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# A Survey on the Effective Utilisation of Child Centred Methods in Teaching, Learning and Assessment of Primary Science in Adamawa State Public Primary Schools.

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**ABSTRACT**

*The success of all education programmes depends on the utilization of quality, credible and reliable methods of teaching and learning processes. Education is critical to our development as individuals and as societies, and it helps pave the way to a successful and productive future in the society. To achieve this, the use of child-centered methods (CCM) has been found to be more relevant than teacher-centered methods. The study investigated the teachers' perception of CCM as well as the current practice of teaching, learning and assessment of pupils in primary science at public primary schools in Adamawa state. For the purpose of the study, a survey research method was applied. A random stratified sampling process was used to select public primary science teachers from the three geopolitical zones of Adamawa State. A sample size of 504 teachers was randomly selected from 168 public primary schools. A structured survey questionnaire was used to gather data for the analysis. The reliability of the instrument was determined using Cronbach's alpha analysis. Four research questions guided the study. Quantitative data were obtained and analysed using descriptive statistic method. A triangulation technique was used to establish the findings of the study. Results show that primary school teachers displayed negative perception toward CCM, teachers were not interested in teaching using CCM hence they used a limited number of child centred activities.. The study also indicates that both school environmental and teacher factors affect the perception of teachers on CCM. The findings of the study finally revealed the present practice of teaching, learning and assessment of primary science in public primary schools in Adamawa State.Finally, conclusions and recommendations were presented.*

**Keywords:** Child-centered methods, Public Primary School, Primary Science Teachers, Perception, Teaching, Learning, Assessment, Effective utilization.

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## INTRODUCTION

Child-centred method (CCM) of teaching is placing the pupil at the centre of the learning process in classroom (Rahman, S.M.H., Sultana, 2016). The teacher provides pupils with opportunities to learn independently and from one another and coaches them in the skills they need to do so

effectively (Osborne, J., 2014). The original education schedule considered to be teacher-centred placed all the emphasis on the teacher and not the student, still dominates the education scene. In the traditional epoch, many teaching practitioners widely applied teacher centred methods to impart knowledge to learners comparative to student-centred methods (Moate R. A., Cox J. A. (2015). With the advent of the concept of discovery learning approach, scholars widely adopt more supple child-centred methods to enhance active learning in classrooms. According to Klieme, E., Pauli, C., Reusser, K., (2009) observed that most teachers today apply the child centred teaching approaches to promote interest, analytical research, critical thinking and enjoyment among pupils in schools. The teaching method that a teacher uses is regarded more effective since it does not centralize the flow of knowledge from the teacher to the learner (Khayzarad K. J. 2013). Questions about the effectiveness of child-centred teaching methods on pupils learning have consistently raised considerable interest in the thematic field of educational research (Baeten M., Dochy F., Struyven K. 2012). In addition, it is not clear whether teachers in primary schools utilise child-centred approaches in teaching science in Adamawa State, which is the focus of this research.

Education systems in the majority of developed countries have been recently paying more attention to the early childhood education. For the purpose of teaching at any level of education is to bring a fundamental change in the learner (Davis, E.A., Smithey, J., 2009). To facilitate the process of knowledge transmission, teachers should apply appropriate teaching methods that best suit specific objectives and level exit outcomes (Azam, M., Kingdon, G.G., 2015) .Among the stages of education, primary level deserves particular attention as it lays foundation for the other levels of education. Hence, every country is active in their own way in preparing their children as a skilled human resource, so that they can fully participate and contribute to their nations' growth and development (Karim et al., 2012,). The research is aimed at analysing the relationship between primary school teachers' application of child-centred approaches and science activities teaching. This is because one of the purposes of science teaching in primary schools is to enhance pupils understanding of scientific concepts. Another aim is to develop children's capacity to understand scientific procedures and to investigate scientifically (Osborne, J., 2014). Duschl, R.A., Schweingruber, H.A.,( 2007). said that pupils need to know, understand and be able to be scientifically literate at different levels of education and connect scientific literacy with learners' everyday experiences, curiosity in the hope that pupils become able to describe, explain and predict, read about science in popular press, discuss and evaluate information with science content (Azuka B. F., Durojaiye D., Okwuoza S., Jekayinfa O. 2013). According to Ng'asike (2012), science is a key subject that children study at all institutions of learning from early childhood to university. Science is critical in providing pupils with essential skills needed.

