

# FACTORS AFFECTING TEACHERS EFFECTIVENESS IN TEACHING CHEMISTRY IN SECONDARY SCHOOL IN ONITSHA URBAN OF ANAMBRA STATE, NIGERIA

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## Abstract

*The study examined the factors affecting teachers' effectiveness in teaching chemistry in Secondary School in Onitsha Urban, Anambra State. Descriptive survey research design was used for the study. The study was guided by two (2) research questions. The population of the study consisted of all the 35 chemistry teachers in twenty-two public secondary schools in Onitsha urban, Anambra state. There was no sampling because the population is small. The instrument for data collection was a forty (40)-item questionnaire developed by the researcher and sub-headed 'Factors affecting Teachers' Effectiveness in Teaching Chemistry' (FATETC). The validity of the instrument was established by two lecturers in the Department of Science Education and expert in measurement and evaluation, Department of education foundation all in Nnamdi Azikiwe University Awka. The reliability index of 0.82 was obtained using Cronbach alpha statistics. Data were analysed using mean and standard deviation. The mean of 2.50 and above indicated agreement while below 2.50 indicated disagreement. The findings revealed among others that poor equipped laboratories, qualification of chemistry teachers, poor incentive to science teachers, inadequate good and current chemistry textbooks in school libraries, inability for the school administrators to make provision for fieldtrips and excursions, lack of technical knowhow in handling some science equipments and inadequate chemistry teachers in secondary schools are factors that affect teachers effectiveness in teaching Chemistry. Based on the findings, the researchers recommended among others that qualified teachers with specialization in chemistry should be allowed to teach the subject, adequate and well equipped laboratories should be provided in secondary schools for sound practical activities and Secondary school library should be equipped with good and current chemistry textbooks.*

**Keywords:** Teachers' Effectiveness, Secondary School, Chemistry

## Introduction

Chemistry is one of the science subjects which secondary school students must offer for them to be specialties in any of the science related discipline such as Medicine, Engineering, Pharmacy, Nursing etc. Chemistry is the study of matters and energy and the relationship that exists between them. Ngawang and Norbu (2021) opined that chemistry is a branch of science that is rational and mathematical where some measures and controlled inputs lead to some predictable output (learning things 2014). Chemistry has

gained worldwide recognition because of its importance in the general education of the youth. The knowledge of chemistry has to some extent placed and still placing food on the table of a common man due to its application in the production of many goods like laundry items, textile materials, cosmetics etc. A country's technological development is primarily rooted on the expertise in handling science related subjects in the grass root of their education system.

Chemistry has been identified as a very essential subject as it is important in scientific and technological development of the nation. Burmeister et al, 2012 is of the view that the field of chemistry, science and technology are related to the economic heart of every developed, industrialized and technologically advanced society. The teaching and learning of chemistry as in the case of other science subjects has tremendous roles towards technological development in a developing country. Chemistry is everything; the food we eat is chemistry. The air we breathe is chemistry; the water and wine we drink are all chemistry; our body response to both internal and external stimuli is equally chemistry. At this point, one could ask: how is the performance of the students in the subject?

In spite of its importance, students often shy away from offering the subject because of its abstract nature which contributes to their poor performance. They attribute offering of science subjects to only the 'intelligent ones'. Nevertheless, teachers' negative perception of the learners ability, unavailability of chemistry laboratories, limited time for practical activities, lack of in-service training, teaching methods/strategies among others make the subject very difficult by the teacher to teach for better understanding on the part of the students in the subject. In educational system, teachers' role cannot be overemphasized. They are the engineers of education and the channel through which academic activities reach the beneficiaries.

The most important factor in improving the classroom interaction which decides the performance of the students in the subject is the teacher (Ngawang and Norbu, 2021). According to Barineka (2012), teaching problems have been the contributing factors towards the widespread poor performance and negative attitudes of students towards the subject. Student who hates a teacher because of one thing or the other invariably hates his/her subjects. Teachers teaching approach contributes a lot in the internalization of the subject matter by the learners. Edomwonyi-out (2011) stated the following as the problems facing teaching of chemistry: inadequate laboratories, non-professionalism and environmental. A teacher who is able to surmount the above problems facing the teaching of chemistry is an effective teacher.

