# REQUIRED COMPETENCIES VARIABLES:

# WHAT THE TEACHERS NEED TO KNOW FOR EFFECTIVE TEACHING OF COMPUTER SCIENCE COURSES (A CASE STUDY OF UNIVERSITIES IN SOUTH-SOUTH NIGERIA)

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***ABSTRACT***

*The study aimed at determining lecturers competencies required for effective teaching of Computer Science courses in universities of South-south, Nigeria. Five specific purposes and their corresponding research questions and hypotheses were formulated to guide the study. The ex-post facto research design was used in the study and it was carried out in South-South Nigeria. The population of the study consisted of 901 year two Computer Science students in all the Universities offering Computer Science in South-South Nigeria. The sample for the study consisted of 270 respondents selected using a combination of stratified sampling and multi-stage sampling technique. Instruments titled "Lecturers' Competences Questionnaire containing 25 items were developed and used for data collection. The questionnaires were structured on a 5-point rating scale. The instruments were face validated by three experts from the Faculty of Education, University of Uyo. The internal consistency reliability of the instruments obtained using Cronbach Alpha technique were 0.76 and 0.87 respectively for the Lecturers' Competences Questionnaire. Mean and standard deviation was used in answering the research questions while Independent t-Test was used for testing the null hypotheses at 0.05 level of significance. The findings include, among others, that classroom management competencies were moderately required by lecturers for effective teaching of Computer Science courses. There is no significant difference in the mean response of male and female students on classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-south, Nigeria. It was concluded that lecturers' competencies have a significant impact on their teaching effectiveness in Computer Science courses. It is recommended among others, that lecturers of Computer Science courses in universities should endeavour to update their competencies in various aspects of teaching, particularly classroom management, lesson presentation and students' assessment to enable them achieve teaching effectiveness in their courses.*

***KEYWORD:*** **students, classroom management, competencies, universities, South-South, Nigeria. Lecturers, computer Science courses in universities in South-South, Nigeria**

## INTRODUCTION

The need for effective teaching of Computer Science courses in Nigerian universities cannot be over-emphasised in today's technology-driven society. According to Ray (2015), the social significance of Computer Science as a distinct subject is undeniable. Hence, lessons in Computer Science can be helpful in creating holistic knowledge about computer systems and how they work. Similarly, Nager and Atkinson (2016) noted that computers have been incorporated into every sphere of our lives. In order to develop digital competence in students, the lecturers themselves must possess the necessary competences so as to be effective in their teaching.

There are some competences that will make teachers, including Computer Science lecturers to be very effective in the discharge of their teaching duties. These competences include, among others, classroom management competence, lesson presentation competence and students assessment competence.

Classroom management competence refers to the ability of a teacher to create a good learning environment that engages all the learners effectively while teaching is on (Sieberer-Nagler, 2016). It involves how a teacher manages or ensures physical convenience to determine the level of students' participation in lesson. Kizlik (2012) noted that when the classroom environment is conducive, students seem to put on positive attitude towards that particular subject, but if the learning environment is not conducive, there could be negative reactions by the students. A well-organized class with a subservient learning environment portrays the background of the teacher concerned. That could be why Sieberer-Nagler (2016) maintained that the achievement of students relates to the classroom climate and learning environments.

Lesson presentation refers to the manner in which the lecturer impacts the learners with what he intends to teach. Akhyak, Idrus and Abu (2013) stated that lesson presentation competence refers to the teaching competency which include competency in opening lessons properly, delivering the content effectively, using communicative language, motivating students, organizing learning activities sequentially, interacting with students communicatively and concluding lessons appropriately. Nzilano (2013) pointed out that competence in lesson presentation is as crucial as the mastery of courses itself because it is one of the important factors that make lecturers to achieve teaching objectives which is a critical aspect of effective teaching.

Students' assessment competence is another essential area of lecturer's competency relevant to this study. Akhyak, Idrus and Abu (2013) posited that this relate to ability to conduct proper assessment of students' learning and provide feedback. These include ability to choose questions of various levels of difficulty, process and analyze assessment results, make appropriate interpretation of the trend in assessment results, make appropriate inference from the results of the assessment and logically arrange follow-up programme based on assessment results.