### *Statement of the Problems*

The purpose of conducting the study was to determine the reason for primary school pupils' low level of scientific skills in public primary schools in Adamawa State. Approaches have been made by both the federal and state governments to improve science teaching in schools. In line with this need, the Federal Ministry of Education (FME), Abuja and the Japan International Cooperation Agency (JICA), signed an agreement to establish a system of training for public primary school teachers in the area of mathematics and science. This agreement gave rise to Strengthening Mathematics and Science Education (SMASE) through an In-service Education and Training (INSET), designed for a period of three years. The overall goal of the project was to enhance the teaching skills of teachers in mathematics and science in Nigeria using child – centred methods. Therefore, the researchers seek to investigate whether primary school teachers are utilising the child-centred approaches in teaching, learning and assessment of science activities in public primary schools in Adamawa State since some of them participated in the training. This is the focus of the research work.

### *Objectives of the Study*

The specific objectives of the study are to:

1. Examine the public primary school teachers' perception on the concept of child-centred methods of teaching in Adamawa State.
2. Investigate the extent to which the public primary school science teachers utilize the child- centred methods in classroom activities in Adamawa State.
3. Assess the teacher factors on the use of child- centred methods in classroom activities in Adamawa State.
4. Evaluate the school environmental factors on the use of child- centred methods in classroom activities in Adamawa State.

### *Research questions*

The study addresses the following research questions:

1. What is the public primary school teachers' perception on the concept of child-centred methods of teaching in Adamawa State?

2. What is the extent to which the public primary school science teachers utilize the child- centred methods in classroom activities in Adamawa State?
3. What are the teacher factors on the use of child- centred methods in classroom activities in Adamawa State?
4. What are the school environmental factors on the use of child- centred methods in classroom activities in Adamawa State?

## Literature Review:

Al-Zube A. F. M. (2013) conducted a study on the use of learner centred techniques in the teaching of English language in selected secondary schools of Lundazi District in Zambia. The study used a qualitative in which case study was used. The study targeted 50 students, 20 teachers and 10 academic teachers and 9 heads of schools that make a total of a population of 99 respondents. They used an interview guide and a document analysis guide. The findings revealed that teachers were not interested in teaching using learner centred techniques hence they used a limited number of learners centred activities. Despite this, students were interested in learning English using the learner centred activities.

Fitzgerald, A., Smith, K., (2016) conducted a study towards the development and implementation of learner centred education in Kosovo. In this study, 36 practising teachers responded to a survey exploring how teachers understand and use contemporary and traditional teaching methodologies. Using a largely qualitative analytic framework, findings revealed that teachers currently appear to understand the philosophy of learner-centred teaching but also possessed a rather superficial view of how these teaching methods can be implemented in classroom settings. The researchers concluded that to broaden the use of these kinds of practices, deliberate emphasis needs to be placed on expanding teacher understanding from theory to practice. The findings of the study have shown the understanding of the teachers on the use of learner centred teaching methods while they did not establish how the teacher can use learner centred teaching methods during teaching and learning process. The sample size of the study was small compared with the design used, then it will be difficult to generalized the findings from the target population. The current study adopted a mixed design which allows the researcher to collect a large amount of data at one time. The study sampled 217respondents to triangulate the information in different categories of respondents. A qualitative study was done by Hasan, M.M., Ehsan, M.A., (2013) on the effectiveness of learner-centred teaching methods in teaching and learning Geography in Nkoaranga and Nasholi secondary schools Arumeru District. 30 students, 5 teachers and 2 heads of schools are the study target. The study used questionnaires during the data collection process. The finding show that learner centred teaching methods has been used often through teaching and learning process. Methods of group discussion as the provision of changes to ask questions or share views, group assignment and homework here used to help learners to understand the lesson thus contributing to the improvement in student's achievements. The study findings have explained only group discussion as one among learner centred teaching strategies while other teaching strategies like think presentation, role play and demonstration have been explained which are also used during the implementation of learner centred teaching methods. This study used questionnaires and an interview guide to collect data that differ from the corresponding respondents to get qualitative and quantitative data.

