

## Teachers Competence and Students Academic Performance in Chemistry: A Study of Selected Schools in Otukpo metropolis of Benue State

Adakole Ikpe

[aikpe@noun.edu.ng](mailto:aikpe@noun.edu.ng)

National Open University of Nigeria

Abuja

### Abstract

*This study investigated the influence of teachers' competence on students' academic performance in chemistry at some senior secondary schools in Otukpo metropolis of Benue State. The sample comprised of 200 students, who were randomly selected from a population of 480 students. The study also involved 5 principals and 20 teachers. The researcher employed the survey design and data was collected using a Teachers Competence Questionnaire (TCQ), School Principals Questionnaire (SPQ) and a Performance in Chemistry Test (PICT). The instrument was validated by a team of experts in test and measurement as well as science educators. The reliability of the Performance in Chemistry Test (PICT) was established using the Kuder-Richardson formula-21. This yielded a reliability index of 0.74. In the same vein, the reliability of the Teacher Competence Questionnaire (TCQ) was established using Cronbach alpha and the results showed a reliability coefficient of 0.82. A hypothesis was formulated and tested using the Pearson Product Moments Correlation (PPMC) statistics at the 0.05 level of Significance. The major finding from the study is that teacher's competence has a significant effect on the academic achievement of student in chemistry. It was then recommended that schools should use competent and qualified teachers for imparting knowledge to students of chemistry. Also, government and ministries of education should ensure participation of staff in conferences, workshops, seminars and the use of in-service training and the provision of incentives/allowances to motivate teachers was similarly recommended.*

Key Words: Teachers' Competence, Academic Performance, Influence

### Introduction

Education is unquestionably an instrument per excellence for the growth of an individual and a nation, a position that is clearly spelt out in the National Policy on Education (2013). So also, the Federal Republic of Nigeria in the National Policy on Education (2013) harped on the dependence of nation's education system on the quality of her teachers. The implication of this is that the teacher remains a major input in any educational system, thus the performance by students in subjects taught is very much dependent on the quality of the teaching done (Iyoboyi & Muftau, 2014). Amie-Ogan and Etuk (2020) also informed on the desirability of competent teachers for effective teaching and learning to occur, insisting that at all levels of education teachers are known to play a decisive role in pivoting the growth and the direction of education.

Numerous studies in the past had related performance in school subjects to a variety of factors. For instance, Ikpe (2014) had informed that an array of factors account for the observed poor performance in chemistry among secondary school students and the researcher mentioned teaching method and teacher competency amongst a number of factors. It is worthy to note that Adeniji (2014) did also reiterate that the implementation and realization of educational policies are very much dependent on the teachers' dedication and commitment to their work. Eberuche (2016) stated that teachers are very important school based factors that have great influence on student's academic performance especially in science subjects such as chemistry. Indeed Nbina (2012) had emphasized the desirability of a very high competence level in teachers for meaningful learning of concepts in chemistry to occur amongst students. Nbina (2012) cited Akpan (2002) as reiterating that as of necessity, the professional chemistry teacher should possess certain competence which should be professional and personal. Professional competences were qualified as been academic and pedagogical. Academic competencies on the one hand

are the teachers' knowledge of his subject whilst the pedagogical competency is about the art of teaching the subject.

Who then is a competent teacher? A competent teacher is one who has impeccable classroom managerial ability and has the capability to deploy an array of teaching aids/instructional materials for teaching, one who can also communicate effectively so as to ensure effectiveness of instruction as well as adopting suitable pedagogies to ensure successful instructional delivery. As defined by Adodo (2014), the phenomenon 'teacher's competence' comprises of; subject content knowledge, teacher's pedagogical skills, classroom communication skills and proper evaluation of instructional objectives. Basically, subject content knowledge has to do with the level of mastery by the teacher of his/her subject area whilst pedagogical skills pertain to the teaching skills employed by the instructor for effective delivery of content. According to Amusan (2016), researchers are of the opinion that teachers competency must be prioritized particularly in secondary schools so as to enhance academic performance. Similarly (Robiyati, Rahayu1, Setiawan&Sudiro, 2019) defined a competent teacher as one who meets with the following criteria for competency: pedagogical competence, personal competence, social competence, and professional competence;

Adediwura and Tayo (2007) defined academic performance as the display of knowledge attained or skills developed in school subjects as manifested by scores as assigned by instructors or obtained from examinations and tests. These, it was further reiterated could be a representation of a student's positioning, scholastically. It could also be said to be an expression used to represent students' scholastic standing. Ikpe (2014) had informed that there was an observed trend of poor performance academically in science subjects including chemistry by students over time. This study sets out to investigate the effect of teacher's competence on student' academic performance in chemistry among students from selected secondary schools in Otukpo metropolis of Benue State in Nigeria.

