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**COMPARATIVE EFFECT OF MODE OF ENTRY ON UNDERGRADUATES' ACHIEVEMENT IN SCIENCE EDUCATION PROGRAMS IN FEDERAL UNIVERSITY OF KASHERE, GOMBE STATE, NIGERIA**

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**Abstract**

*This study was carried out to investigate the Effect of Mode of Entry on Undergraduates' Achievement in Science Education Programs in Federal University of Kashere, Gombe State, Nigeria. The study adopted ex post facto research design in which three research questions guided the study with three corresponding null hypotheses. The DE and UTME science education students who registered in the 2018/2019 academic session were 160 comprising of 72 DE and 88 UTME constituted the sample of the study. Second semester senate approved result of 2018/2019 academic session were used as the base data for analysis. The data was analysed using Mean and Standard deviation to answer the research questions while t-test and ANOVA were used to test the null hypotheses at 0.05 level of significance. Findings revealed a statistically significant difference between the achievement of 200 level DE and UTME in favour of the DE students with medium effect size difference between the achievement of the groups. However, significant difference does not exist between the achievement of 200 level DE and UTME undergraduates admitted in to the seven science education programs. Based on these findings, it was recommended among others that the university management should appeal for the need to change the current DE and UTME admission policy of 40% DE and 60% UTME ratio to 70% DE and 30% UTME respectively. This is to allow the universities to admit the right candidates for the program.*

**Keywords:** Mode of Entry, Undergraduates' Achievement, Science Education Programs

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**Introduction**

The need for university education have continue to increase in recent times considering the number of candidates aspiring to obtain a university degree. Despite the incessant need for university education, access remained a persistent problem for many students in Nigeria. The statistic of Ministerial Strategic Plan of 2016–2019 indicated that Nigeria has 128 (public and private) universities serving 1,700, 000 tertiary students enrolment representing only 10% tertiary gross enrolment ratio as compared to global average of 27% (National Planning Commission, 2017). With these, only about 17% of those seeking placement in higher institutions in Nigeria are admitted (FME, 2017). The remaining candidates are destined to reapply the following academic session where they compete with others seeking similar placements. The pressure for seeking admission continues every academic session forcing universities to adjust admission policies that will accommodate more students even beyond their infrastructural carrying capacities. Carrying

capacity in universities refers to available spaces that will conveniently accommodate new candidates such as lecture halls, libraries, laboratories, bed spaces, toilets and bathrooms. It is pertinent to ask why the number of candidates seeking admission increases every year? Reacting to this, Bello, et al., (2020) enumerated factors such as demography, admission policies, mismatch between course placement and candidates' interest, the changing needs and dynamics of the labour market as well as globalisation. Demography alone is enough to increase enrolment because, students graduating from secondary schools and those from colleges of education and polytechnics are all potential university applicants. Secondary school graduates apply through Unified Tertiary Matriculation Examinations (UTME) while those from colleges of education and polytechnics apply through Direct Entry (DE). These two modes of entry are operational in all Nigerian universities and the application is made through the Joint Admissions and Matriculation Board (JAMB) website (JAMB, 2018). Upon

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application, the UTME candidates are expected to obtain a minimum cut-off mark in the matriculation examination conducted by JAMB alongside five credits in English Language, mathematics and three related subjects to the course of study. However, the candidates' JAMB score must satisfy the stipulated cut-off mark proposed by the university of interest.

UTME is a computer based standardized examination for potential candidates preparing to apply for admission in to tertiary institutions in Nigeria. The examination is developed and managed by the JAMB and it focused on developing students' problem solving skills, critical thinking, knowledge of scientific concepts and principles across all subjects. Thus, candidates are tested in four subjects based on their choices; the use of English is compulsory and any other three subjects relevant to the proposed course of study as set out in the relevant chapters of the JAMB UTME Brochure (JAMB, 2018). During the conduct of the examinations, the use of calculators, timers, mobile phones and any other electronic devices are strictly prohibited with serious penalties imposed on any candidate found to possess such things.

Currently, Nigerian universities admit students into 100 level on the basis of their performance in the UTME Examination while students who obtained National Diploma (ND), Nigerian Certificate in Education (NCE) and Higher National Diploma (HND) are admitted as Direct Entry (DE) into 200 level. During the admission process, the DE candidates must meet the requirement for admission into the university of interest. Part of the admission requirement are the 5 credit O' level, candidates' aggregate point at A level result and the matching between the course studied at accredited NCE, ND and HND as well as the one applied for in the university.