An effective teacher is one who shows a deep understanding of curriculum of subject in question. He/she plans, teaches and assesses to promote mastery for all students. Effective teacher provides high quality instruction to increase students achievement by providing research-base instruction filled with technology integration (<https://www.lee.k12.al.us/page>). According to Georgetown University (nd), expertise in academic field is not the only skill needed for teachings to be effective. Effective teaching leads to cordial interaction with the learners thereby helping them to understand a new way of looking at the world. An effective teacher is patient with her students and be able to assess herself on a regular basis. She adjusts her teaching strategies considering the

learners factors and availability of materials. An effective teacher is a role model who set the tone for the class. She puts on a positive attitude by motivating the students to desire to learn. She prepares her lesson, organises her teaching sequentially, and makes a complex idea very clear through the use of different teaching techniques. An effective teacher adopts active learning strategies to make his class active hence enable the students to be actively involved in the teaching –learning processes. An effective teacher is patient and fair with his students. She is equally internet/technologically sound since novel information is mostly assessed in the net through technological gadget. Effectiveness of a teacher is not in the teacher him/herself but in the products of his/her teaching- the students. A sound chemistry student is a product of an effective chemistry teacher.

Effective chemistry teacher according to Bluefield University (2021) is the one who possesses strong combination of passion, skills, knowledge and experience in the subject. The teacher must first of all get Chemistry Education Degree which gives the foundation to teach students and feel confident in the subject matter. A chemistry teacher teaches with passion by approaching each lesson with enthusiasm and letting the students know why chemistry is exciting. He/she should equally recognise and admit the fact that many chemistry topics are abstract and so derive the means to make them more concrete and relatable by connecting classroom experience with their real world. For instance, changes in the states of matter can be connected to their daily boiling of water in their various homes. In the research carried out on factors influencing the effectiveness of teaching chemistry in senior secondary school in Nkwere Local Govt. Area of Imo State, the result of the research shows that negative attitude of students towards learning chemistry, lack of modern laboratories, lack of workshop by the chemistry teachers among others are some of the factors influencing effectiveness of teaching of chemistry in secondary schools (Samphina Academy,2023). Effective chemistry teacher resorts to practical activities and gets the students involved.

One area that requires urgent reforms in chemistry is the practical, where it is important to rethink the role and place of chemistry practical in the teaching and learning of chemistry. Practical aspect of chemistry seems to have died natural death in some of our secondary schools today due to some circumstances. Ejidike and Oyelana (2015) opined that the availability of laboratory equipment, chemicals and materials, laboratory personal, safety measures, substantial recommended textbooks, accurate period allocation among others leads to effective teaching of chemistry. Many schools do not have laboratories or a functional laboratory and so the teachers are incapacitated in carrying out practical activities with their students. Some teachers equally are not at home in handling some equipment during practical activities and so resort to chalk and board teaching of chemistry. Chemistry practical can be fun and at the same time dangerous, good chemistry teachers therefore prioritize safety. They make complex topics simpler by breaking down the topics into smaller and more digestible chunk. Chemistry teachers in the verge to be good and effective in carrying out their duty face lots of challenges which sometimes make them ineffective in discharging their duties. Ineffective teaching of chemistry contributes to a greater extent the poor performance of the students in the subject. Students lack interest and are very reluctant in attending the class. The researcher therefore resorts to identify the

factors affecting teachers' effectiveness in teaching chemistry in Onitsha urban (Onitsha North and South LGA) of Anambra State.

### **Purpose of Study**

The purpose of this study is to determine the factors affecting teachers' effectiveness in teaching chemistry in Onitsha urban of Anambra State. The study specifically sort to

- i. Identify the factors affecting teachers' effectiveness in teaching of chemistry
- ii. Determine the possible solutions to the factors affecting teachers' effectiveness in teaching chemistry.

### **Research Questions**

The following research questions guided the study

- i. What are the factors affecting teachers' effectiveness in teaching of chemistry in secondary school?
- ii. What are the possible solutions to the factors affecting teachers' effectiveness in teaching chemistry in secondary school?

