

Demographic Variables and Instructional Effectiveness in Senior Secondary Schools in Cross River State

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Abstract

This study, guided by two hypotheses, investigated how Mathematics teachers' demographic variables could influence their instructional effectiveness in senior secondary schools in Cross River State. Ex-post facto research design was adopted for the study. Purposive sampling technique was used by the researcher, where all the members in the population were selected. The sample of the study is made up of all the 144 mathematics teachers in Cross River State, Nigeria. The questionnaire was the main instrument used for data collection. The instrument was validated by experts in Measurement and Evaluation. The reliability estimate of the instrument was established using Cronbach Alpha reliability method and reliability coefficient was found to be .78. Independent t-test and One-Way Analysis of Variance (ANOVA) were used to test the hypotheses. The .05 level of significance was used for the statistical testing of each of the hypotheses of the study. The results of the analyses indicated that gender and age significantly influence instructional effectiveness of Mathematics teachers. It was recommended that Government should organize regular seminars and workshops for all the Mathematics teachers in secondary schools, irrespective of their age or gender towards effective utilization of instructional materials and methods of teaching.

Introduction

Instructional effectiveness refers to the kind of teaching that produces positive and expected results in learners. It is teaching that presents a teacher as a professional, satisfactorily playing his/her role in the classroom in the areas of competence in any given subject matter, effective use of methods and materials, motivation of learners, teacher-student interaction and evaluation of students' learning, among others. Instructional effectiveness at all levels of the educational system demands that teachers should among other things, plan in advance what to teach, how to teach and develop reliable and viable assessment procedures (Ekuri, Egbai & Ita, 2011). Instructional effectiveness is therefore an indispensable factor in teaching and learning process. The demand of effective teaching therefore places the teacher not only at the centre of teaching, but also at the centre of assessment activities in the school. It is perhaps for this reason that continuous assessment as an educational enterprise has been recognized and emphasized in the Nigerian educational sector (Federal Republic of Nigeria, FRN, 2008).

One of the indicators of quality education is cognitive achievements of learners (United Nations Educational, Scientific and Cultural Organization, (UNESCO), 2005). Oyama

and Otu (2021) noted that the performance of students in any academic tasks has always been of special interest to the government, educators, parents and society at large. To ensure effective teaching, government had structured educational system in bureaucratic concept of teaching in which specialists in curriculum design the curriculum for teachers. The supervisors' job is to evaluate and make sure teachers implement the curriculum and the procedures at the school district.

The Nigerian government makes investment in education because of the long-term economic benefits of improving the educational systems. Thus it has also enacted policies geared towards improving the educational lots of Nigerian students. In the National Policy on Education (FRN, 2008), Mathematics is one of the core and compulsory subjects of the junior and senior secondary school curricula. This importance accorded Mathematics in the school curricula reflects accurately the recognition of the vital role it plays in contemporary society, especially when the broad aim of secondary education within the overall national objectives is the preparation for Higher Education (FRN, 2008), and also to equip students to live effectively in the modern age of science and technology.

It is obvious that teacher gender has characteristics that are natural/biological with serious interface with the culture of the society. The cultural misconception that the male teacher is more competent than the female continues to raise dust. Though some scholars have argued it vehemently with empirical evidence by virtue of their analyses, the input of males and females with regard to who teaches better or influences teaching effectiveness may not be holistically credited to male teachers. It is still very open and competitive to determine who performs efficiently in respect to implementation of curriculum contents.

In the teaching of Mathematics, the reasoning among people inferred that male teachers are more competent than females via teaching methods, utilization of instructional material and evaluation of students. It is erroneous to conclude that male teachers are more effective than the female. Gender is indeed very sensitive in relation to teachers' instructional effectiveness in the school system. Male teachers seem to be more effective coupled with the issue of gender inequality clause. According to Otu, Eduwem and Umoinyang (2017):

Male plays the role of a star actor while the female plays a supporting role. The male is expected to have superior strength, greater stamina, superior intelligence and better organizing ability; psychologically, the male is trained to play dominant, superior role of decision maker, while female is programmed to be submissive and obedient (P 175).

Generally, males are being given kudos in terms of outstanding performance in many institutions, and ministries; education is not an exception. The male teachers still have chances of doing better than the female even though both could be committed with family issues.

The family responsibility of males could be minute, which is provision of funds. It justifies that the male gender in the family is less involving than the female, thus, placing them in advantaged position of preparing their lesson, improvising where the need arises and getting mastery of the subject matter for effective teaching as compared to the female. The females are always being confronted with family issues as being mirrored by the society to ensure that there is orderliness in the house. It does not give them sufficient time to read and have a grip of the curriculum contents and so the male teachers are always rated higher in effective teaching.