The admission policy of Federal University, Kashere admit UTME students in 100 level and DE students in 200 level of various degree programs (FUK Student Handbook, 2015). The two categories of students (UTME and DE) are interfacing each other at 200 level, taking the same courses, attending the same lecture, laboratory practical and examinations. As such, it is possible to compare their result by the end of second semester 200 level to validate the claim that

DE perform better than UTME undergraduates in science education. Over the years, there seem a variation in the achievement of science education students. These variations are so glaring that faculty and senate members are overwhelmed demanding the causes of these disparities. The question of why some set of students' result appear to be poor while others with good grades continue to occur at most senate consideration of results. However, little can be said about the causes of these differences without empirical evidence. The usual answer given by examination officers in the department was that the achievement in the result followed the UTME and DE identification numbers. Thus, indicating that entry mode has an unprecedented effect on students' achievement.

Achievement is connected to students' overall result either semester wise or sessional as approved by the university senate. However, achievement can be inferred from individual courses taken by students, the overall achievement can be obtained from the cumulative grade point average (CGPA) published by the end of academic session. Achievement in this study refers to the CGPA calculated by summing up the sum of points (SP) from the preceding semesters and divided by the sum of units (SU) of all the courses taken. Therefore, the 200 level senate approved result of science education students was taken as a benchmark for measuring their achievements. Science education is a department domiciled in the faculty of education of the university. It has seven accredited programs including agriculture, biology, chemistry, computer science, integrated science, mathematics and physics education. The seven programs had students from 100 level to 400 level with courses captured from Benchmark Minimum Academic Standard (BMAS, 2018) by Nigerian University Commission.

Conceivably, the debate about undergraduates' achievement in science education based on entry mode of DE and UTME is not new in Federal University of Kashere. Though, the debate is not based on empirical evidence and to the best knowledge of the researchers, there is no research conducted on the lingering issue in the department. However, there studies that attempted to address the issue. For example,



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a study was conducted by Babatunde, et al., (2019) on academic achievement of direct entry and non-direct entry (Pre- NCE) science students in Niger State College of Education, Minna based on their modes of admission into NCE I. The study adopted an ex-post-facto research design. The population of the study consisted of all students admitted in the school of sciences of Niger state college of education, Minna during 2008/2009 academic sessions. Altogether they were 1,110 admitted in the college during the years under study. A three years track of academic performance of 372 students in selected courses in the school of sciences were used for the study. The findings revealed that there is a significant difference between the mean scores of academic achievements of Direct Entry and Non-direct entry students of school of sciences in favour of Non-direct entry.

Similarly, Saliu and Musa (2017) conducted a study on the impact of university mode of entry on the academic performance of architecture students in Ahmadu Bello University. The research design used in the study was quantitative approach and was conducted using document review from secondary materials such as journals, books, papers, internet, and thesis. Data was collected from the department of architecture Ahmadu Bello University Zaria on the performance of 1,902 students from 1991/1992 to 2014/2015 sessions which covers 20 Sets of Course-Credit System. It was then analyzed using One-way ANOVA technique with significance threshold of 0.05, bar charts, column charts, graphs and tables. The study rejected the null hypothesis and concluded that, the impact of University Mode of Entry on the Academic Performance of Architecture Students is statistically significant favoring direct entry students.

Likewise, Faruque, et al., (2017) carry out a study to compare the academic performance of students in the Bachelor's degree of Information Technology (BIT) having Arts and Science backgrounds in universities of Uganda. In order to achieve the objective of their study, a sample of 202 final year BIT students were purposively selected from two universities in Uganda. These students were categorized on the basis of their A' level backgrounds (130 Arts and 72 Sciences). A descriptive approach employing the Welch's t-test was used to determine the difference

between the performance of the two groups and a simple linear regression analysis was used to examine the correlation among students' performance between semesters. The results indicated that there's a significant difference in the academic performance of the two groups, with the science group outperforming arts. Based on the reviewed literature, this study poised to investigate the Comparative Effect of Mode of Entry on Undergraduates' Achievement in Science Education Programs in Federal University of Kashere, Gombe State, Nigeria.