### Statement of the Problem

It has been observed that there is low level of skills acquisition and poor application of skills to practical situations among Computer Science students and graduates from tertiary institutions, including universities in South-south Nigeria. This situation is mostly attributed to low level of teaching competence among lecturers of Computer Science courses in some aspects of teaching such as classroom management, using various ICT tools, using various teaching methods, lesson presentation and students' assessment. This situation does not augur well for the attainment of the objectives of university education in Nigeria. This problem therefore gave the impetus for this study to determine the lecturers' competencies in classroom management, lesson

presentation and students' assessment required for effective teaching of Computer Science courses in universities in South-South, Nigeria.

**Purpose of the Study**

The main purpose of this study was to determine the lecturers' competencies required for effective teaching of Computer Science courses in universities in South-South, Nigeria. The specific objectives of the study were to determine:

1. Lecturers' classroom management competencies required for effective teaching of Computer Science courses in universities in South-South, Nigeria.
2. Lecturers' competencies in lesson presentation required for effective teaching of Computer Science courses in universities in South-South, Nigeria.
3. Lecturers' competencies in students' assessment required for effective teaching of Computer Science courses in universities in South-South, Nigeria.

**Research Questions**

The following research questions guided the study.

1. To what extent are classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria?
2. To what extent are lesson presentation competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria?
3. To what extent are students' assessment competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria?

**Research Hypotheses**

The following null hypotheses were formulated and tested at 0.05 level of significance

1. There is no significant difference in the mean responses of male and female students on the classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria
2. There is no significant difference in the mean responses of male and female students on the lesson presentation competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria
3. There is no significant difference in the mean responses of male and female students on the students assessment competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria

## RESEARCH METHOD

**Design of the Study**

The researcher used ex-post facto design. This is because the events to be investigated had already occurred. In the opinion of Nworgu (2009), ex-post facto studies seek to establish what relationship exists between two or more variables. The decision to use ex-post facto design in this study is based on the fact that the variables under study are complex and do not lend themselves to experimental research method. Nworgu (2009) further noted that the ex-post facto studies seek to get at the degrees of association rather than merely trying to discover whether the effect is present or not.

**Area of the Study**

The area of this study is the South-South Geopolitical Zone of Nigeria. The South-South zone occupies the southern belt of Nigeria, and is made up of six states; Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers. These six states are further subdivided into one hundred and forty (140) local government areas in an attempt to reach the grass roots more effectively.

**Population of the Study**

The population of study consisted of 901second year Computer Science students in all the state and federal Universities offering Computer Science in South-South Geographical Zone of Nigeria (Field survey, 2018).

| S/N | NAME OF UNIVERSITY AND LOCATION | STATE | OWNERSHIP | NO OF Comp Sc STUDENTS (200level) |
|---|---|---|---|---|
| 1. | Rivers State University, P.H | Rivers | State-owned | 119 |
| 2. | Niger Delta University, Wilberforce Island | Bayelsa | State-owned | 67 |
| 3. | Cross River State University of Technology, Calabar | Cross River | State-owned | 58 |
| 4. | Akwa Ibom State University, Ikot Akpaden | Akwa Ibom | State-owned | 60 |
| 5. | Delta State University, Abraka | Delta | State-owned | 92 |
| 6. | Ambrose Ali University, Ekpoma | Edo | State-owned | 80 |
| 7 | University of Uyo. Uyo | Akwa Ibom | Federal | 81 |
| 8 | University of Calabar, Calabar | Cross River | Federal | 55 |
| 9 | University of Port Harcourt, P.H | Rivers | Federal | 124 |
| 10 | University of Benin, Benin | Edo | Federal | 104 |
| 11 | Federal University, Otueke | Bayelsa | Federal | 61 |
| | TOTAL | | | 901 |

**Population Distribution According To Universities**

**Sample and Sampling Technique**

The sample for the study consisted of 270 year two Computer Science students. The sample size was determined using Krejice and Morgans (1970) sampling model. The sample was selected using a combination of stratified sampling and multi-stage sampling technique. The population was first stratified into federal and state universities. Then three federal and three state universities were randomly selected. Thereafter, 45 students were randomly selected from each of the six universities.

