Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.6, No.27, 2015


# Levels of Possession of Science Process Skills by Final Year Students of Colleges of Education in South-Eastern States of Nigeria

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**Abstract**
This study investigated the levels of possession of science process skills by final year Nigerian Certificate in Education (NCE) Students in colleges of Education in South-Eastern States of Nigeria. The skills that were assessed were observation, experimentation, measurement, communication, and inference. The research was guided by five research questions and one hypothesis. The research adopted the descriptive survey design. A sample of 200 out of 1000 final year NCE students who studied Biology, Chemistry, Physics and Integrated science in the 2013/2014 academic session were used for the study. The instruments for data collection consisted of a set of practical instructions called science process skills Tests (SPST) and a 28-item Assessment format for science process skills (AFSPS), both instrument were developed by the researcher and validated by 3 experts. AFSPS was an instrument based on 4-point Likert scale of very low, low, high and very high. It was used in rating of the respondent's levels of possession of the skills. The instruments were face validated and in addition, AFSPS had reliability co-efficient of 0.75 determined by using the Cronbach Alpha statistics. The researcher rated the students' level of possession of the skills using AFSPS while the students were carrying out the activities using SPST. Mean and standard deviation were used to answer the research questions and t-test was used to test the hypothesis. The results indicated among others, high level possession of observation, experimentation and measurement skills and low level possession of communication and inference skills by the respondents and gender-related significant difference in level of possession of the skills. Based on the findings, it was recommended that teacher-trainers should emphasize more on skills acquisition. The Federal and states ministries of Education should employed qualified and trained personnel into the teaching profession; they should also provide adequate and well equipped science Laboratories to facilitate the production of N.C.E. Science Teachers with high level knowledge in science process skills.

## Introduction

Education is one of the basic instruments used for the transmission of societal values to the younger generation, Padilla (2004). Every community or Nation tries to transmit its ideals, values, culture and norms to their citizens through education. Development of any nation both in Science, Industrialization and Advancement in knowledge in other areas of human endeavour cannot be achieved without education. It follows therefore, that sustainable growth and development can only be ensured on the bedrock of effective and efficient education system. It is for this reason that curricula contents and intended learning outcomes of education are geared towards solving national problems. Okonkwo (2009) observed that the choice of the subject to be taught and the contents of such subject in the curricula are usually driven by the needs of the nation concerned.

The use of science, technology and productivity are often used to describe the level of development of nations. This implies that no nation can make appreciable progress in terms of development without correct scientific base. Okoli (2006) stated that whatever plans that are made towards national development must include Science Education as an integral part of the school curriculum. Federal Ministry of science and Technology, Nigeria (1986) defined science as objective knowledge about nature, properties and behaviour of the physical world. Omiko (2007) defined science as the way of knowing the facts, theories and what exists in the natural environment. He further stated that specialists in science discipline are always trained in a lot of scientific concepts, skills, facts and theories. Igwe (2003) observed that science is a process and body of knowledge that has utility. UNESCO as cited by Kazeni (2005) sees science as an interconnected series of concepts and conceptual schemes that have developed as a result of experimentation and observations.

Experimentation and observation are key activities in the study of science, hence the necessary components of teaching, learning and practice of science. Omiko (2007) observed that experimentation and observation skills are not all that required in science, they are only fundamental; another implication of the definition is that science is not only about a body of facts, skills and theories, the method of acquisition of scientific skills is a major component of the concept of science. Knowledge obtained through any process is always attractive and worth while in so far as it would serve as a solution to man's problem. In line with this therefore, science is a process through which man obtain testable (Verifiable) knowledge of the physical world and utilizes the knowledge to solve human problems. To this extent, science has been organized in this nature as knowledge, process and product.

Nigeria as a nation and indeed African continent as a whole has since risen to the challenges of development through Science Education on the basis of policies, curricular contents and setting of Educational objectives. The National Policy on Education in Nigeria, set as a goal for science Education in Nigeria that "Government shall popularize the study of science and production of adequate number of scientists to inspire and support National Development" (FRN, 2004:28). The expected impacts of science on the National Psyche and dynamism of state function were highlighted in the National Policy on science and technology (1986). According to the policy, the aims of science and technology education is to inculcate science and technology in the thinking and working processes of the society in order to create science and technology culture". This emphasis by the Federal Government of Nigeria is due to the expected outcome of science Education programmes. Enebechi (2008) advanced the following as reasons for the study of science;

a. Its potential to improve the living conditions of man and his value orientations.