### **Statement of the Research Problem**

The increasing pressure for entry in to university education calls for the attention of all stakeholders in education including the need to search for the most desirable mode of selecting candidates for admission into the Nigerian universities. In Federal University of Kashere for instance, the admission policy is 40% for DE and 60% for UTME respectively (FUK Students Handbook, 2015). This policy paved way for the intake of more UTME candidates than the DE. In science education department, the UTME candidates find it difficult to graduate as many withdrawal cases and those with high incidence of carry over courses are emanating from them. This is not unconnected with their ill-experience and inability to adjust to the changing needs of university system. Conversely, the DE candidates have continued to show a remarkable achievement with minimal cases of carry over, not registered courses, spill over and withdrawals. These differences in achievement between DE and UTME candidates did not go unnoticed as it formed the central concern of most senate members of the university during result considerations. However, there is no empirical evidence that confirm the causes of these differences in the achievement between DE and UTME candidates. It is on this premise that the researchers find it appropriate to investigate the Comparative Effect of Mode of Entry on Undergraduates' Achievement in Science Education Programs in Federal University of Kashere, Gombe State, Nigeria.

### **Aim and objectives of the Study**

The aim of this study was to investigate the Comparative Effect of Mode of Entry on



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Undergraduates' Achievement in Science Education Programs in Federal University of Kashere, Gombe State, Nigeria. The explicit objectives of this research are to:

1. Find out the difference in the mean achievement scores among 200 level undergraduates admitted in Science Education Department through DE.
2. Find out the difference in the mean achievement scores among 200 level undergraduates admitted in Science Education Department through UTME.
3. Determine the difference in the mean achievement score of 200 level undergraduates admitted in Science Education Department through DE and UTME in Federal University of Kashere.

### Research Questions

The study was guided by the following research questions;

1. What is the difference in the mean achievement scores among 200 level undergraduates admitted in Science Education Department through DE?
2. What is the difference in the mean achievement scores among 200 level undergraduates admitted in Science Education Department through UTME?
3. What is the difference in the mean achievement scores of 200 level undergraduates admitted in Science Education Department through DE and UTME in Federal University of Kashere?

### Research Hypothesis (Null Hypothesis)

The study tested the following hypotheses at 0.05 level of significance.

- H<sub>01</sub>:** There is no significant difference in the mean achievement scores among 200 level undergraduates admitted in Science Education Department through DE.
- H<sub>02</sub>:** There is no significant difference in the mean achievement scores among 200 level undergraduates admitted in science education department through UTME.
- H<sub>03</sub>:** There is no significant difference in the mean achievement scores of 200 level undergraduates admitted in Science Education Department through DE and UTME in Federal University of Kashere.

### Methodology

The research design was Ex-post facto also known as causal comparative design. The design assumed a methodological approach for eliciting probable antecedents of events that previously occurred which cannot be subjected to direct rigorous manipulation and control by the researcher. The design was adopted to comparatively explore a possible causes of variation in the achievement of 200 level DE and UTME students. As usual, causal comparative research design investigates causes of a phenomenon by comparing a retrospective antecedent that led to such phenomenon. This is chiefly achieved by collecting data from the subjects after the incident had occurred. As for this study, the group means of 200 level science education students admitted through the DE were compared with the group means of UTME in the seven programs of the department. The population of the study consisted of the entire one hundred and sixty 200 level science education students of 2018/2019 academic session. The sample for the study are 160 DE and UTME science education students who registered in the 2018/2019 session. The sample comprises of 72 DE and 88 UTME undergraduates. The data for this study were collected from examination office of the department of science education in the university. Students' identification number was used to separate students along DE and UTME. The data was analysed using Means, t-test and Analysis of Variance and 0.05 level of significance was used as a decision rule in accepting or rejecting the null hypotheses. Statistical Package for Social Sciences (SPSS), version 23.0 was used for the analysis.

### Result

**Hypothesis two (H<sub>01</sub>):** There is no significant difference in the mean achievement scores among 200 level DE science education students based on programs.

To test this hypothesis, the mean achievement scores of 200 level DE science education students based on programs were first subjected to descriptive statistics to compare means. Subsequently, analysis of variance (ANOVA) were used to determine whether there was a significant difference in the achievement of the groups.