Otu and Bassey (2019) carried out a study to prove that both males and females may have 50%/50% effectiveness in job performance. In this study, the population was made up of three thousand two hundred and fifty teachers (3,250) from one hundred and twenty four public secondary schools in the state. A total of four hundred (400) teachers were sampled randomly for the study; this consisted of 200 males (50%) and 200 females (50%). The hypothesis formulated for the study was that gender does not significantly influence teachers' perception of training and retraining programme in Cross River State. The hypothesis was tested at 0.05 level of significance using independent t-test. The result revealed that the observed t-value between male and female teachers' perception of training and retraining programme was 1.11. Since the observed t-value was less than the critical t-value of 1.96 needed for significance at 0.05 level and 398 degrees of freedom, it means that the observed t-value of 1.11 was not statistically significant. By that result, the null hypothesis was therefore retained and so male and female teachers do not significantly differ in their perception of training and retraining programme.

Administratively, studies have shown that in Nigeria, especially in education sector, more percentage of male principals have excelled in respect to administrative efficiency than their female counterparts despite the fact that women constitute a larger chunk in teaching profession. One of the reasons advanced, with regard to this, is that female are globally seen as weaker vessel, and docile to male instruction rather than being independent minded. This myopic reasoning among people inferred that male teachers are more competent in teaching than females in terms of teaching methods, utilization of instructional materials and evaluation of students.

Uko (2002) carried out a research work on administrative effectiveness of principals in Cross River State and had one of the hypotheses stating that the principals' administrative effectiveness in terms of human relations is not significantly influenced by gender. The total sample used for that study was one thousand (1000) teachers and two hundred (200) principals and vice principal randomly selected from one hundred (100) secondary schools in the research area. The result of that analysis portrayed a significant t-value of 5.51 with 198 degree of freedom. It was found to be far above the critical t-value of 1.98. Based on that finding, the null hypothesis was rejected while the alternate hypothesis was retained. The result finally showed that there is a significant gender influence on principal's administrative effectiveness in terms of human relations. The result further

revealed that male principals have a higher mean level of human relations ($\bar{x} = 32.13$) than their female counterparts ($\bar{x} = 30.09$).

Males are resource persons that are administratively inclined, with certain competent skills and agility to exploit every little opportunity at their disposal to achieve the earmarked agenda of the society. There are technicalities usually adopted by male teachers for learners' continual assimilation of curriculum contents in the teaching process as supported by natural phenomena like norms, values and other cultural ethics. These have permeated to tentatively believe that teachers' gender influence instructional effectiveness in the classroom.

The society is going digital and this demands that every Mathematics teacher should be Information and Communication Technology (ICT) compliant. This is still part of sufficient structure nomenclature for instructional effectiveness. The purpose is to exploit the internet and impart knowledge that is of global outlook, thereby, making the learners capable of competing favourably with their counterparts in other parts of the world. It is onus on male and female teachers to join this trend, which may help them to be more effective in the teaching of Mathematics.

Otu and Bassey (2018) carried out a study on Information and Communication Technology (ICT) and Social Studies teachers' effectiveness. One of the hypotheses stated that there is no significant difference in internet usage between male and female Social Studies teachers. The population of the study was two thousand five hundred and eighty nine (2589) teachers in the three (3) Educational Zones from one hundred and ninety eight (198) schools. A sample of 455 Social Studies teachers was randomly drawn, out of which 285 were males while 170 were females. The statistical technique used to test the hypothesis at 0.05 level of significance was chi-square. The result showed that the calculated chi square value of 268.13 was greater than the table value of 7.82 at 3 degree of freedom. It shows that there is a significant difference in the internet usage between male and female Social Studies teachers. The males are more committed in the use of ICT than the female and therefore very effective in teaching.

Okeke (2015) investigated teacher variables, motivation and academic achievement of secondary school students in Economics. Ninety two (92) Secondary School II (SS II) Economics teachers and 2,940 SS II Economics students were used for the study. Six null hypotheses were tested at 0.05 level of significance using Pearson Product Moment Correlation Co-efficient (r), independent t-test and ANOVA. The results showed that there is no significant influence of teachers' gender on the academic achievement of students in Economics.

Ogunyemi (2007) sees teacher gender in the context of curriculum as a variable that is associated with being male or female and the socio-cultural relationship between different groups of women and different groups of men, resulting from the social milieu evolving along with society.