**Instrumentation**

A researcher developed instrument titled "Questionnaire on Lecturers' Competencies Required for Effective Teaching of Computer Science Courses in Universities In South South Nigeria**"**was developed and used for data collection. The questionnaire contained 25 items meant for determining the competences required for effective teaching by Computer Science lecturers in the areas of classroom management, lesson presentation, and students' assessment competences. The respondents were required to tick under the column that best indicate the extent which they think each competency was required by their Computer Science lecturer(s) for effective teaching. It was based on the following scale: Very Highly Required (5 points); highly required (4 points); moderately required (3 points); lowlyrequired (2 point) and Very lowly required (I point)

h instrument was given to three experts in the Department of Vocational Education for face validation. These experts were requested to read through the instruments item by item, make

corrections where necessary and indicate the suitability of the items for answering the research questions. Their comments, suggestions and corrections were utilized in making adjustments and modification of the final copy of the instrument.

**Reliability of the Instruments**

A pre-testing of the instrument was done. The instrument was administered on 30 respondents who were not part of the sample but from the population of the study. The resulting data was subjected to Cronbach's Alpha analysis. A reliability coefficient of 0.79 was obtained. This high index indicated that the instrument was reliable for use in the study.

**Method of Data Collection**

The researcher obtained a letter of introduction from the Head of Department to the university authorities selected for the study. The researcher enlisted the services of three trained research assistants in administering the instruments to the 270 year two Computer Science students randomly selected from the six universities by hand. All the copies of the questionnaire administered were correctly completed and returned. This represented 100% return rate.

**Method of Data Analysis**

Mean and standard deviation was used for answering the research questions while the independent t-test was used for testing the null hypotheses at 0.05 level of significance. This statistical tools were used because it would enable the researcher to determine the various competencies / skills that were required by lecturers for effective teaching of Computer Science courses in Universities in South South Nigeria. The decision on the null hypotheses was based on the p-value (level of significance) obtained. When the obtained p-value was less than or equal to 0.05, the null hypothesis was rejected. When the reverse was the case, the null hypothesis was accepted. The Statistical Package for the Social Sciences (SPSS) was used in computing all the statistics

**RESULTS**

The result of the statistical analysis of data collected for the purposes of answering the research questions and testing of the null hypotheses formulated for the studyare as follows.

**Research Question 1**

To what extent are classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria?

The data for answering research question 1 is presented in Table 1.

**Table 1:Mean responses on the classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria (n = 270)**

| S/N | Classroom Management Competency Items | X | SD | Remarks |
|---|---|---|---|---|
| 1 | Ability to maintain a conducive classroom atmosphere for students learning. | 2.89 | 0.55 | MR |
| 2 | Ability to monitor behaviour of students during class. | 3.01 | 0.63 | MR |
| 3 | Ability to detect inappropriate behaviour by students promptly. | 2.91 | 0.64 | MR |
| 4 | Ability to use instructional time effectively. | 2.70 | 0.54 | MR |
| 5 | Ability to maintain effective discipline in class | 2.84 | 0.75 | MR |
| | Cluster Mean | 2.87 | 0.30 | MR |

*MR = Moderately Required

The result in Table 1 shows the mean responses of students on the classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria. As shown, the mean responses on all the five items as well as the cluster mean fell within the range 2.50 and 3.49. This result indicate that majority of the students agreed that all the classroom management competencies are moderately required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria.

**Research Question 2**

To what extent are lesson presentation competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria?

The data for answering this research question is presented in Table 2

**Table 2: Mean responses on the lesson presentation competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria (n = 270)**

| S/N | Lesson Presentation Competencies | X | SD | Rem |
|---|---|---|---|---|
| 1 | Ability to speak fluently during lesson presentation. | 2.82 | 0.63 | MR |
| 2 | Ability to vary teaching strategies. | 2.72 | 0.57 | MR |
| 3 | Ability to present lessons in a way that promote students' creativity. | 2.55 | 0.58 | MR |
| 4 | Ability to link instructional activities to students' previous knowledge. | 2.66 | 0.57 | MR |
| 5 | Ability to demonstrate good understanding of the concepts in the lesson. | 2.66 | 0.52 | MR |
| | Cluster Mean | 2.68 | 0.35 | MR |

*MR = Moderately Required

The result presented in Table 2 shows that the mean responses on all the five items as well as the cluster mean fell within the range of 2.50 and 3.49. This result indicate that majority of the students agreed that all the lesson presentation competencies are moderately required by

lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria.

**Research Question 3**

To what extent are students' assessment competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria?

The data for answering this research question is presented in Table 3.