### **Statement of the problem**

Amie-Ogan &Etuk (2020) are of the view that the primary role of the teacher's is to transmit knowledge and skills. As such there is the need for the teacher to demonstrate efficiency in this primary role. Nwosu (2000) pointed out that there is deficiency and poor academic performance by students in science particularly chemistry and the researcher attributed this to lack of teachers' competence and the unavailability of learning resources in our classrooms. It is worthy to mention that Bello-Osagie and Olugbornila (2017) posted a failure rate of 98% in science subjects for Nigerian secondary school students in the Senior School Certificate Examinations. They further reiterated that most secondary school students dread and show negative attitude towards major science subjects as a result of the incompetence displayed by some teachers

According to Nbina (2012) there is deficiency and poor academic performance by students in science (chemistry) and this it was stated was due to lack of teachers' competence and learning resources in our classrooms. It was pointed out that the current situation is that most of the people engaged to teach chemistry in secondary schools are actually not professional teachers in the field. This according to Nbina (2012) could be one of the reasons for the observed poor performance in the subject. It was asserted that to qualify one as a competent teacher of chemistry, some pertinent question to ponder on are; do I have the academic and professional competencies that will enable me teach the content meaningfully? Secondly, do I have the mastery and skills to properly evaluate the learners? In the light of these, this study sets out to establish the relationship between teachers competence on students' performance in the field of chemistry.

### **Purpose of the Study**

This study sets out to investigate the influence of teacher's competence on students' academic performance in chemistry in some schools in Otukpo, Benue State Nigeria.

### **Hypothesis**

The following null hypothesis was formulated for testing at  $\leq 0.05$  levels of significance.

**HO<sub>1</sub>:** there is no significant relationship between teachers' competence and academic performance of students' in chemistry in some schools in Otukpo.

### **Research Design**

The survey research design was used to carry out this study.

### **Sample and sampling techniques**

The population comprised of all the SS1 chemistry students and teachers as well as principals from 12 secondary schools in the metropolis. A total of 480 chemistry students, 20 chemistry teachers and 12 principals from 12 secondary schools were involved. In the final analysis, a sample of 200 chemistry students drawn from 5 schools using intact classes was used. Furthermore, the researcher selected 5 principals and 20 teachers for the study via the random sampling technique.

### **Instrumentation**

The following instruments were used to collect data for the study, they are; Performance in Chemistry Test (PICT), Teachers Competence Questionnaire (TCQ) and the School Principals Questionnaire (SPQ). The Performance in Chemistry Test consists of a set of twenty (20) multiple choice items designed to test the level of students understanding of the selected concepts in chemistry. The items of the multiple choice question consist of four response options, one of which is the correct answer while the others serve as distracters. The teachers' competence questionnaire TCQ was a 20-item questionnaire measured on a Likert type four point rating scale of Strongly Agree (SA); Agree (A); Disagree (D) & Strongly Disagree (SD). The responses were assigned weights of: 4; 3; 2 & 1. The criteria used for structuring the TCQ are; teacher's resourcefulness, classroom management ability, deployment of various teaching methods for instruction, availability at duty post, and usage of instructional materials for teaching as well as proper evaluation practice. The Teacher Competence Questionnaire (TCQ) was graded using a score range of four (4) for Strongly Agree (SA) to one (1) for Strongly Disagree (SD) for positive items and as for negative items the scoring was reversed. The School Principals Questionnaire (TPQ) was designed to obtain information such as the chemistry

### **Validation**

To ascertain the reliability of the Performance in Chemistry Test (PICT) the Kuder-Richardson formular-21 as recommended by Nbina (2012) was adapted. This yielded a reliability index of 0.74. In the same vein, the reliability of the Teacher Competence Questionnaire (TCQ) was established using Crombach alpha and the results showed a reliability coefficient of 0.82. The School Principals Questionnaire (SPQ) was validated by two senior science educators, and a senior language expert. Feedback from these experts led to the reframing and expunging of ambiguous and inappropriate statements from the instrument. A questionnaire with a total of twenty five (25) items was initially presented to the team of experts for face validation after which only twenty (20) items were eventually retained and used for data collection.