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**Table 1: Mean Achievement Scores of DE Undergraduates' in Science Education Based on Programs**

Programs	N	Mean ( $\mu$ )	SD
Agriculture Education	18	3.3161	.84800
Biology Education	7	3.3871	1.17402
Chemistry Education	10	3.0380	.69809
Computer Science Education	16	2.7306	.90842
Integrated Science Education	6	2.9650	.49249
Mathematics Education	6	3.6467	.47154
Physics Education	9	2.5756	.93699

**Key:** N= number in samples, SD= standard deviations

Table 1 shows the mean and standard deviations of 200 level DE science education students based on programs. The overall means in table 1 are made clearer with a graphical representation as shown in a column chart in Fig. 1;

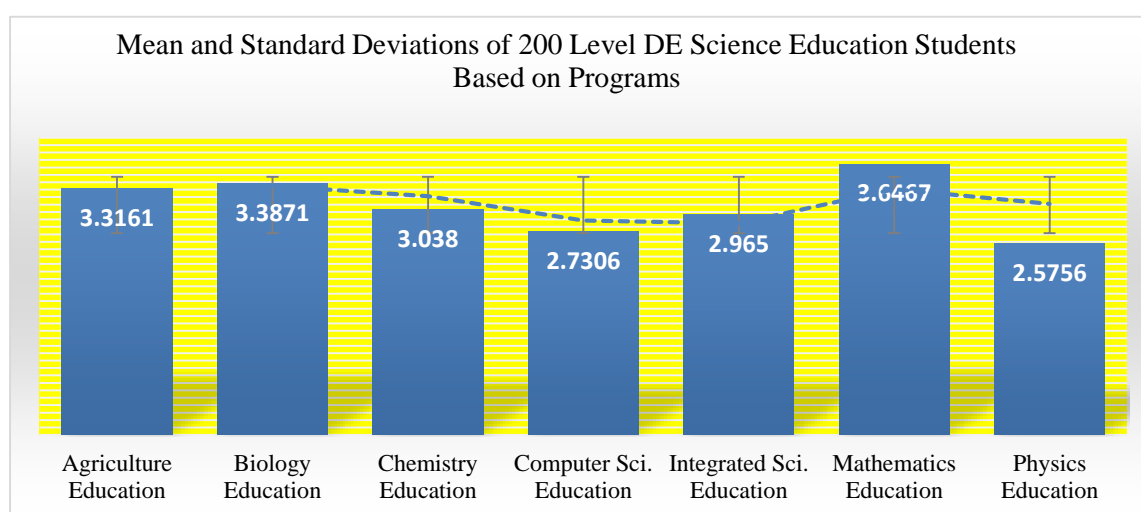


Figure 1. Graphical Illustration of the Overall Mean Scores of DE Undergraduates' achievement in Science Education Based on Programs.

To find out if the difference between the seven means is statistically significant,

ANOVA comparison was carried out as shown in table 2.

**Table 2: ANOVA Comparison Results of DE Undergraduates' Achievement in Science Education Based on Programs**

Source of Variation	Sum of Squares	df	Mean Square	F-ratio	P-value	Decision
Between Groups	7.902	6	1.317	1.837 <sup>NS</sup>	.106	Ho <sub>1</sub> Accepted
Within Groups	46.607	65	.717			
Total	54.509	71				

**Key:** df= degree of freedom, NS= not significant at 0.05 level

Table 2 present ANOVA comparison of 200 level DE undergraduates' achievement in science education based on programs. The result reveals that  $F=(6, 65) = 1.837$ ,  $P > 0.05$  is not significant at 0.05 alpha level. This indicates that there is no statistically significant difference in the mean achievement among 200 level DE undergraduate science education students

based on programs. Hence, the null hypothesis is not rejected.

**Hypothesis three (Ho<sub>2</sub>):** There is no significant difference in the mean achievement scores among 200 level UTME science education students based on programs.



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To test this hypothesis, the mean achievement scores of 200 level DE science education students based on programs were first subjected to descriptive statistics to compare

means. Subsequently, analysis of variance (ANOVA) were used to determine whether there was a significant difference in the achievement of the groups.