Khalid A., Azeem M. (2012) did a study about the Constructivist vs traditional: Effective instructional approach in teacher education. A quasi-experimental design was employed. Then, quantitative teaching methods were employed under which experimental design was used. A questionnaire was used during data collection and analysis. The researcher sample 20 students, 4 teachers and 1 head of school. The study revealed that the material designed and the teaching methods used in the experimental school motivated the students in learning. The study indicates students of the experimental school showed considerable change in performance in the post test compared to the students of the control school. The study did not explain the application of learner centred teaching methods on enhancing teaching and learning process. The current study used a convergent design which enable the researcher to collect both qualitative and quantitative data. Molina, E., Fatima, S.F., Ho, A.D., Melo, C., (2020) did a study on the measuring the quality of teaching practices in primary schools: assessing the validity of the teach observation tool in Punjab, Pakistan. The method used in this research is quasi-experimental methods (quasi). The study used a mixed design with a mailed questionnaire for teachers and an interview guide for teacher educators and principals. Teachers, teacher educators and principals were surveyed randomly to participate in the study. The study involved 73 teachers 4 teacher educators and 4principals. The study found that majority of the students were active and enthusiastic, but half of the students need more attention from the teacher in the learning process. Thus, the students found it difficult to answer and respond to the teacher's questions and explanations. They were also shy and not confident to present their writings in front of the class. The study findings are based only on English grammar subjects in investigating the use of learner centred teaching methods in which it can be difficult for students to participate due to foreign languages. The sample size for the teacher educators and the principals was a little bit small to make the findings of the study to be generalized to the target population. This reflects inadequate empirical knowledge in parental relations that needs to be established.

## Research Methodology

***Study Area***

The study was conducted in the 21 Local Government Areas (LGA) in the three geopolitical zones of Adamawa State, that comprises Adamawa central, Adamawa north and Adamawa south.

***Sampling Techniques and Sample Size***

For the purpose of this study, stratified random sampling technique was employed since the study covered all the 21 LGA in the state. The 21 LGA were zoned into five, namely; Mubi zone comprises of 4 LGA, Gombi zone comprises of 4 LGA, Yola zone comprises of 4 LGA, Numan zone comprises of 5 LGA and Ganye zone comprises of 4 LGA. A random stratified sampling approach (Teddlie and Yu 2007) was used to select a total of eight (8) public primary schools from each LGA making a total of 168 primary schools, out of which five primary schools were randomly selected from the urban LGA and three primary schools were selected from the rural LGA. Teachers of class four to six in the selected primary schools were used as respondents in the study making a total of 504 respondents.

***Research Design and Instrument used.***

Based on the need to generate base-line data, the study adopted a descriptive research design. The importance of descriptive survey designs is that it is useful in describing the characteristics of a large population and ensures a more accurate sample collection and collation to gather targeted results in which to draw conclusions and make important decisions (Rahman, S.M.H., Sultana, 2016). For the purpose of the study, 26-items structured survey questionnaire was designed and captured the respondents' perceptions with respect to the research questions that were formulated in order to achieve the stated objectives. The questionnaire items were divided into three sections A, B and C. Section A contains information regarding demographics details of the respondents. Section B focuses on teacher factors and section C focuses on the school environmental factors on perceptions of respondents on child centred methods in classrooms teaching, learning and assessment of primary science. The items in sections B and C were rated on a 4-point Likert type scale option of Strongly Agree (SA); Agree (A); Disagree (D) and Strongly Disagree (SD).