### **Methods**

A descriptive survey research design was employed in the study. The population of the study consisted of all the 35 chemistry teachers in twenty-two public secondary schools in Onitsha urban, Anambra state. There was no sampling because the population is small. The instrument for data collection was a forty (40)-item questionnaire developed by the researcher and sub-headed 'Factors affecting Teachers' Effectiveness in Teaching Chemistry' (FATETC). FATETC is divided into two parts, A and B. Part A comprises of information on the personal data of the teachers used for the study while part B has questions in which the respondents are required to indicate their level of agreement or disagreement on the factors affecting teachers' effectiveness in teaching Chemistry.

The instrument was validated by two experts in the department of science Education (chemistry option) and in the measurement and evaluation. Their corrections and inputs were accepted and this led to the modification of some items before the final production of the instrument. Internal consistency of the items was established using Cronbach alpha technique which gave a coefficient of 0.82 which is a welcome score for the study.

The research adopted the 4-point rating scale of strong Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) to analyse data obtained from the respondents. These have the values of 4,3,2,1 respectively. 40 copies of the questionnaire were distributed and collected on the spot with the help of five research assistants; the data generated was analysed using mean and standard deviation. The criterion mean was placed at 2.5 [  $(4+3+2+1)/4 = 10/4 = 2.5$  ]. Therefore, any mean score of 2.5 and above indicated agreement and any mean score below 2.50 was regarded as disagreement.

## Results

Results are presented in tables according to research questions

### Research Question One

What are the factors affecting teachers' effectiveness in teaching of chemistry in secondary School?

**Table 1: Mean Rating and Standard Deviation Scores of Respondent on the factors affecting teachers' effectiveness in teaching of Chemistry.**

| S/N | ITEMS   | X    | SD   | DECISION |
|-----|---|------|------|----------|
| 1.  | Qualification of chemistry teachers affects their effectiveness in handling the subject   | 3.26 | 0.95 | AGREE    |
| 2   | poor incentive to the science teachers hinders them from teaching effectively   | 3.20 | 0.76 | AGREE    |
| 3   | Teachers' inability to source for firsthand information from the internet makes their teaching ineffective.   | 2.94 | 0.84 | AGREE    |
| 4   | Poorly equipped laboratories affects the teachers effectiveness in teaching   | 3.71 | 0.62 | AGREE    |
| 5   | Chemistry teachers are not sponsored to attend conferences and seminars   | 3.17 | 0.66 | AGREE    |
| 6   | Lack of interest on the part of the students discourages the teachers from teaching effectively   | 2.97 | 0.82 | AGREE    |
| 7   | Chemistry teachers lack technical know-how in handling some laboratory equipments   | 2.60 | 0.69 | AGREE    |
| 8   | Lack of Team teaching in our secondary schools contributes to ineffective teaching of Chemistry   | 2.60 | 0.98 | AGREE    |
| 9   | Teachers handling the subject do not specialize in chemistry education  | 2.42 | 0.92 | DISAGREE |
| 10  | Teachers inability to improvise instructional materials hinders effective lesson content delivery   | 2.82 | 0.71 | AGREE    |
| 11  | The time allotted to Chemistry practical is too short for the teacher to effectively teach the subject.   | 3.34 | 0.64 | AGREE    |
| 12  | Teachers lack of innovative instructional materials like projectors, slides etc makes their teaching ineffective  | 3.0  | 0.85 | AGREE    |
| 13  | Teachers dependent on given support to students to indulge in examination malpractice during external examinations deterred them from teaching effectively. | 2.28 | 0.99 | DISAGREE |
| 14  | Inadequate good and current Chemistry textbooks in our school library contributes to ineffective teaching of the subject                                    | 3.06 | 0.91 | AGREE    |