**Table 3: Mean responses on the students' assessment competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria (n = 270)**

| S/N | Students Assessment Competencies | X | SD | Rem |
|---|---|---|---|---|
| 1 | Ability to use several types of tests to assess students' learning | 2.67 | 0.63 | MR |
| 2 | Ability to provide immediate feedback on students assessment result | 2.70 | 0.57 | MR |
| 3 | Ability to set questions of various levels of difficulty, | 2.84 | 0.66 | MR |
| 4 | Ability to set questions to cover all the topics taught in the course | 2.82 | 0.54 | MR |
| 5 | Ability to process and analyze assessment results appropriately | 2.69 | 0.57 | MR |
| | Cluster Mean | 2.74 | 0.34 | MR |

The result presented in Table 3 shows that the mean responses on all the five items as well as the cluster mean fell within the range 2.50 and 3.49. This result indicate that majority of the students agreed that all the students' assessment competencies are moderately required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria.

**Research Hypothesis 1**

There is no significant difference in the mean responses of male and female students on the classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria

The data relating to this hypothesis is presented in Table 4.

**Table 4.t-test analysis of the Mean responses of male and female students on the classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria (n1 = 143; n2= 127)**

| S/N | Classroom Management Competency Items | X1 | X2 | T | P | Dec |
|---|---|---|---|---|---|---|
| 1 | Ability to maintain a conducive classroom atmosphere for students learning. | 2.73 | 3.07 | -1.41 | 0.08 | **NS** |
| 2 | Ability to monitor behaviour of students during class. | 2.87 | 3.17 | -1.98 | 0.10 | **NS** |
| 3 | Ability to detect inappropriate behaviour by students promptly. | 2.94 | 2.87 | 0.89 | 0.37 | **NS** |
| 4 | Ability to use instructional time effectively. | 2.66 | 2.73 | -1.03 | 0.31 | **NS** |
| 5 | Ability to maintain effective discipline in class | 2.73 | 2.98 | -1.76 | 0.06 | **NS** |
| | Cluster Mean | 2.79 | 2.97 | -1.07 | 0.09 | **NS** |

Note: NS = Not Significant at 0.05 level of significance

The summary of t-test analysis of the mean responses of male and female students on the classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria presented in Table 4 shows that the observed level of significance for all the five listed items are greater than the stipulated probability level of 0.05. On this basis, the null hypothesis is retained signifying that there is no significant difference between the opinions of male and female students on the classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria.

**Research Hypothesis2**

There is no significant difference in the mean responses of male and female students on the lesson presentation competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria

The data for testing this hypothesis is presented in Table 5.

**Table 5.t-test analysis of the Mean responses of male and female students on the competence in lesson presentation required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria ($n_1$ =143; $n_2$= 127)**

| S/N | Lesson Presentation Competencies | X1 | X2 | T | P | Dec |
|---|---|---|---|---|---|---|
| 1 | Ability to speak fluently during lesson presentation. | 2.91 | 2.72 | 2.42 | 0.06 | NS |
| 2 | Ability to vary teaching strategies. | 2.57 | 2.88 | -1.63 | 0.08 | NS |
| 3 | Ability to present lessons in a way that promote students' creativity. | 2.55 | 2.54 | 0.13 | 0.89 | NS |
| 4 | Ability to link instructional activities to students' previous knowledge. | 2.80 | 2.46 | 1.56 | 0.10 | NS |
| 5 | Ability to demonstrate good understanding of the concepts in the lesson. | 2.79 | 2.52 | 2.42 | 0.30 | NS |
| | Cluster Mean | 2.73 | 2.63 | 2.18 | 0.13 | NS |

Note: NS = Not Significant at 0.05 level of significance

The summary of t-test analysis of the mean responses of male and female students on the lesson presentation competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria presented in Table 5 shows that the observed level of significance for all the five listed items are greater than the stipulated probability level of 0.05. On this basis, the null hypothesis is retained signifying that there is no significant difference between the opinions of male and female students on the lesson presentation competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria.

**Research Hypothesis 3**

There is no significant difference in the mean responses of male and female students on the students' assessment competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria

The data relating to this hypothesis is presented in Table 6.