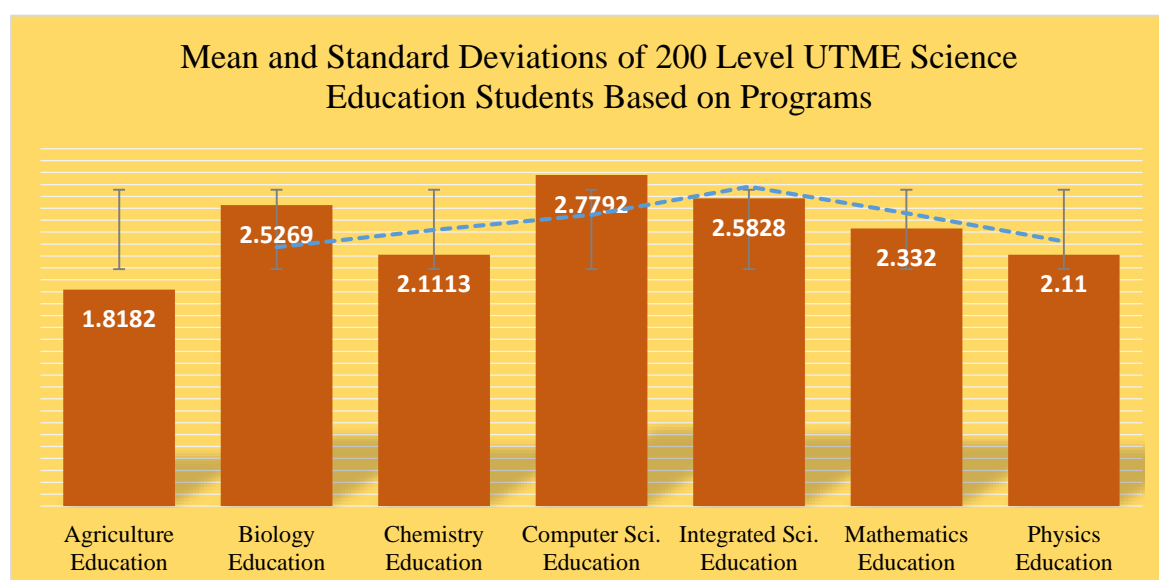
**Table 3: Mean Achievement Scores of UTME Undergraduates' in Science Education Based on Programs**

Programs	N	Mean	SD
Agriculture Education	11	1.8182	1.02611
Biology Education	16	2.5269	.90678
Chemistry Education	8	2.1113	.92854
Computer Science Education	13	2.7792	.72363
Integrated Science Education	25	2.5828	.78563
Mathematics Education	10	2.3320	.96976
Physics Education	5	2.1100	.92217

**Key:** N= number in samples, SD= standard deviations

Table 3 shows the mean and standard deviations of 200 level UTME science education students based on programs. The

overall means in table 3 are made clearer with a graphical representation as shown in a column chart Fig. 2;



**Figure 2. Graphical Illustration of the Overall Mean Scores UTME Undergraduates' Achievement in Science Education Based on Programs.**

To find out if the difference between the seven means is statistically significant,

ANOVA comparison was carried out as shown in Table 4.

**Table 4: ANOVA Comparison Results of UTME Undergraduates' Achievement in Science Education Based on Programs**

Source of Variation	Sum of Squares	df	Mean Square	F-ratio	P-value	Decision
Between Groups	7.815	6	1.302	1.705 <sup>NS</sup>	.130	Ho <sub>2</sub> Accepted
Within Groups	61.861	81	.764			
Total	69.675	87				

Ns: not significant at 0.05 level



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Table 4 present ANOVA comparison of 200 level UTME undergraduates' achievement in science education based on programs. The result reveals that ( $F(6, 81) = 1.705, P > 0.05$ ) is not significant at 0.05 alpha level. This indicates that there is no statistically significant difference in the mean achievement among 200 level UTME undergraduate science education students

based on programs. Hence, the null hypothesis is not rejected.

**Hypothesis one (Ho<sub>3</sub>):** There is no significant difference in the mean achievement scores of 200 level DE and UTME science education students in Federal University of Kashere.