|                     |  |             |             |              |
|---------------------|--|-------------|-------------|--------------|
| 15                  | Teachers do not employ learner- centered teaching strategies in Chemistry classroom  | 2.45        | 0.98        | DIAGREE      |
| 16                  | Chemistry curriculum is too broad for the teachers.  | 2.28        | 0.83        | DISAGREE     |
| 17                  | School Administrators' do not make provisions for fieldtrips and excursions for effective Chemistry teaching.  | 3.4         | 0.51        | AGREE        |
| 18                  | Lack of Chemistry laboratory discourages the teachers from teaching effectively.   | 3.48        | 0.74        | AGREE        |
| 9                   | Poor salary scale from the government pushes chemistry teachers to indulge in alternative businesses to argument their monthly income thereby distracting them from carrying their primary duty of teaching effectively. | 3.54        | 0.74        | AGREE        |
| 20                  | The number of Chemistry teachers in our secondary schools is inadequate to handle the subject effectively.   | 3.54        | 0.70        | AGREE        |
| <b>Cluster Mean</b> |  | <b>3.01</b> | <b>0.27</b> | <b>AGREE</b> |

Results in table 1 indicate that the items 1,2,3,4,5,6,7,8,10,11,12,14,17,18,19,and 20 with mean value above 2.5 were accepted by the respondents as factors affecting teachers' effectiveness in teaching of chemistry in Onitsha urban, Anambra State. Item 9, 13, 15 and 16 with mean value below 2.5 were rejected as factors affecting teachers' effectiveness in teaching of chemistry. The cluster mean of 3.01 and standard deviation score of 0.27 showed that the teachers agreed with most of the factors affecting teachers' effectiveness in teaching of chemistry in Onitsha urban, Anambra State.

### Research Question Two

What are the possible solutions to the factors affecting teachers' effectiveness in teaching Chemistry in secondary schools

**Table 2: Mean Rating and Standard Deviation Scores of respondents on possible solutions to the factors affecting teachers' effectiveness in teaching Chemistry**

| S/N | ITEM   | X    | SD   | DECISION |
|-----|--|------|------|----------|
| 1.  | Qualified chemistry teachers should be employed  | 3.89 | 0.32 | AGREE    |
| 2   | Improvement in the condition of service for chemistry teachers                                     | 3.66 | 0.54 | AGREE    |
| 3   | Teachers' should be trained in the use of internet to source for novel information.                | 3.46 | 0.61 | AGREE    |
| 4   | Provision of adequate laboratories for chemistry teaching and practical activities.                | 3.69 | 0.47 | AGREE    |
| 5   | Sponsoring of Chemistry teachers for conferences, seminars and workshops by the school management. | 3.57 | 0.47 | AGREE    |

|              |   |      |      |        |
|--------------|---|------|------|--------|
| 6            | Parents and school authorities should guide their children/wards in choosing of their future carrier          | 3.34 | 0.54 | AGREE  |
| 7            | In-service training on handling of some scientific equipment for Chemistry teachers                           | 3.60 | 0.50 | AGREE  |
| 8            | Introduction of Team teaching in our secondary school   | 3.20 | 0.53 | AGREE  |
| 9            | Only the teachers with specialization in Chemistry should be allowed to teach the subject.                    | 3.62 | 0.69 | AGREE  |
| 10           | Improvisation of Chemistry instructional materials aids effective teaching of the subject.                    | 3.49 | 0.51 | AGREE  |
| 11           | Adequate time should be allotted to the chemistry practical.  | 3.54 | 0.51 | AGREE  |
| 12           | Introduction of electronic gadget like projector, slides etc in teaching and learning of chemistry            | 3.40 | 0.49 | AGREE  |
| 13           | Teachers are to discourage their students from indulging in examination malpractice..                         | 3.66 | 0.48 | AGREE2 |
| 14           | Adequate good and current Chemistry textbooks should be made available in the school library.                 | 3.54 | 0.51 | AGREE  |
| 15           | Learner-centered teaching pedagogy should be used in the Chemistry classrooms.                                | 3.40 | 0.51 | AGREE  |
| 16           | Chemistry curriculum should be reviewed   | 3.31 | 0.58 | AGREE  |
| 17           | School Administrators' should make provisions for fieldtrips and excursions for effective Chemistry teaching. | 3.34 | 0.48 | AGREE  |
| 18           | Every school should provide Laboratory for the practical activities   | 3.71 | 0.46 | AGREE  |
| 19           | The salary scale of the teachers should be reviewed and upgraded  | 3.80 | 0.41 | AGREE  |
| 20           | Government should recruit more Chemistry teachers.  | 3.66 | 0.48 | AGREE  |
| Cluster Mean |   | 3.54 | 0.27 | AGREE  |