b. Its ability to help the citizenry make informed choices in many areas of public and private life which science now centres. He listed four (4) aims which were given by the Association of Science Education (ASE) of America for Science Education, they are;

1. The acquisition of knowledge and understanding of a range of scientific concepts, generalizations, principles, and law through the systematic study and experience of aspect of a body of knowledge called science.
2. The acquisition of range of cognitive and psychomotor skills and processes as a result of direct involvement in scientific activities and procedure in the laboratory and field.
3. The utilization of scientific knowledge and process in pursuit of further knowledge and deeper understanding; the development of the ability to function autonomously and objectively in an area of science studies to solve practical problems and communicate experiences to others; work together with some understanding of how it complements and contrasts with other perspectives and way of organizing knowledge and inquiry.
4. The attainment of basic understanding of the nature of advanced technological societies, the interaction between science and society, and the contributions of science makes to culture and realization that scientific knowledge and experience is of some value in the process of establishing a sense of personal and social identity.

The American Association for Advancement of Science (AAAS) did the pioneer work on identification of activities that constitute science process skills (Kazeni, 2005), AAAS identified fourteen (14) activities that constitute science process skills. These activities are classified into two (2) categories based on operational difficulties and intellectual demands. These categories with their component skills are the basic science process skills, include; observing, measuring, inferring, classifying, predicting, and communication and the Integrated science process skills, include; formulating hypotheses, identifying variables, defining variables operationally, designing investigations, experimenting, analyzing data, indicating causes and effect relationship and formulating variables/models. Over the years, authors and researchers have made various modifications of the list of the skills (Enebechi, 2008). However, the list by AAAS still remains comprehensive in its form. The Nigerian Educational Research and Development Council (NERDC) had in 1992 recognized and adapted the skills.

Literature has shown that the acquisition of the science skills is crucial to the development of scientific culture by the learners and for the development of the society. (Federal Ministry of Education, FME, 2000, Okoli, 2001, Omotayo and Yusuf, 2002, Nwosu, 2003, FRN, 2004 and Nweke 2015. Science process enables the learners to develop and retain, cognitive, affective and psychomotor aspects of scientific study which will in turn enable them study and practice science as part of human culture.

However, contrary to the stated objectives of Science Education in Nigeria and the National aspirations of Nigerian Government, several research reports spanning over decade, (Okoli, 2001, Nwagbo, 2001, Omotayo and Yusuf 2002, Okoli 2005 and Nweke 2015) are consistent that students achieve poorly in Secondary School Science subjects. Similarly, statistics from the West African Examination Council (2013,2014 and 2015) (WEAC) reports, and the National examination Council (NECO, June/July, 2013, 2014 and 2015) on students performances in the sciences, (Biology, Chemistry, Physics And Mathematics) converge on the fact that students record very poor performance in the Senior Secondary School Certificate Examination.

This trend poses a lot of concern which ought to be addressed if Nigeria and indeed African continent is to grow appreciably in the area of science and technology. According to Nweke (2015) not much has been done to provide specific instructional and assessment programmes to facilitate the development of science process skills both at the primary and secondary school levels and by the central examining bodies like WAEC.

Assessment of possession of science process skill has so far been intrinsic in nature in relation to other facts of the contents of science subject domains. WAEC Chief Examiner's Reports (2014) show that the poor performance in these science subjects are largely due to poor performances in practical aspects of science. Omiko (2013) and Nweke (2015) were of the same opinion when they observed that poor performance in practical work is synonymous with poor performance in science process skills.

Generally, senior secondary school certificate examination (SSCE) candidates show weakness in questions involving the application of acquired science process skills. Observations by several researchers, (Okonkwo, 2009; Omiko, 2014 and Nweke, 2015) show similar trends in the primary school basic science and technology and basic science at the junior secondary school (JSS) level. Many factors have been adduced for the poor performance among which is the teacher's competence. The extent to which the students are able to develop science process skills depend largely on the competence of the teacher.

The Federal Republic of Nigeria (FRN, 2004) states that the minimum-qualification for teaching in Nigerian schools should be the Nigeria certificate in Education (NCE). This implies that the holders of the NCE in the science discipline are to teach basic science and science at the Universal Basic Education (UBE) level or at the JSS level. Based on this, it is important to access the level trainee-teachers possess science process skills.