***Instrument Reliability and Validity Test***

Thirty survey questionnaires were distributed to thirty teachers (respondents) that were randomly selected from six public primary schools in Jimeta Yola north local government area to be piloted. The respondents who participated in the pilot study were not used again in the main study. Thereafter, the researchers went through the filled questionnaires and identified those that needed to be perfected and the corrected version was used for the study. The reliability of the instrument was determined using Cronbach's alpha analysis.

***Methods of Data Collection and Analysis***

Multiple approaches methods were employed for collection of the questionnaires from the respondents (Russell, J.L., Kaufman, J.H., Stein, M.K., 2012), the responses were collected, collated and coded before processing and analysis. Simple descriptive statistics analysis (frequencies and percentages) was done on the demographic profile of the respondents. The data gathered for the study were later analyzed statistically with mean and standard deviation using computer software, Statistical Package for Service Solution (SPSS V. 24). Decision on the research questions was based on a benchmark mean of 2.50. Discussion, conclusion and recommendations were drawn from the findings in accordance with the research objectives.

**Results and Discussions of the findings**

Table 1below described the demographic data provided by 456 respondents out of the 504 Questionnaires that were administered. The data was reported in the order as it appeared in first part of the questionnaire which covered questions related to the respondents' personal details.

**Table 1: Demographic data of the respondents**

| **Gender** | **Frequency** | **Percentage (%)** |
|---|---|---|
| Male | 234 | 51.3 |
| Female | 222 | 48.7 |
| **Age group** | **Frequency** | **Percentage (%)** |
| 26 – 35 Years | 107 | 23 |
| 36 – 45 Years | 206 | 45 |
| 46 – 55 Years | 122 | 27 |
| 56 Years and above | 21 | 5 |
| **Marital Status** | **Frequency** | **Percentage (%)** |

| | | |
|---|---|---|
| Single | 54 | 11.8 |
| Married | 352 | 77.2 |
| Divorced | 37 | 8 |
| Widow | 13 | 3 |
| **Religion** | **Frequency** | **Percentage (%)** |
| Islam | 264 | 58 |
| Christianity | 192 | 42 |
| Others | 0 | 0 |
| **Years of Service** | **Frequency** | **Percentage (%)** |
| 5-10 years | 32 | 7 |
| 11- 15 years | 177 | 39 |
| 16-20 years | 218 | 48 |
| 21- 30 years | 29 | 6 |
| 31-35 years | 0 | 0 |
| **Educational Qualification** | **Frequency** | **Percentage (%)** |
| ND | 56 | 12 |
| NCE | 167 | 37 |
| Degree/HND | 206 | 45 |
| Masters/PhD | 27 | 6 |
| **SMASE in-service training on CCM** | **Frequency** | **Percentage (%)** |
| No of teachers attended training | 125 | 27 |
| No of teachers not attended training | 331 | 73 |

The demographic data of the respondents revealed that in terms of gender, the male have the highest percentage of 51.3% and the female have 48.7%. While the age group 36 to 45 years old top highest with percentage of 45% followed by 46 to 55 years 27%, then 26 to 35 years 23% and 56 years above 5% accordingly. The data of marital status of the respondents shows that married respondents have the highest percentage of 77.2%, followed by single respondents with 11.8%, divorced respondents with 8% and widow respondents with 3%.respectively. The religion data shows that Islam has the highest percentage of 58%, Christianity has 42% and others with 0%. In terms of years of service, 16-20 years has the highest percentage of 48%, followed by 11- 15 years with 39%, then 5-10 years with 7% and 21- 30 years with 6%. In relation to educational qualifications, Degree/HND has the highest percentage of 45%, followed by NCE with 37%, then ND with 12% and Masters/PhD with 6%. In terms of SMASE In-service training, the Teachers that attended the training were only 27%, while those that did not attended the training were 73%, almost one third of those that attended the training.

