REVAMPING EARLY CHILDHOOD EDUCATION MATHEMATICS THROUGH EFFECTIVE EVALUATION: A PREPARATION FOR E-LEARNING

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Abstract

The paper focuses on revamping early childhood education Mathematics through effective evaluation: A preparation for E-learning. Effective evaluation is geared towards worthwhile decision making process. While E-learning is online learning through Information and Communication Technology (ICT). The study was a quasi experiment which involves two intact groups. The study was carried out in Isiala Mbano in Imo State Nigeria. The population of the study was 40 nursery 3 pupils and the sample was also 40 children, 20 for group A (Innovative Method Group) and 20 for group B (Conventional Method Group). There were 10 items which were validated by experts. K – R formular 21 was used to validate the items and the index obtained was 0.76. The two null hypotheses were rejected. The innovative method group, performed better than the conventional method group. The researchers recommended that effective evaluation of early childhood Mathematics should be ensured through seminars and workshops for teachers from time to time to enable them bring in innovation during programme and curriculum evaluation among others as a guide to remedy challenges faced by pupils in Mathematics.

Keywords: Effective Evaluation, E-learning.

Introduction

Educational evaluation are steps involved in making sound and worthwhile decisions based on several attributes in students. Good and qualitative information are normally used "to make value judgments through measurement processes. Measurement itself is an organized pattern of assigning numerical values or quantities to aspects or attributes of objects according to some lay down rules. Therefore Evaluation is a worthwhile decision making process so as to give value judgment. Several decisions that are being numerous in nature are taken in education from one time to another. These decisions are issues that concern programmes and progress of students. Evaluation as a matter of necessity should be valid inorder to ensure that right and accurate decisions are made. Tests are useful and vital instruments which are normally employed in making value judgments in education. Evaluation could be said to be prognostic or diagnostic. When evaluation is prognostic, it is used to predict what an individual or person will be able to do or achieve in future. This means that it is predictive in nature and therefore can be called predictive evaluation. The strength and or weakness of the testee could be found or determined using diagnostic evaluation. It could be used to reveal the extent of learning students have had or what they do not know about a learning content or subject matter. This is to ensure that provisions are made to remedy the deficiencies or short falls or inadequacies of testees. Tests that satisfactorily meet this requirement serve diagnostic purpose. This therefore means that various forms of evaluation techniques such as readiness or placement evaluation (pretesting), formative, including diagnostic, testing itself will serve for diagnostic purpose (Iwuji, 1997). When evaluation is done for a diagnostic purpose such as to place them into various vocations or programmes, equal opportunities for all children (no matter their genetic and environmental variations) is achieved. This helps to integrate various pupils with numerous potentials as well as serving as a check or measure against dropping out of school. Proper use of diagnostic evaluation will enable the pupil or child not to see the society as his enemy any more, if in the previous times he has been having that negative attitude. The child that is properly diagnosed will also not regard his teachers and peers as his "worst enemies" or the reason for his being a dropout. The child through diagnosis will therefore properly fit into his society since he has been adequately and properly provided for in his learning environment or school. The child will now become socialized and adjusted with other people across the various segments/strata of the society. Evaluation is the end point of measurement (Nwana 2007) and provides remedial measures to students who may resort to anti-social behaviours. In Nigeria different agencies/organizations/establishments value certificates irrespective of the capability of the holders(s) of such certificate(s). Certificates are also the modes of admission into higher institutions of learning, employment opportunities etc. Students may do all they could to pass examination so as to have the certificates. To guard against this, effective evaluation should be carried out for pupils in primary schools for better academic performances.

Evaluation ensures that adequate techniques such as continuous assessments and school based assessments are properly undertaken and conducted so as to ensure that pupils from diverse origins and backgrounds will be duly accommodated and taken care of. Value judgments are made about the test scores of pupils and according to Iwuji (1997), these value judgments are remarks like poor, good, pass, fail, bright, dull etc. Pupils who normally perform poorly and usually get negative remarks like dull, lazy, weak, incompetent etc. may brand themselves "never do well" and will develop low personality esteem. This can cause them to become dropouts, leading them to hating themselves, their peers, parents, teachers and society at large. To prevent these dangers, educational evaluation is properly utilized to prognose, diagnose and place every child so that he can discover his potentialities, areas of interest and career choice so that he can have personality value for himself. Effective evaluation of primary school mathematics will give the child enough background that will prepare him for future challenges in the subject.

Revamping Early Childhood Mathematics

Revamping early childhood education is the state of brining back to life the decayed structure of Education at this level. This can be achieved through formidable educational policies, high productivities among others. Where this occurs, intellectual potentials of various stakeholders are well utilized and required behavioural changes activated due to acceleration in relevant educational policies. According to Anyanwuocha (2006), where this occurs the needs and fortunes of various individual learners are adequately provided for and met.

Adequate measures should be taken to ensure that early childhood education should not be neglected and therefore not suffer major setback so as to achieve the desired goals. Inorder to achieve this, Obi (2005) opines that teacher effectiveness should be brought into full swing during instructional delivery, classroom management and evaluation exercises. Evaluation as the end point of measurement should be carried out with every degree of seriousness in the early childhood education so as to ensure adequate preparation for future education, proper placement of children into prospective career choices and realization of talents in appropriate vocational areas. Financial insufficiency for school fees and inability to provide necessary instructional materials for children should be guarded against. The teacher should therefore devise ways such as improvisation of instructional materials among others so as to overcome this ugly development, so as to achieve sustainable national cohesion.