**Purpose of the Study**

The main purpose of this study was to determine the level of possession of each science process skill by the final year students of Colleges of Education on Biology, Chemistry, Physics and integrated science and whether the level of possession of science process skills-depend on gender. Specifically the study sought to determine;

1. The level of possession of observation skill by final year Nigeria Certificate of Education (NCE) on biology, chemistry, physics and Integrated Science Students.
2. The level of possession of experimentation skills by final year NCE students of Biology, chemistry, physics and Integrated Science.
3. The level final year NCE students of biology, chemistry, physics and integrated science possess the measurement skills.
4. The level of possession of Communication skills by final year NCE students of Biology, Chemistry, Physics and integrated science
5. The level of possession of inference skill by final N.C.E students of Biology, Chemistry, Physics and Integrated Science.
6. Whether the level of possession of science process skills by final year N.C.E Biology, Chemistry, Physics and Integrated science students is based on gender.

**Scope of the Study**

The study focused on the Science Process Skills expected to be demonstrated by the final year N.C.E students of Biology, Chemistry, Physics and Integrated science. The skills selected for the study were observation, experimentation, measurement, communication and Inference: These skills were chosen because their relevance to the hands-on-teaching and learning of science at the level of Education where the N.C.E teachers were being prepared to teach. The skills were drawn from the National Commission for Colleges of Education Minimum Standard Hand Book.

The subjects (respondents) for the study were drawn from the final year NCE students trained in Biology, Chemistry, Physics and Integrated science courses from Colleges of Education in the South-Eastern part of Nigeria. The choice of the respondents was because students of these science subjects constitute the bulk of science students at the NCE level and they form the greater percentage of science teachers in the basic and post-basic levels of Education.

**Research Questions**

The following research questions guided the study.

1. What is the level of possession of observation skills do final year NCE students of Biology, Chemistry and Integrated Science have?
2. To what level do NCE final year students of Biology, chemistry, physics and integrated science possess the experimentation skills?
3. What is the level of possession of measurement skill by final year NCE students of Biology, Chemistry, Physics and Integrated science?
4. To what extent do NCE final year students of Biology, Chemistry, Physics and Integrated Science subjects possess the communication skills?
5. What is the level of inference skills possessed by final year NCE students of Biology, chemistry, Physics and integrated science subjects?

**Hypothesis**

The following null hypothesis guided the study.

$Ho_1$ There is no significant difference between the mean rating of male and female students on the level of possession of science process skills by final year NCE Biology, Chemistry, Physics and Integrated science students.

**Design of the study**

The research design used for the study was descriptive survey design. A descriptive research design seeks to describe the what, how, or why something is happening. A survey research design was described by Ali

(2006) as a descriptive study which uses sample of an investigation to document, describe and explain what is in existent or non-existent on the present status of phenomena being investigated. The survey research design was suitable for this study because data were collected from the final year students studying science subjects in the Colleges of Education in the South Eastern states of Nigeria. This research was in line with this as it sought to find the respondents level of possession of the skills. In this research, the respondents were required to answer the questions on the questionnaire and their responses were rated. The research sought to find out the extent that respondents could perform the tasks (exhibit science process skills). The level of performance was rated according to how well the skill was exhibited.

**Population of the Study**

The population of the study was 1000 final year NCE students who studied biology, chemistry, physics and integrated science subjects in 2013/2014 Academic Session in the Colleges of Education in South Eastern part of Nigeria. the population was made up of 390 biology students, 315 chemistry students, 105 physics students and 190 integrated science students

**Sample and Sampling Techniques**

The sample size for the study was 200 students. the sample size was appropriate in ensuring close observation and proper rating of students. Proportionate stratified random sampling technique was used to determine the number of respondents per discipline. The sample was composed of 86 biology students, 71 chemistry students, 13 physics students and 30 integrated science students respectively.

**Instrument for Data Collection**

There were two instruments that were used for data collection; the Science Process Skill Test (SPST) and the Assessment Format for Science Process Skills (AFSPS). These two instruments were developed by the researcher. The SPST instrument was made up of a set of practical instructions to guide the respondents to carry out laboratory activities. It contained 12 sets of instructions grouped into sections, A, B, C, and D. Section A was made up of 3 sets (1-3) drawn from chemistry concepts, while section B was made up of 3 sets (4-6) drawn from Biology concepts, section C was made up of 3 sets (7-9) drawn from physics concepts and section D was made up of 3 sets (10-12) drawn from Integrated science concepts. In both cases the concepts were drawn from the minimum standard of colleges of Education document, 3rd edition. The concepts were relevant to all the respondents drawn from Biology, Chemistry, Physics and Integrated Science subjects.

