He also claimed that, Parents education and occupational background may affect student's career choice because some students may contemplate on whether to continue their parent's occupation or not. What the students see in televisions also may affect their career choice. Some career demand that you have the personality to match the qualities of the occupation and attend a certain higher institution. Goodman et al. (2015) opine that academic choices made by a brother end up influencing another. Kusumawati (2013), with his study result made in Indonesia, identified cost, institution reputation, student residence proximity, finding a job and influence of relatives as key factors that determine higher education institution selection by the student. Beneke and Human (2010) also show that the institution reputation is the most important factor, followed by geographical location and facilities safety.

Onayase and Onayase, (2019) also carried out an investigation into other factors that could affect higher institution choice, thus, identified religion, peer group and some environmental factors. However, all higher education institution have their subject requirements, personality characteristics and entry requirements. All these are supposed to be fully assessed before an individual can be verified to be qualified into a specific higher education institution. Shah and Bhutto (2012) showed that interest and career objective is the most important factor which affects students' choice of an institution. Besides, perception of personal ability being suitable with chosen major and the school requirements are proved to be crucial in students' decision. In fact, the assessment of personal interest and ability before choosing a university to enroll not only influences students' retention rate but also tends to make more capable students to choose more competitive and private universities with longer training period.

Quatman and Edler, (2012), higher education institution choices are partial, determined by factors like socioeconomic status, gender, race, parents' occupation and level of education and the expectations of parents. Several researchers have examined these factors to establish whether they actually play a role in higher institution choice. Hooley, (2012) remarks that "usually, social status is passed down from generation to generation, nevertheless one may not benefit by being exposed to many opportunities or on the other hand may not have the opportunity to recognize all the career option open to him/her". He further explained that, even though ones socio-economic status may have affected his career decision, many career related decisions lie ahead. High aspiration and motivation to achieve will help one reach his/her goals.

Goodman et al. (2015) indicate there are many factors that the economic model does not refer to. Those factors are related to the fact that, on one hand, the higher education institution selection comprise the existence of a large number of institutions, each with several attributes, and the students preferences regarding institution registration and the institution attributes are heterogeneous; and on the other hand, students have precise information about higher education institution potential. Sociological model has its focus in the cultural and social aspects and sustains that sociological variables such as gender, academic capacity, sociological status, school context and other people opinions are the main factors that influence students in higher education institution selection.

Proboyo and Soedarsono (2015), present the factors that influence higher education institution selection as student interest, his own capacity to perform the course, family advices, and also institutional factors such as higher education institution reputation, institution values and previous students' success. Agrey and Lampadan (2014) listed factors that influence higher education institution selection in Thailand, with evidence that learning environment is conducive and good job perspectives having greater impact in the institution selection. Cokgezen (2014) in his study in Turkey identifies fees, city population characteristics in which the higher education institution is located, academic performance and class language as decisive factors for higher education institution selection. He claims the student is inclined to compare future perspectives and the institution services with the costs of education process; considering cost (fees) as a major factor. Therefore, if higher education institution offers high quality services, it will be chosen by future students over others. Higher education institution quality may be connected to the quality of teaching and research programs, as well as its offered services.

Lien et al (2015) suggested four groups of factors which are often in common in most research. These groups of factors are as follows; students' personal characteristics, characteristics of the higher education institution, influence from other people, and communicative effort from the higher education institution. Firstly, students' own interests, abilities and socio-economic status have significant impact on students' decision. Secondly, academic reputation and prestige of an institution together with availability of high-qualified majors which address students' needs and interests play an important role in their choices. Thirdly, as for the influence of significant persons, parents take the first place for several reasons, especially for financial support. Peers, relatives and teachers are also other important people affecting students' university choices. Fourthly, the institution's attempts to inform and attract prospective students in various channels have significant influence on students' choice of higher education institution.

Hanson, Norman and Williams (2018) claim that during the higher education institution choice period students attach particular importance to the reputation of the higher education institution and its educational quality. They also suggested some other factors such as variety and quality of facilities and majors offered to students; the social atmosphere of the campus; quality of teaching personnel and distance from students' families. Mazzarol and Soutar (2012) found similar results in a study conducted in Australian universities. They suggested that quality and reputation of the university and recognition of the certificates were the most important factors for those students. Tatar and Oktay (2016) found that students' higher education institution entrance exam scores are the most important factor that influence their choice. They claimed that students may have had the idea that they would like to attend to any program for which their entrance exam score was adequate. Another finding of this study suggested that students gave a lot of importance to the possibility of finding a job with a decent salary when they graduated.