### **Data collection procedure**

Data for this study was collected with the aid of a Performance in Chemistry Test (PICT), Teachers Competence Questionnaire (TCP) and the School Principals Questionnaire (SPQ). Information on the teacher's bio-data was acquired from the responses to SPQ which was dispensed on the principals of the various schools that made up the sample of the study. The PICT and TCQ protocols were administered on the subjects i.e. the students and teachers by the researcher in conjunction with a research assistant each from the selected schools. The respondents were assured that their responses were to generate data strictly for research purpose and they were further assured of the confidentiality of their responses.

## Date analysis

Data collected for the purpose of this study was analysed based on the research hypothesis formulated using the Pearson Product Moment Correlation (PPMC) statistics. The hypothesis was tested at the 0.05 level of significance.

## Results

### Hypothesis One

There is no significant relationship between teachers' competence and students' academic performance in chemistry. The result of the analysis is shown in Table 1.

**Table 1:** Pearson Product Moment Correlation analysis of teachers' competence and students' performance in Chemistry

Variable	N	$\Sigma x \Sigma y$	$\Sigma x^2 \Sigma y^2$	$\Sigma xy$	r	Df	t-cat	t-crit	Decision
Teachers Competence (x)	200	12964	1007260	976873	0.96	198	48.25	1.96	at p=.05
Students performance (Y)	200	13402	1071728						

P<.05 level of significance

The result in Table 1 reveals that the calculated t-value of 48.25 is greater than the critical t value of 1.96 at p<.05 alpha level. Therefore, the null hypothesis is rejected. This implies that there is a significant relationship between teachers' competence and students' academic performance in chemistry.

### Discussion

Based on the performance of the students academically and the responses to the Teachers Competence Questionnaire (TCQ), the data generated for this study was statistically analysed. Findings of the study reveal that there is a significant relationship between teachers' competence and academic performance of chemistry students in some secondary schools in Otukpo. This is in agreement with the findings of Nbina (2012) who had investigated the relationship between teachers' competence and academic performance of secondary school students in Tai Local Government Area of Rivers State. Nbina (2012) further informed that the observed result might be due to the fact that the teachers' intellectual competence is a major factor in determining the quality of learning acquired by students in schools. It therefore stands that a competent teacher should possess those sterling qualities that would be capable of inspiring learners to develop those hidden capabilities and innate tendencies which will ultimately augur well for high academic performance. The study, according to Nbina (2012) actually concurs with the revelations of Ivowi (1986) and Inyang (1997) who had reported after some investigations that there is a significant relationship between teachers' competence and academic performance.

Ebereuche (2016) in a study involving some secondary school students in Surulere Local Government Area of Lagos, Nigeria found out that there was a significant relationship existing between teachers competence and academic achievement in Physics .So also, the finding is in agreement with that of a study carried out by Amie-Ogan and Friday (2020) who investigated the influence of teachers'

competence on students' academic performance in public secondary schools in IkotEkpene and EssienUdum Local Government Areas of Akwa Ibom State, Nigeria. Their study established that teacher's subject content knowledge and pedagogical skills influence students' academic performance in public senior secondary schools. Earlier, Podungge, Rahayu, Setiawan and Sudiro (2019) posted a similar finding after investigating the relationship between teachers' competence and students' academic achievement in Gorontalo city, Singapore.

This study aims at investigating the relationship between teacher competence and student academic achievement mediated by both intrinsic and extrinsic motivations. The respondents of this study are 115 high-school students in Gorontalo city, to whom questionnaires were distributed to acquire data, which was analyzed using path analysis in Smart PLS. The results of the analysis indicate that teacher's competence does not influence the extrinsic motivation of students to study. However, teacher competence directly influences student's academic achievement because it raises the intrinsic motivation of students to study. In addition, intrinsic motivation mediates the effect of teaching.