**Table 6.t-test analysis of the Mean responses of male and female students on the competencies in student assessment required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria($n_1$ =143; $n_2$= 127)**

| S/N | Students Assessment Competencies | X1 | X2 | T | P | Dec |
|---|---|---|---|---|---|---|
| 1 | Ability to use several types of tests to assess students' learning | 2.71 | 2.63 | 1.09 | 0.27 | NS |
| 2 | Ability to provide immediate feedback on students assessment result | 2.78 | 2.62 | 2.22 | 0.07 | NS |
| 3 | Ability to set questions of various levels of difficulty, | 2.83 | 2.86 | -0.34 | 0.73 | NS |
| 4 | Ability to set questions to cover all the topics taught in the course | 2.79 | 2.85 | -0.80 | 0.42 | NS |
| 5 | Ability to process and analyze assessment results appropriately | 2.51 | 2.89 | -1.75 | 0.11 | NS |
| | Cluster Mean | 2.73 | 2.77 | -1.08 | 0.28 | NS |

Note: NS = Not Significant at 0.05 level of significance

The summary of t-test analysis of the mean responses of male and female students on the students' assessment competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria presented in Table 6 shows that the observed level of significance for all the five listed items are greater than the stipulated probability level of 0.05. On this basis, the null hypothesis is retained signifying that there is no significant difference between the opinions of male and female students on the students' assessment competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria.

**Discussion of Findings**

The analysis of the responses to research question 1 presented on Table 1 revealed that three classroom management competencies were moderately required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria. Testing of the corresponding null hypothesis revealed that the null hypothesis was rejected implying that there was no significant difference in the mean responses of male and female students on the

classroom management competencies required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria.

This finding is very obvious and could be explained by the fact that the respondents acknowledged the close relationship between a lecturer's competence in classroom management and his/her teaching effectiveness. Obviously, if a lecturer does not possess effective classroom management competences, he/she would not be able to teach effectively as the classroom may be rowdy, noisy and full of disruptive behaviours. This would lead to ineffective teaching culminating in poor students' academic performance.

The finding of the study that classroom management competencies are required by lecturers for effective teaching of Computer Science courses in universities in South-south, Nigeria supports that of Onyekuru and Ihegbunam (2013) who found that teaching effectiveness of secondary school teachers in Emohua Local Government Area of Rivers State is influenced by their classroom management skills.

Another interesting finding of the study was that three lesson presentation competencies were required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria. The finding support the views of Akhyak, Idrus and Abu (2013) that application of the most effective instructional procedures to achieve teaching objectives is a critical aspect of effective teaching. This is because lesson presentation is the mode of delivering instruction which may be either teacher-centred (instructivist) or student teacher collaborative (constructivist).

Another important finding of the study was that three students' assessment competencies were moderately required by lecturers for effective teaching of Computer Science courses in universities in South-South, Nigeria. Testing of the corresponding null hypothesis revealed that the null hypothesis was rejected signifying that there was no significant difference in the mean responses of male and female students on students assessment competencies required by lecturers for effective teaching of Computer Science courses in universities in south-south, Nigeria. This finding is in consonance with that of Adodo (2014) who, in a study on the assessment of secondary school teachers' competence in evaluating students' cognitive and psychomotor achievement in Basic Science and Technology in Ondo state found that teachers qualification and their years of experience does not have any effect on how to determine the objective of the test, constructing table of specification and evaluating students' learning outcome. It was also found that there was a significant difference between teachers' gender and their competency in evaluating students learning outcome.

## Conclusions

From the findings obtained from this study, it could be concluded that lecturers competence have a significant impact on their teaching effectiveness in Computer Science courses, particularly in the areas of classroom management, lesson presentation and students' assessment. It is therefore very important that lecturers teaching Computer Science courses in universities in south-south, Nigeria should endeavour to acquire the relevant teaching competences to enable them teach effectively and enhance students' academic performance and skill acquisition in the course.

## Recommendations

The following recommendations were made based on the findings of this study

1. Lecturers of Computer Science courses in universities in South-south, Nigeria should endeavour to update their competence in various aspects of teaching, particularly classroom management, lesson presentation and students' assessment to enable them achieve teaching effectiveness in their courses
2. The management of universities in South-south Nigeria should design special staff development programmes for Lecturers of Computer Science courses to enable them

enhance their teaching competences for effective teaching of the courses assigned to them

3. The National Universities Commission (NUC) in collaboration with the Teachers Registration Council of Nigeria (TRCN) should enforce the policy that only professional teachers with relevant teaching qualifications should be allowed to teach in Nigerian schools, including universities.

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