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### 3. Methodology

The study was carried out in the Delta State cities of Warri and Otefe. Personal interviews and the distribution of questionnaires to the chosen respondents of interest served as the study's main sources of data. The chi-square test of independence and the Mann Whitney U test were used to assess the study's data. The most important factor influencing an institution's preference as well as other relevant components were examined using the percentage analysis to look at the most popular institution among students and graduates. In order to ascertain if the institutions' preferences are influenced by outside factors, the chi-square independence test was also performed.

#### 3.1. Chi-Square Test of Independence

The Chi-Square statistic is commonly used for testing relationships on categorical variables, and is most commonly used to evaluate tests of independence. A chi-squared test is a statistical hypothesis test that is valid to perform when the test statistic is chi-squared distributed under the null hypothesis, specifically Pearson's chi-squared test. The model is given below:

$$\text{Chi-squared statistic} = \chi^2 = \sum_{i=1}^r \sum_{j=1}^k \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \quad (2)$$

Here,  $O_{ij}$  represents the observed frequency in the  $i$ th row and the  $j$ th column of the contingency table of interest, which the  $E_{ij}$  is the corresponding expected frequency or value.

$$E_{ij} = \frac{\text{Row Total} \times \text{Column Total}}{n} \quad (3)$$

This defines the chi-square distribution with  $(r - 1)(c - 1)$  degrees of freedom when the null hypothesis of independence is true. This is because in an  $r \times c$  contingency table, there are  $rc$  cells.

Where;

- $r$  = number of rows in the contingency table
- $c$  = number of column in the contingency table

### 3.2. The Mann-Whitney U Test

The Mann-Whitney U test is used to test the null hypothesis that two independent samples are drawn from the same population. To use the Mann-Whitney U test, the data in the two samples are combined and ranked either from the largest to the smallest or from the smallest to the largest preferably in ascending order. The ranks assigned to the observations in the two samples are then separated and the sums of the ranks are calculated for each sample. We will have denote the sum of the ranks for the first sample with sample size  $n_1$  by  $R_1$  and the sum of the ranks for the second sample, with sample size  $n_2$  by  $R_2$ . A significant difference between the rank sums of  $R_1$  and  $R_2$  implies a significant difference between the samples.

The value of the Mann-Whitney U test statistic is computed to the difference between the rank sum.

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \quad \text{Corresponding to sample 1} \quad (4)$$

$$U = n_1 n_2 + \frac{n_2(n_2+1)}{2} - R_2 \quad \text{Corresponding to sample 2} \quad (5)$$

The statistic  $U$  is approximately normally distributed with mean;

$$U_u = \frac{n_1 n_2}{2} \quad (6)$$

Standard deviation or error of  $U$  test

$$\sigma_u = \sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}} \quad (7)$$

Hence, the corresponding  $Z$  score for the Mann-Whitney U test statistic is calculated as

$$Z = \frac{U - U_u}{\sigma_u} \quad (8)$$

The  $Z$  score is as usual compared at a given level of significance with an appropriate critical value obtained from a standard normal distribution table for a rejection or acceptance of the null hypothesis. Accept  $H_0$  if  $|Z| > Z_\alpha$  where  $Z_\alpha$  is from the standard normal table.

The data were analyzed using Minitab 17.0 and SPSS 23.0

## 4. Results

### 4.1. Hypothesis One

$H_0$ : There is no significant preference for university than polytechnic education by the public

$H_1$ : There is a significant preference for university than polytechnic education by the public

Level of significance = 0.05

**Table 1** Mann-Whitney Test and CI: University, Polytechnic

Ranks				
	Category of participants	N	Mean Rank	Sum of Ranks
Preferred institution	Polytechnic	3	2.00	6.00
	University	3	5.00	15.00
	Total	6		

Test Statistics <sup>a</sup>	
	Preferred institution
Mann-Whitney U	0.000
Wilcoxon W	6.000
Z	-1.993
Asymp. Sig. (2-tailed)	0.040
Exact Sig. [2*(1-tailed Sig.)]	0.003 <sup>b</sup>

a. Grouping Variable: Category of participants; b. Not corrected for ties. Source: Computed from table 11

N Median

University 3 34.00

Polytechnic 3 9.00

Point estimate for  $\eta_1 - \eta_2$  is 25.00

91.9 Percent CI for  $\eta_1 - \eta_2$  is (20.01,111.00)

W = 15.0

Test of  $\eta_1 = \eta_2$  vs  $\eta_1 > \eta_2$  is significant at 0.0404

The test is significant at 0.0383 (adjusted for ties)

From the result presented above, it was shown that for evaluating if there is a significant difference in the preference of university and polytechnic education in Nigeria, the p-value is 0.04 indicating that the null hypothesis is rejected. Hence we can conclude from the result that there is a significant preference for university than polytechnic education by the public. This implies that many people prefer to get university education instead of the polytechnic.