The findings in hypothesis one showed that there is a significant relationship between teachers' competence and students' academic performance in chemistry. This might be due to the fact that the intellectual competence of the teacher is a primary asset in the quality of learning the students acquire in schools. A chemistry teacher competent in his work possessing the qualities which enable him to inspire and develop the latent capacities of his students would automatically contribute immensely to the high academic performance of the students in chemistry. Also teachers' competence in terms of resourcefulness, effective teaching skills and good evaluation enhance students' performance. This is in line with the finding of Ivowi (1986) that there is significant relationship between teachers' competence and students' performance. This is also in agreement with the findings of Inyang (1997), that teaching is effective when the teacher makes use of instructional materials.

Anang and John (2015) also supported the findings in their result which showed that there was a low significant relationship between teachers' personality profile and students' academic achievement in physics. It was recommended amongst others that government should organize seminars and workshops for teachers in their employ to sensitize them on the need to exhibit unique qualities and display acceptable behaviour while interacting with students in and outside the classroom.

## Conclusion

Based on the findings of the study, it was concluded that there is a significant relationship between teachers' competence and academic performance in chemistry amongst secondary school students in Oturopolis metropolis of Benue State, Nigeria.

## Recommendations

Based on the findings from the study, the following recommendations were made:

- It is recommended that government should endeavour to ensure that teachers recruited to impart knowledge on secondary school students are not only competent but qualified. The government should also endeavour to ensure that teachers in their employ participate in subject panels in conferences, seminars and workshops. This will keep them informed about new developments in their field.
- Similarly, ministries of education at both state and federal level should facilitate participation of teachers in seminars, workshop, conferences and in-service training programmes.
- It was also recommended that schools should engage qualified teachers for imparting knowledge to students of chemistry.

## References

- Adediwura, A.A. and Tayo, B. (2007). Perception of teachers' knowledge, attitude and teaching skills as predictor of academic performance in Nigerian secondary schools. *Educational Research and Review Vol. 2 (7), pp. 165-171*,
- Adeniji, K. A. (2014). Motivational teaching strategies towards improving learning of mathematics at primary and secondary school level. *Abacus, 39(1), 344-35*

- Adodo S. O. (2014). School teachers' competency in evaluating students cognitive and psychomotor achievement in basic science and technology. *Journal of emerging trends in educational research and policy studies* 5(3), 48-53
- Akpan, B. B., (2002). Basic concepts in educational psychology. Uyo: Academic Publishers Ltd.
- Amie-Ogan, O. T. and Etuk E. F. (2020). Influence of teachers' competence on students' academic performance in public senior secondary schools In Ikot Ekpene and Essien Udim Local Government Areas of Akwalbom State. *International Journal of Innovative Social Sciences & Humanities Research* 8(4), 118-128.
- Eberechukwu C. M. (2016). The effect of teachers' competence on students' academic achievement in physics: a study of some selected schools in Surulere Local Government Area of Lagos State.
- Nbina, J. B. (2012). Teachers' competence and students' academic performance in senior secondary schools chemistry: Is there any relationship? *Journal of Educational Research* 11(1).
- Nwosu, A. A., (2000). Students task involvement and achievement in process oriented science activities in process oriented science activities. *Journal of Science Education* (70): 61-67.
- Ikpe, A. (2014) Effects of e-Learning Instructional Strategy on Academic Achievement, Retention and Attitude of Chemistry Students of Different Age Groups at the National Open University of Nigeria. An Unpublished PhD Dissertation, Faculty of Education, Ahmadu Bello University, Samaru-Zaria.
- Iyaboyi M., Muftau O. (2014). An assessment of human capital development in Nigeria through the lens of Education. *International letters of social Humanities Science* 35:1-14.
- Podunge, R.; Rahayu, M.; Margono S and M, and Sudiro, A. (2019). Teacher Competence and Student Academic Achievement. *Advances in Economics, Business and Management Research*, 144. 23rd Asian Forum of Business Education (AFBE).
- Anang, M. K. P. and John. T (2015) Personality Profile of Teachers and Their Students Performance in Post Basic Modern Physics *International Multidisciplinary Journal Ethiopia* 9(1)159-168