**Table 5: Paired Sample t-test Results of DE and UTME Undergraduate' Achievement in Science Education Programs**

Group	N	Df	Mean	SD	t-value	p-value	Decision
DE	72	158	3.060	.87620	4.629*	0.000	Ho <sub>3</sub> Rejected
UTME	88		2.407	.89491			

\*Significant at 0.05 level

A paired sample t test (dependent samples) in table 1 was used to compare the scores of DE and UTME undergraduate' achievement in science education programs. The difference between the two conditions was found to be statistically significant,  $t(158) = 4.629, p < 0.05$ . The findings indicate that undergraduates admitted through UTME on average had lower level of achievement;  $M = 2.407, SD = .89491$  than the undergraduate admitted through DE;  $M = 3.060, SD = .87620$ . The *Mean* difference between the two groups was 0.653. Furthermore, the effect size calculation from *Cohen's d* ( $d = .73$ ) indicated a *medium* effect size difference between the achievement of the groups. The p-value was 0.000 and is relatively less than 0.05 level of significance, hence, the null hypothesis is rejected indicating a significant difference between the achievement of the groups in favour of the DE students.

### Discussion of Findings

The finding of research question one on the difference in the mean achievement scores of 200 level DE and UTME undergraduates in science education showed a marginal difference in the means. To further confirm if such differences were statistically significant, a corresponding hypothesis one was tested. The finding indicated a statistically significant difference between the achievement of the groups in favour of DE undergraduates. This implies that the DE undergraduates having prior experience at A' Level have more chances of scoring good grades than their UTME counterparts. The

finding further shade light on the variation that exist between the two candidates at the initial stage. Thus, any deviation that continue to emanate in the subsequent students' result could be attributed to their entry requirement which confirmed that the DE candidates are more prepared for the program than the UTME.

The DE candidate are already prepared to study science education having obtained a prior training in the course of study at NCE or ND. Additionally, the implication of this finding point to the need for policy adjustment that provide more admission spaces for the DE candidates than the UTMEs for science education program. This finding was supported by the earlier finding of Saliu and Musa (2017) whose result indicated that there is statistically significant difference on the Academic Performance of Architecture Students based on University Mode of Entry favoring direct entry students. However, the finding was not supported by Babatunde, et al., (2019) whose result revealed that there is a significant difference between the mean scores of academic achievements of Direct Entry and Non-direct entry students of school of sciences in favour of Non-direct entry. The finding of the study point to the superiority of DE as preferred candidates for admission in to science education programs than the UTME.

The finding of research question two on the difference in the mean achievement scores among the 200 level DE undergraduates' science education students based on programs showed a slight difference in the



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means. To further confirm if such differences were statistically significant or otherwise, a corresponding hypothesis two was tested. The finding indicated no statistically significant difference in achievement among the 200 level DE undergraduates' science education based on programs. This implies that the 200 level DE undergraduates admitted in to the seven science education programs are of equal strength. The finding was not supported by Faruque, et al., (2017) whose result indicated a significant difference in the academic performance of the two groups, with the science group outperforming the arts counterparts.

The finding of research question three on the difference in the mean achievement scores of 200 level UTME undergraduates' science education students based on programs showed a small difference in the means. To further confirm if such differences were statistically significant, a corresponding hypothesis three was tested. The finding indicated no statistically significant difference in the achievement among the 200 level UTME undergraduates' science education based on programs. This implies that the 200 level UTME undergraduates admitted in to the seven science education programs are comparable. This finding was contrary to the finding of Saliu and Musa (2017) whose result indicated a statistically significant difference on the Academic Performance of Architecture Students based on University Mode of Entry favoring direct entry students.

### Conclusions

Based on the findings of this study, it was concluded that; there is a statistically significant difference between the achievement of 200 level DE and UTME in favour of the DE students with medium effect size difference between the achievement of the groups. However, significant difference in the achievement does not exist among the 200 level DE and UTME undergraduates admitted in to the seven science education programs

### Recommendations

The study recommends the following based on the findings of this study:

1. The university management should establish a remedial program for the

UTME students as a means of increasing their level of preparedness for entry into science education programs.

2. The leadership of the faculty of education should organize a special orientation programs for the UTME students during their first year of admission. This is to create awareness on how to approach their academic activities and to increase chances for achieving good performance.
3. The university management should make a case for the need to change the current DE and UTME admission policy of 40% DE and 60% UTME ratio to 70% DE and 30% UTME respectively. This is to allow the university to admit more DE candidates who are already exposed to teaching career during their NCE/ND programs and had built professional passion in teaching.

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