Studies on age as an indicator of instructional effectiveness have yielded conflicting results. Martin (2003) discovered that students perceive middle-aged teachers as more effective than both younger and older ones. Butts and Raun (2007), and Anidon and Kean (2008) also observed a significant influence of age in the interaction patterns of students and perception of instructional effectiveness. In a study involving 240 teachers-trainees of the College of Education Oro, with ages ranging from 20-52, Salami (2006) found out that age has a significant influence on withdrawal cognition of teachers. Teachers in the age bracket of 20-30years had greater tendency to withdraw from the teaching profession than teachers between the age of 30-40 years and above.

One would expect teachers' age to influence students' achievement due to maturity thus, as teachers advance in age, they should have better mastery of content, better utilization of educational resources, motivational technique and effective content delivery. This view is consistent with Hanushek's (1996) finding that teachers' age was consistently related to students' achievement than their educational qualification.

Darling-Hammond (1998) in his study revealed a negative relationship between teachers' age and students' academic achievement. Teachers advancing in age that is getting to mandatory retirement age are bound to experience burnout easily. Younger teachers in this respect may be more up-to-date with curriculum and examination requirement and probably make these their main focus. On the other hand, young inexperienced teachers may be easily overwhelmed by work. In which case learners' achievements may be minimal and the contrary may be for the older teachers. Rapport is very important in learning outcomes; this aspect is associated more with younger teachers whereas it may be more difficult for an older teacher to establish rapport with his or her class. Furthermore, in most cases, younger teachers often find teaching interesting and become more enthusiastic and have more up-to-date knowledge on their subject than older teacher. However, the younger teachers may not be taken seriously by students because of their age and may be a disadvantage to the students.

Hypotheses

Ho1: There is no significant influence of gender on instructional effectiveness of Mathematics teachers.

Ho2: Age has no significant influence on instructional effectiveness of Mathematics teachers.

Methodology

The design used for this study is the Ex-post facto design. This study was conducted in Calabar Education Zone in Cross River State. Calabar Education Zone is made up of seven (7) Local Government Areas which include Akamkpa, Akpabuyo, Bakassi, Biase, Calabar South, Odukpani and Calabar Municipality. The population of this study covers all the Mathematics teachers in public secondary schools in Calabar Education Zone. There are one hundred and forty four (144) Mathematics teachers in Calabar Education

Zone. All the teachers in the public schools in the area were used in this study. The sampling techniques adopted for this study was the purposive sampling technique. Therefore, the sample for this study consisted of all the teachers that made up the population (144 Mathematics teachers) selected from all the public secondary schools in Calabar Education Zone.

Two instruments were used for this study. The first instrument titled Teachers/School Profile Questionnaire (TSPQ) was constructed by the researcher for this study. Information included in the instrument was structured to elicit data in relation to teachers' age, sex, marital status, qualification and years of teaching experience. The second instrument used for the study was Instructional Effectiveness Evaluation Form (IEEF), used to measure instructional effectiveness of Mathematics teachers in the research area. The IEEF was made up of 13 items with five options ranging from 5-1, where 5 represented excellent, 4 very good, 3 good, 2 fair and 1 poor. To ensure that the instrument measure what it is purported to measure, it was subjected to face validity by two Educational Measurements lecturers in the Department of Educational Foundations in University of Calabar for scrutiny. In this study, the reliability of the instrument was established using Cronbach alpha reliability coefficient estimate. The questionnaire was administered to 40 Mathematics teachers from Akwa Ibom State who were not part of the sample. The reliability coefficient of the instrument was 0.737.

Out of 144 copies of questionnaires administered only 124 were successfully retrieved. The 124 retrieved copies were coded and the data obtained was used for analysis. Independent t-test and One-way Analysis of Variance (ANOVA) were used to test the hypotheses at .05 level of significance.

Presentation of results

In this section each hypothesis is re-stated, and the result of data analysis carried out to test it is presented. Each hypothesis of the study was tested at .05 level of significance.

H₀₁: There is no significant influence of gender on instructional effectiveness of Mathematics teachers.

The independent variable in this hypothesis is gender (male and female); while the dependent variable is instructional effectiveness of Mathematics teachers. To test this hypothesis, instructional effectiveness of Mathematics teachers of male and female teachers were compared using Independent t-test analysis. The result of the analysis is presented in Table 1.