**Table 2: Instrument Reliability and Validity Test Results.**

| S/No | Component Factors | Cronbach's Alpha | rho_A | Composite Reliability | Average Variance Extracted (AVE) |
|---|---|---|---|---|---|
| 1 | Teachers' perception on the concept of child-centred methods | 0.764 | 0.776 | 0.741 | 0.717 |

| | | | | | |
|---|---|---|---|---|---|
| 2 | Extent to which the science teachers utilize the child- centred methods | 0.751 | 0.765 | 0.711 | 0.686 |
| 3 | Teacher factors on the use of child-centred methods | 0.728 | 0.737 | 0.702 | 0.635 |
| 4 | School environmental factors on the use of child-centred methods in classroom activities | 0.713 | 0.702 | 0.783 | 0.683 |

*Cronbach's alpha recommended minimum value 0.70 (Khayzarad K. J. (2013) Average Variance Extracted Value (AVE) recommended minimum value 0.50 (Karim et.al,.2012)*

Table 2 above revealed the reliability and validity of the instrument used. The composite reliability was examined through Cronbach's alpha, which indicated a higher value of 0.764 and lower value of 0.713. The values fully complied with the recommended minimum value of 0.7 (Hobbs 2013; Lederman et, al. 2014; Moate et, al. 2015). The validity of the instrument was ensured through convergent validity. According to Ogunmade (2005) Sammons (2008); Rye (2012), for convergent validity, the recommended minimum value is 0.6 which is in line with the values obtained in this study. Also, Ryan (2009); Osborne (2014); Liang, (2005) suggested that the average variance extracted (AVE) value of instrument should be higher than 0.5 which also correspond to the values obtained in this study. The results of the analysis confirmed that the instrument was reliable and valid.

**Table 3: Descriptive statistics of frequency counts, mean, and standard deviation results of the factors that were decided by the respondents based on the research questions.**

| S/No | Component Factors | N | SA | A | D | SD | Mean | SD | Decision |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Teachers' perception on the concept of child-centred methods | 456 | 53 | 71 | 263 | 69 | 2.40 | 1.082 | Disagree |
| 2 | Extent to which the science teachers utilize the child- centred methods | 456 | 52 | 85 | 257 | 62 | 2.32 | 1.045 | Disagree |
| 3 | Teacher factors on the use of child-centred methods | 456 | 49 | 83 | 259 | 65 | 2.36 | 1.061 | Disagree |
| 4 | School environmental factors on the use of child-centred methods in classroom activities | 456 | 47 | 81 | 265 | 63 | 2.38 | 1.069 | Disagree |
| **Weighted Average Mean and Standard Deviation** | | | | | | | **2.38** | **1.064** | **Disagree** |

*The items in table 3 were rated on a 4-point Likert type scale option of Strongly Agree (SA); Agree (A); Disagree (D) and Strongly Disagree (SD), mean and standard deviation values obtained from the analysis. Decision on the research questions was based on a benchmark mean of 2.50. This implies that "any item with a mean value of 2.50 and above were regarded as agreed while any item with mean value of less than 2.50 were regarded as disagreed (Molina, et. al,. 2020).*

**Research Question 1;** What is the public primary school teachers' perception on the concept of child-centred methods of teaching in Adamawa State? To answer the question, six items were used in the questionnaire and administered to 456 respondents. The result of the study was indicated in table 3. The result revealed that public primary school teachers in Adamawa state showed negative perceptions on the use of child centred methods of teaching with the mean value of 2.39 which was less than 2,50 and the decision was regarded as disagree. The respondents displayed negative perceptions to the items that are focused on the use, significance, and problems they encounter while using CCM. The result of this finding is in line with the result obtained by Mtitu E. A. (2014)