#### 4.2. Hypothesis two

- H0: The preference of polytechnic education is independent on admission policy
- H1: The preference of polytechnic education is dependent on admission policy
- Level of significance = 0.05

**Table 2** Tabulated Statistics: Factors, Worksheet columns

Admission policy factors	Frequencies	Responses				Total
		Strongly Agreed	Agreed	Disagreed	Strongly disagreed	
Polytechnic jamb score is easier	Observed	15	3	2	2	22
	Expected	61.18	13.64	9.09	9.09	100.00
Polytechnic offers Quick certificate	Observed	11	6	1	4	22
	Expected	50.00	27.27	4.55	18.18	100.00
Polytechnic has Affordable school fees	Observed	9	4	8	1	22
	Expected	40.91	18.18	36.36	4.55	100.00
Ease of Postgraduate study opportunities	Observed	2	17	1	2	22
	Expected	9.09	77.27	4.55	9.09	100.00
International countries do not accept the polytechnic certificate for postgraduate studies	Observed	14	6	0	2	22
	Expected	63.64	27.27	0.00	9.09	100.00
Total	Observed	51	36	12	11	110
	Expected	43.36	32.73	10.91	10.00	100.00
			DF	P-Value		
Pearson Chi-Square	47.430		12	0.0000		

The result of the above hypothesis shows that some of the students who chose to prefer polytechnic education are because of the admission policy since the p-value is 0.00 indicating rejection for the null hypothesis. This preference is majorly because of the jamb requirement in the admission policy which favours the polytechnic students mostly.

### 4.3. Hypothesis Three

H0: The preference of university education is independent on admission policy

H1: The preference of university education is dependent on admission policy

Level of significance = 0.05

**Table 3** Tabulated Statistics:

Admission policy factors	Frequencies	Responses				Total
		Strongly Agreed	Agreed	Disagreed	Strongly disagreed	
Polytechnic jamb score is easier	Observed	64	54	24	32	178
	Expected	38.20	30.34	13.48	17.98	100.00
Polytechnic offers Quick certificate	Observed	97	56	8	17	178
	Expected	54.49	31.46	4.49	9.55	100.00
Polytechnic has Affordable school fees	Observed	12	31	84	51	178
	Expected	6.74	17.42	47.19	28.65	100.00
	Observed	129	44	2	3	178

Ease of Postgraduate study opportunities	Expected	72.47	24.72	1.12	1.69	100.00
International countries do not accept the polytechnic certificate for postgraduate studies	Observed	133	26	17	2	178
	Expected	72.72	14.61	9.55	1.12	100.00
Total	Observed	439	211	135	105	890
	Expected	49.33	23.71	15.17	11.80	100.00
			DF	P-Value		
Pearson Chi-Square	373.441		12	0.0000		

Upon reviewing the preference of university by admission policy, the result of the test shows (p-value 0.000) also shows that it is also dependent on admission policy as they view future prospects of international opportunities and post graduate opportunity easy if they have university education unlike their counterpart in the polytechnic, who are required to go through series of stages to make their certificate worth using for post graduate admission.

**4.4. Hypothesis Four**

H0: The preference of polytechnic education is independent on learning outcome  
 H1: The preference of polytechnic education is dependent on learning outcome  
 Level of significance = 0.05

**Table 4** Tabulated Statistics:

Admission policy factors	Frequencies	Responses				Total
		Strongly Agreed	Agreed	Disagreed	Strongly disagreed	
Polytechnic focuses more on practical	Observed	19	2	1	0	22
	Expected	86.36	9.09	4.55	0.00	100.00
Highly trained lecturers and professors	Observed	8	9	4	1	22
	Expected	36.36	40.91	18.18	4.55	100.00
Entrepreneurial Skill are common in the polytechnic	Observed	15	2	2	3	22
	Expected	68.18	9.09	9.09	13.64	100.00
University courses take a longer duration	Observed	21	0	1	0	22
	Expected	95.45	0.00	4.55	0.00	100.00
Total	Observed	63	13	8	4	88
	Expected	71.59	14.77	9.09	4.55	100.00
			DF	P-Value		
Pearson Chi-Square	29.654		9	0.0010		

By evaluating the respondents opinion on preference dependence on learning outcome, the result for polytechnic students shows  $p < 0.05$  which shows that students who prefer the polytechnic education also do so because of the learning outcome. 83.36% of these students prefer the polytechnic because the education system is more practically inclined than the university while 68.18% of them prefer the system because of the entrepreneurial skills they will

acquire from the education system, why also, 95.45% of them prefer the polytechnic because of the duration to obtaining a certificate.