The level of possession of Science Process Skills by the respondents was assessed using a rating instrument, Assessment Format for Science Process Skills (AFSPS), developed by the researcher. the initial draft of the instrument contained 30 items of assessment drawn from the 5 process skills being assessed by the researcher. The right column of AFSPS provided for rating scale numbered 1-4, corresponding to very low (VL=1), LOW (L=2), high (H=3) and very High (VH=4) levels of possession of the skills being studied respectively.

Each of the instruments (SPST and AFSPS) made provisions for the teaching subject and sex of the student. Indication of sex by the respondent enabled the researcher to classify data according to gender.

**Validation of the Instrument**

The drafts of the instruments were submitted to five (5) experts, one from the field of measurement and Evaluation, one from Biology, one from chemistry, one from physics and one from integrated science. The experts made amendments on the drafts in terms of adequacy, clarity of language and choice of terminology. In validating the instruments, the experts dropped two (2) items-leaving twenty-eight (28) items.

**Reliability of the Instrument**

The final instrument made up of 28 items was subjected to test of reliability using Cronbach Alpha-statistics. A reliability co-efficient of 0.85 was obtained for the (AFSPS) which showed that the instrument was consistent and suitable for the study. The instrument was them administered to the final year students in their respective schools and Departments (Biology, Chemistry, Physics and Integrated science

**Method of Data Collection and Analysis**

The researcher administered the two instruments the SPST and AFSPS on the subjects (respondents); the equipment for the practical activities was supplied by the researcher with the help of the laboratory Assistants. The respondents were grouped into 5 and each group worked as a team to ensure close observation by the researcher. Every member of each group carried out the exercise at the same time. The researcher observed the respondent while they worked and used the Assessment Format for Science Process Skills (AFSPS) to rate each respondent according to his/her level of performance of the task. A copy of the AFSPS was used for each respondent. The data collected were analyzed using mean and standard deviation for the research questions while T-test statistics was used to test the hypothesis. Any mean score below 2.50 is regarded to be low while those from 2.50 and above are regarded to be high.

**Results**

The results of the analysis of the data collected for the study were presented in tables according to each research question.

**Research Question1:** What is the level of possession of observation skills by the final year NCE students of biology, chemistry, physics and integrated science?

Table 1: **Mean results based on Observation Skill**

| S/N | Items | VH | H | L | VL | $\bar{x}$ | SD | INT |
|---|---|---|---|---|---|---|---|---|
| 1. | Ability to use senses to identify characteristics of properties | 21 | 79 | 81 | 20 | 2.50 | 0.86 | High |
| 2. | Ability to identify similarities and differences between objects based on features/properties | 27 | 70 | 82 | 21 | 2.5 | 0.85 | High |
| 3. | Ability to identify qualitative changes in conditions | 18 | 74 | 81 | 27 | 2.4 | 0.83 | Low |
| 4. | Ability to use observable properties to classify object or parts of organism | 23 | 81 | 72 | 24 | 2.5 | 0.85 | High |
| 5. | Ability to observe quantitative changes in formation of products | 19 | 95 | 59 | 27 | 2.5 | 0.84 | High |
| 6. | Ability to identify differences between substances before and after chemical reaction | 27 | 75 | 67 | 31 | 2.5 | 0.91 | |
| | **Grand Mean** | | | | | **2.50** | **0.85** | |

Based on the results in table 1 above, all the items under observation skills apart from item 3 had mean values that occurred in the region of high level (HL). The grand mean of 2.50 with standard deviation of 0.85 is also within the region of high level.

**Research Question 2:** To what level do NCE final year students of biology, chemistry, physics and integrated science possess the experimentation skills?

Table 2: **Mean Results based on Experimentation**

| S/N | Items | VH | H | L | VL | $\bar{x}$ | SD | INT |
|---|---|---|---|---|---|---|---|---|
| 7. | Ability to identify instruments for carrying out an experiment | 40 | 79 | 55 | 26 | 2.7 | 0.94 | High |
| 8. | Ability to set up instruments for experiments | 33 | 95 | 62 | 20 | 2.6 | 0.82 | High |
| 9. | Ability to follow steps or procedures in experiments | 22 | 105 | 55 | 18 | 2.7 | 0.79 | High |
| 10. | Ability to observe precautionary measures when carrying out an experiment | 22 | 86 | 57 | 35 | 2.5 | 0.9 | High |
| 11. | Ability to identify and carryout necessary repetition of steps in experiments | 15 | 82 | 64 | 39 | 2.4 | 0.88 | Low |
| 12. | Ability to work independently | 20 | 106 | 53 | 21 | 2.6 | 0.8 | High |
| | **Grand Mean** | | | | | **2.58** | **0.86** | |

Table 2 above showed that for each of the items in the experimentation skills, the mean was within the region of high level of exhibition of the skills by the final year N.C.E students studying biology, chemistry, physics and integrated science subjects. The grand mean of 2.58, with standard deviation of 0.85 was within the region of high level of possession of experimentation skills.