**Research Question 2;** What is the extent to which the public primary school science teachers utilize the child- centred methods in classroom activities in Adamawa State?. Six items were administered to the respondents in order to address the research question. The result of the study showed that the mean value of 2.32 was obtained which was less than 2.50 and the decision was regarded as disagree. The result revealed that teaching in Adamawa state still remains teacher oriented where a teacher talks throughout the lesson and does not allow pupils to actively participate in the learning process. The responses also indicated that teaching to a large extent relies on pupils copying notes from the blackboard. It further indicates that the curriculum delivered in schools is theory based, with little time for problem solving and written exercises. The result was also evident in lesson planning where 80% represented the teachers' activities while 20% of time was allocated to pupils. Many of the teachers like to

use CCM, but they were overloaded and not having enough knowledge on them, consequently did not practice them in class. The result obtained in this study correspond to the results of the work of Moate *et al.,* (2015), Klieme et al (2009)

**Research Question 3;** What are the teacher factors on the use of child- centred methods in classroom activities in Adamawa State? Seven items in the questionnaire were administered to the respondents to answer the research question. The results of the study indicated the mean value of 2.36 was obtained which was less than 2.50 and the decision was regarded as disagree. The result revealed that teacher factors include lack of self-confidence, lack of positive attitude and prior experience on CCM among teachers. The responses indicated that almost two third of teachers are not confident with the knowledge and skills they have on CCM. The responses from the study also indicated that majority of the teachers (73%) reported that they have not had professional development training on how to use CCM in the classroom while 27% confirmed they have been trained, as teachers' professional development is a key factor to successful utilization of child-centered methods in the classroom. The results of this finding correlate with the results obtained by Aalderen-Smeets *et al.,* (2015), Lederman *et al.,* (2014) in their studies.

**Research Question 4;** What are the school environmental factors on the use of child- centred methods in classroom activities in Adamawa State? Six items were administered to the respondents in order to answer the research question. The result of the study showed that the mean value of 2.38 was obtained which was less than 2.50 and the decision was regarded as disagree. The result revealed that the school environmental factors include insufficient and lack of clear quality indicators on CCM, shortage of school facilities and resources, big class size, heavy workload on teachers, and language of instruction. The result obtained in this study is in agreement with results obtained by Sammons *et al.,* (2008), Liang (2015) in their studies.

## Conclusion

From this study, it can be concluded that the public primary school science teachers in Adamawa state have a negative perception of CCM of teaching and the extent of usage of the methods is very low. The focus is the shift in the learning process from the teacher to the CCM. Thus, it is important that the government should motivate science teachers to adopt CCM approach when preparing for their lessons in order to bring up a new generation of scientists. To achieve scientific thinking, teachers should view pupils as active learners and give them varied opportunities to explore and experiment things around them. Such opportunities can allow pupils to construct meaningful and develop understandings that are not only valid but also valuable to their ongoing intellectual development. Moreover, teachers need to consider organizing classroom learning content in order to capture learner attention in Science activities. Teaching and learning of Science enables the pupils to understand the world around them and be curious in nature. Though child-centered approaches require more effort in preparation because the teacher must demonstrate mastery of content as well as be creative in designing activities that will facilitate the achievement of learning objectives. More over Science is essential in the national development of any country.

## Recommendations

Based on the findings of the study, it is recommended that public primary school science teachers in Adamawa state should be encouraged to have positive perception of CCM. This could be achieved by proper coordination system between all educational stakeholders, especially proper training and coaching, would help teachers to have the zeal and confidence toward CCM. All education stakeholders and policy makers should work together in identifying various factors hindering teachers to adopt CCM in their classrooms and solve them, so that the approach will move from policy to practice and contribute to improving the quality of education. Also, the state education supervisory bodies should keep up with their supervisory duties so that the standard of using CCM by primary school teachers will be properly implemented and utilized. On the final note, the improvement of teacher welfare packages and prompt promotion is also important.

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