Table 1: Independent t-test analysis of the influence of gender on instructional effectiveness of Mathematics teachers (N=124)

Gender	N	\bar{x}	SD	t-value
Female	57	59.82	4.26	4.099
Male	67	56.25	4.99	

* Significant at .05 level, critical $t=1.96$, $df = 122$.

The result in table 1 revealed that the calculated t-value of 4.099 is higher than the critical t-value of 1.96 at 0.05 level of significance with 122 degree of freedom. With this result the null hypothesis that there is no significant influence of gender on instructional effectiveness of Mathematics teachers was rejected. This implies that there is a significant influence of gender on instructional effectiveness of Mathematics teachers.

Ho2: Age has no significant influence on instructional effectiveness of Mathematics teachers.

The independent variable in this hypothesis is age (Below 30, 31-40 and 41 and above); while the dependent variable is instructional effectiveness of Mathematics teachers. To test this hypothesis, instructional effectiveness of Mathematics teachers from age categories below 30, 31-40 and 41 and above were compared using One-Way Analysis of Variance (ANOVA). The result of the analysis is presented in table 2.

Table 2: Summary of one-way ANOVA on the influence of age on instructional effectiveness of Mathematics teachers (N=124)

Age	N	\bar{x}	SD		
Below 30	42	55.98	5.12		
31-40	56	58.54	4.72		
41 and above	26	59.92	4.23		
Total	124	57.96	4.96		
Source of variance	SS	Df	Ms	F	Sig of F
Between group	284.047	2	142.024	6.256*	.003
Within group	2746.751	121	22.700		
Total	3030.798	123			

*Significant at .05 level, critical $F=3.00$, $df= 2, 121$.

The result on table 2 revealed that the calculated F-value of 6.256 is higher than the critical F-value of 3.00 at .05 level of significance with 2 and 121 degrees of freedom. With this result, the null hypothesis was rejected. This result therefore implied that age significantly influenced instructional effectiveness of Mathematics teachers. Since age has a significant

influence on instructional effectiveness of Mathematics teachers, a post hoc analysis was employed using Fishers’ Least Significant Difference (LSD) multiple comparison analysis. The result of the analysis is presented in table 3.

Table 3: Fishers’ Least Significant Difference (LSD) multiple comparison analysis of the influence of age on instructional effectiveness of Mathematics teachers

(I) AGE	(J) AGE	Mean Difference		
		(I-J)	Std. Error	Sig.
Below 30	31-40	-2.55952(*)	.97255	.010
	41 and above	-3.94689(*)	1.18894	.001
31-40	Below 30	2.55952(*)	.97255	.010
	41 and above	-1.38736	1.13069	.222
41 and above	Below 30	3.94689(*)	1.18894	.001
	31-40	1.38736	1.13069	.222

*The mean difference is significant at the .05 level.

The result of the analysis in table 3 showed that respondents whose age is below 30 are significantly different in their instructional effectiveness of Mathematics teachers from those whose age is either 31-40 or 41 and above. Also respondents whose age is 31-40 are significantly different in instructional effectiveness of Mathematics teachers from those who are 41 and above.

Discussion of finding

The result of the first hypothesis indicated that gender significantly influences instructional effectiveness of Mathematics teachers. The findings of this study is in line with Uko (2002) who reported that there is a significant gender influence on principal’s administrative effectiveness in terms of human relations. The author further reported that male principals have a higher mean level of human relations (\bar{x} =32.13) than their female counterparts (\bar{x} =30.09), when the difference in means was compared statistically using the independent t-test analysis. There are technicalities usually adopted by male teachers for learners’ continual assimilation of curriculum contents in the teaching process as supported by natural phenomena like norms, values and other cultural ethics.

The result of the second hypothesis indicated that there is a significant influence of age on instructional effectiveness of Mathematics teachers. The findings of this hypothesis is in line with the view of Salami (2006) who found out that age has a significant influence on withdrawal cognition of teachers. Teachers in the age bracket of 20-30years had greater tendency to withdraw from the teaching profession than teachers between the age of 30-40 years and above.

Conclusion

Based on the findings of the study, it was concluded that gender and age has significant influence on instructional effectiveness of Mathematics teachers.

Recommendations

Based on the conclusion of the study, the following recommendations are made:

1. Government should organize regular seminars and workshops for all the Mathematics teachers in secondary schools, irrespective of their age or gender towards effective utilization of instructional materials and methods of teaching.
2. Mathematics teachers should be encouraged by government through various incentives like increment in salaries, allowances, promotion, to enable those with experience impart to the students ideas that would make them productive.

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