**Research Question 3:** What is the level of measurement skills possessed by the final year students of biology, chemistry, physics and integrated science subjects?

Table 3: **Mean and standard deviation based on Measurement skills**

| S/N | Items | VH | H | L | VL | $\bar{x}$ | SD | INT |
|---|---|---|---|---|---|---|---|---|
| 13. | Ability to determine appropriate values using average value of measures | 20 | 121 | 50 | 9 | 2.8 | 0.68 | High |
| 14. | Ability to identify appropriate device for measuring quantities | 23 | 113 | 42 | 22 | 2.7 | 0.81 | High |
| 15. | Ability to use measuring instruments correctly | 12 | 88 | 81 | 19 | 2.2 | 0.74 | Low |
| 16. | Ability to repeat measurement to obtain more appropriate value | 9 | 75 | 79 | 37 | 2.3 | 0.74 | Low |
| 17. | Ability to specify units of measurements using the correct S.I. Units (metric-system) | 36 | 62 | 70 | 32 | 2.5 | 0.96 | High |
| 18. | Ability to estimate quantify using the spatula | 13 | 87 | 74 | 26 | 2.4 | | Low |
| | **Grand Mean** | | | | | **2.50** | **0.79** | |

In the above table3, the mean value for items 15, 16 and 18 under measurement were found to be below the average value of 2.5. This indicates that the students have low possession of the skills required in these items. The mean values of items 13, 14 and 17 are between 2.5 to 2.8. This indicates that the NCE final year students possess the skills required in those items. The grand mean value of 2.50 and standard deviation of 0.79 fell above the region of high level. Therefore the students exhibit high level possession of measurement skills.

**Research Question 4:** To what level do NCE final year student of Biology, Chemistry, Physics and Integrated Science subjects possess communication skills?

**Table 4: Mean and Standard Deviation of Results Based on Communication Skill**

| S/N | Items | VH | H | L | VL | $\bar{x}$ | SD | INT |
|---|---|---|---|---|---|---|---|---|
| 19. | Ability to express observation in quantitative description | 16 | 65 | 77 | 42 | 2.3 | 0.88 | Low |
| 20. | Ability to use written reports to transmit information | 13 | 87 | 67 | 33 | 2.4 | 0.83 | Low |
| 21. | Ability to express observations in appropriate quantitative | 17 | 82 | 78 | 23 | 2.50 | 0.80 | High |
| 22. | Ability to report event procedurally ability to use | 23 | 77 | 75 | 25 | 2.50 | 0.85 | High |
| 23. | Ability to use appropriate reporting format for the type of observation or event | 14 | 85 | 72 | 29 | 2.50 | 0.82 | Low |
| | **Grand Mean** | | | | | **2.42** | **0.83** | |

Based on table 4 above, items, 19, 20 and 23 had mean values of 2.3 and standard deviation of 0.88, 2.4 and standard deviation of 0.83 and 2.42 and standard deviation of 0.82 respectively. The mean values which are below 2.5 fell below the high level region. Similarly the grand mean value of 2.42 with standard deviation of 0.83 was within the low level range. Therefore the students showed low level of possession of communication skills.

**Research Question 5:** What is the level of inference skills possessed by final N.C.E students of Biology, chemistry, Physics and Integrated science subjects?