**4.5. Hypothesis five**

H0: The preference of polytechnic education is independent on parental influence

H1: The preference of polytechnic education is dependent on parental influence

Level of significance = 0.05

**Table 5** Tabulated Statistics: Factors, Worksheet columns

Admission policy factors	Frequencies	Responses				Total
		Strongly Agreed	Agreed	Disagreed	Strongly disagreed	
My parents always wanted m to study at the polytechnic	Observed	4	5	7	6	22
	Expected	18.18	22.73	31.82	27.27	100.00
My parents do not have enough fund	Observed	5	3	9	5	22
	Expected	22.73	13.64	40.91	22.73	100.00
Parents expectation	Observed	9	4	6	3	22
	Expected	40.91	18.18	27.27	13.64	100.00
Total	Observed	18	12	22	14	66
	Expected	27.27	18.18	33.33	21.21	100.00
			DF	P-Value		
Pearson Chi-Square	4.470			6	0.6130	

The test of hypothesis on the dependence of preference on parental influence shows  $p > 0.05$ , which implies that for those who prefer to study in polytechnic, their parents did not influence them to do so.

**4.6. Hypothesis six**

**Table 6** Tabulated Statistics: Factors, Worksheet columns

Admission policy factors	Frequencies	Responses				Total
		Strongly Agreed	Agreed	Disagreed	Strongly disagreed	
My parents always wanted m to study at the polytechnic	Observed	36	49	28	65	178
	Expected	20.22	27.53	15.73	36.52	100.00
My parents do not have enough fund	Observed	53	49	49	27	178
	Expected	29.78	27.53	27.53	15.17	100.00
Parents expectation	Observed	34	54	43	47	178
	Expected	19.10	30.34	24.16	26.40	100.00
Total	Observed	123	152	120	139	534
	Expected	23.03	28.46	22.47	26.03	100.00
			DF	P-Value		
Pearson Chi-Square	27.093			6	0.0000	



**H<sub>0</sub>:** The preference of university education is independent on parental influence

**H<sub>1</sub>:** The preference of university education is dependent on parental influence

Level of significance = 0.05

The test of hypothesis on the dependence of preference on parental influence shows  $p < 0.05$ , which implies that preference of university education is dependent on parental influence.

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## 5. Discussion

The result of the study reveals that 89% of all the people who participated in this study prefer to study in the university setting instead of the polytechnic education. The study also revealed through the Mann-Whitney U test ( $p = 0.04$ ) that there is a significant preference for university than polytechnic education by the public. This implies that many people prefer to get university education instead of the polytechnic. The chi-square test of independence revealed that some of the students who chose polytechnic education are because of the admission policy ( $p < 0.05$ ), while those who chose university ( $p$ -value 0.000) also shows that it is also dependent on admission policy as they view future prospects of international opportunities (74.7%) and post graduate opportunity (72%) easy if they had university education. By evaluating the respondents opinion on preference dependence on learning outcome, the result for polytechnic students shows  $p < 0.05$  which shows that students who prefer the polytechnic education also do so because of the learning outcome. 83.36% of these students prefer the polytechnic because the education system is more practically inclined than the university while 68.18% of them prefer the system because of the entrepreneurial skills they will acquire from the education system, why also, 95.45% of them prefer the polytechnic because of the duration to obtaining a certificate. Whereas, the test for university show  $p < 0.05$  indicating that the students who prefer university education do so because they feel that the university education system provides them with highly trained lecturers and professors (58.99) of specialized fields.

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## 6. Conclusion

Based on the study's findings, we draw the conclusion that admission to universities is preferred by students over admission to polytechnics, and that this preference is significantly influenced by the quality of learning outcomes, potential future employment to avoid HND discrimination, postgraduate study opportunities, and international study opportunities. Furthermore, the study comes to the conclusion that parents and other family members have an impact on students' preferences for pursuing higher education.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

This is to declare that the study was conducted solely on the basis of common societal dilemma identified and as such, the study was not based on a paid consultancy with any organization having an interest in our field of research.

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