The result from table 2 indicates that the entire item has mean score above 2.5 and so were all accepted as the possible solutions to the factors affecting teachers' effectiveness in teaching Chemistry. The cluster mean and standard deviation of 3.54 and 0.27 respectively indicates that all the teachers strongly agreed that the all the items in table 2 are solutions to the factors affecting teachers effectiveness in teaching of chemistry in Onitsha urban secondary schools.

## Discussion

The result from table 1 above indicates that qualification of chemistry teachers, poor incentive to science teachers, teachers' inability to source for firsthand information, poor equipped laboratories, inability to attend conferences and seminars by the chemistry teachers, lack of interest on the part of chemistry students, lack of technical knowhow in

handling some science equipment, lack of team teaching,, inability of the chemistry teachers to improvise for teaching, limited time allocation for chemistry practical, lack of use of innovative instructional materials like projectors, slides etc in the class, inadequate good and current chemistry textbooks in school libraries, inability for the school administrators to make provision for fieldtrips and excursions, lack of chemistry laboratories, poor salary scale of the teachers, inadequate chemistry teachers in secondary schools were indicated by most of the respondents as factors affecting teachers' effectiveness in teaching chemistry. The above findings is in line with findings of Samphina Academy (2023) who identified negative attitude of students towards learning chemistry, lack of modern laboratories, lack of workshop by the chemistry teachers among others as some of the factors influencing effectiveness of teaching of chemistry in secondary schools. The findings of the study concerning the attitude of the chemistry student towards effective teaching corresponds to that of Pyatt and Sims(2012) who identified that success or failure in academic pursuit depends to a great extent on the interest or attitude of the learners involved.

Results from table 2 depict that the respondents agreed that there are many possible solutions towards effective teaching of chemistry. These include employing qualified chemistry teachers to handle the subject in secondary schools, training of teachers in the use of internet for sourcing of novel and firsthand information, provision adequate laboratories for practical activities, sponsoring chemistry teachers for conferences and workshops, introduction of team teaching in secondary schools, allotting adequate time for chemistry practical, introduction of electronic gadgets in schools, equipping the school library with current and good chemistry textbooks, provision for field trips/excursions, review / upgrade the salary scale of chemistry teachers and recruitment of more chemistry teachers in secondary schools .

### **Conclusion**

The study investigated on Factors Affecting Teachers' Effectiveness in teaching Chemistry in secondary schools in Onitsha urban, Anambra state. Many factors were identified as factors that hinder effective teaching of chemistry in secondary school. The researcher equally investigated on the possible solutions to the identified problems.

### **Recommendations**

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

1. Qualified teachers with specialization in chemistry should be allowed to teach the subject. This is one of the bases that help in achieving effective teaching and learning.
2. There should be improvement in the condition of service of chemistry teachers in secondary school. Government should encourage and motivate the teachers by looking with some considerations into their monthly salaries. This will reduce distractions of engaging into some other businesses that will enable the two ends to meet.
3. Adequate and well equipped laboratories should be provided in secondary schools for sound practical activities. Practical enable the teachers to make some abstract chemistry topics to be concrete.



4. Chemistry teachers should be sponsored for conferences, workshop, seminars and other in-service training at least once or twice a year. This will to a greater extent update their knowledge and makes them to be away of the current innovations like handling of some scientific equipment and using electronic gadget in teaching and learning of the subject.
5. Secondary school library should be equipped with good and current chemistry textbooks for both the teachers and students for effective teaching and learning.
6. Chemistry teachers are encouraged to use learner-centered pedagogy in the classrooms and laboratories. They should consider the interest of the learners in planning their lessons.
7. Teachers should discourage their students directly and indirectly from engaging in any form of examination malpractice which seems to be the order of the day in Senior School Certificate examinations nowadays.

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