**Table 5: Mean and Standard Deviation Based on Inference Skills**

| S/N | Items | VH | H | L | VL | $\bar{x}$ | SD | INT |
|---|---|---|---|---|---|---|---|---|
| 24. | Ability to make assumptions based on observations | 17 | 91 | 68 | 24 | 2.5 | 0.81 | High |
| 25. | Ability relate the observed characteristics and experimental results | 13 | 90 | 64 | 33 | 2.4 | 0.84 | Low |
| 26. | Ability to draw reasonable conclusions based on observation | 17 | 77 | 82 | 24 | 2.4 | 0.81 | Low |
| 27. | ability to relate initial assumptions with experimental results | 14 | 85 | 80 | 21 | 2.5 | 0.77 | High |
| 28. | Ability to specify relevant conclusion at each stage of an experiment | 14 | 92 | 71 | 23 | 2.5 | 0.78 | High |
| | **Grand Mean** | | | | | **2.46** | **0.80** | |

Table 5 above shows that the mean values of items 24, 27, and 28 are 2.5 with standard deviation of 0.81, 2.5 and standard deviation of 0.77, 2.5 with standard deviation of 0.79. These results indicate that the students possess the skills required in those items. Table 5 also shows that items 25 and 26 had the following mean values and standard deviation, 2.4 and standard deviation of 0.84 and 2.4 with standard deviation of 0.81. These values indicate that the students possess low skills of inference in those items. The grand mean of 2.46 and standard deviation of 0.80 was within the region of Low level. Therefore, the students showed low level possession of inference skills.

**Table 6: T-test analysis of mean rating and possession of science NCE process skills between male and female final year students of Biology, Chemistry, Physics and integrated science subjects in colleges of Education in south-Eastern states of Nigeria.**

| Gender | N | $\bar{x}$ | SD | Df | t-cal | t-crit |
|---|---|---|---|---|---|---|
| Male | 100 | 3.62 | 0.83 | | 7.2 | 1.96 |
| Female | 100 | 2.48 | 0.90 | 99 | | |

Table 6 showed the mean values of males and females on their possession of science process skills. The males had mean value of 3.62 and standard deviation of 0.83 while the females had 2.48 with standard deviation

of 0.90. The T-test analysis indicates that T-cal had 7.2 while t-crit is 1.96. The analysis showed statistically significant difference in the possession of science process skills in favour of the males.

**Findings**

Based on the analysis of the data obtained, the results indicate that;

(i) The final year N.C.E students in the Colleges of Education, in the South Eastern part of Nigeria studying Biology, Chemistry, Physics and Integrated science subjects possess high level skills in the following science process skills observation, experimentation and measurement. This conclusion was drawn based on the mean rating and the grand mean which were found to be above 2.5.

(ii) The final year N.C.E students in the Colleges of Education in the South-Eastern part of Nigeria, studying Biology, Chemistry, Physics and Integrated Science subjects showed low level possession of the following science process skills, communication and inference. Their mean rating and the grand mean fell below 2.5 in both communication and inference skills. This finding agrees with the chief Examiner's report on the performance of the Senior Secondary School Certificate Examination in both WAEC and NECO May/June 2013 and 2014.

(iii) There was significant difference $P < 0.05$ between the mean ratings of the male and female final year N.C.E students in the levels of possession of science process skills.

**Recommendations**

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

1. The teachers that teach N.C.E students should emphasize the inculcation of science process skills right from the first year of the students in the school. This should be done through regular and properly guided laboratory work as well as regular assessment of science process skills.
2. The Federal Ministry of Education should structure the N.C.E programmes especially the science programmes to have more practical (Laboratory work) activities. They should also make adequate provisions for laboratory equipment and chemicals to ensure that proper laboratory work takes place in the science laboratories.
3. The teachers should note some of the problems in the skills where there was indication that the student's level of possession of the science process skills was low. This is important because it will enable the teachers to encourage the students who may be deficient on those relevant skills.
4. There should be regular workshops and re-training programmes for science teacher-trainers geared towards equipping them properly to inculcate various aspects of science process skills.
5. The states and Federal Ministries of Education should ensure that well trained science Teachers, laboratory Technologists and technicians are employed to man the science laboratories and effective training of students- teachers in science process skills.

**Conclusion**

The results of the findings of this study has educational implications; such as (i) the low level in the science process skills can be improved if the science teachers particularly the N.C.E teachers who teach these subjects are well trained in the science process skills. (ii) The low level of achievement of students in the sciences can be traced to be as a result of low level acquisition of the science process skills by the students taught by the N.C.E teachers. Based on the above statements, teachers who train the N.C.E students' teachers should pay special attention to some of the items where there was low level possession of the science process skills. The employers of N.C.E teachers should also be guided in order to provide needed orientation programmes for the newly employed N.C.E teachers as well as in-service programmes for those already in the service. The students – teacher trainees should participate actively in practical activities done in the school, and if possible the students should always be engaged in laboratory work. It is only through hands-on-activities that the students can acquire the science process skills easily.

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