Effective testing for evaluation could be carried out in several areas of Mathematics such as primary school arithmetic, to which number bases such as binary numbers form an integral part, (Egbe, Odili and Ugbebor 2000).

Conventional Method of Solving Problems in Early Childhood Mathematics

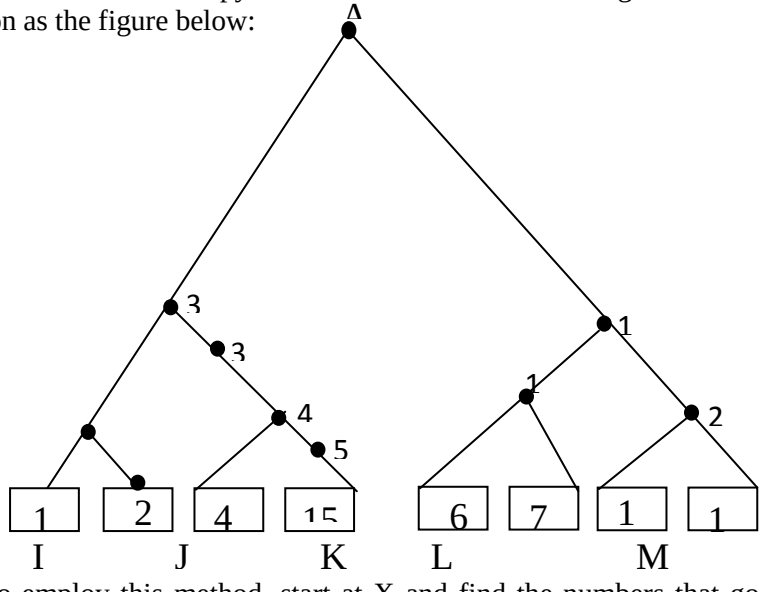
Solutions in arithmetic such as numbers bases, most of the time are carried out by teachers using routine method which is a traditional approach to solutions of such

problems. This traditional way of problem solution is a conventional method used by most Mathematics teachers in the early childhood Education. The conventional method as it applies here makes use of basic mathematical operations which are addition, subtraction, multiplication and division, (Obi, 2015). This rudimentary approach may give the pupils solid foundations in the subject if well utilized (Ogbugh, 2004). In the use of conventional approach here in the teaching of arithmetic. Channon, Smith and Head (2007) are of the opinion that the numbers and numeration are of importance to our usual base ten system. According to Ogomaka (2002), binary system is important because it is used in computer programs. Hearne (2004) stated that binary numbers are made up of only two digits, 1 and 0. According to Adeniran (2013), a computer contains a large number of switches. Each switch is either 'on' or 'off'. An 'on' switch represents 1, an 'off' switch represents O.

Evaluating pupils based on the conventional methods is a routine measure which may at times be boring on the pupils. However, a better innovative method to promote the pupils' interest may be used to facilitate effective evaluation.

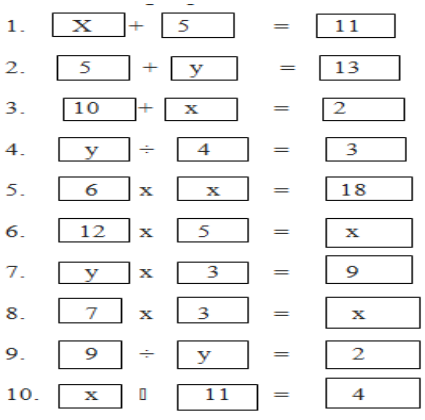
Innovative Method of Solving Problems in Early Childhood Mathematics

Instead of the usual method of solving problems in mathematics, a better and innovative method which promotes the learning interest of the children may be used and this offers better performances during evaluation of early childhood mathematics. This innovative method is a pyramidal structure built in the region around numbers and numeration as the figure below:



To employ this method, start at X and find the numbers that go in the boxes I,J,K,L,M,N,O,P where the numbers are added or subtracted.

Evaluation of early childhood Mathematics could be done in variety areas such as arithmetical sign operations. The items could be developed as follows: in this exercise.



Statement of the Problem:

Mathematics as a core and compulsory subject at levels has over the years posed serious challenges to learners of various age groups which has eventually affected in no small way their performances at higher education level. This difficulty could stem from lack of seriousness and interest on the part of the learners leading to poor performances (inherent in low ability) in the subject. It could also be as a result poor motivational technique which educational stakeholders fail to render to learners for better assimilation of the subject. Another possible reason to this could be lack of adequate instructional strategy which the teachers fail to provide to the learners most of the time. Some Mathematics teachers lack required qualifications and necessary skills to impart knowledge on their learners. Inadequate provision of instructional materials such as standard Mathematics textbooks, poorly improvised instructional materials, poor mathematics laboratories among others have also contributed to poor performances on the subject. Lack of co-operation from learners during instructional procedures as well as poor evaluation approaches have all contributed to poor and faulty mathematics foundation at lower levels and as a result, the aching difficulty experienced at higher level of education among students of the subject and its related disciplines. Could the adequate employment of effective evaluation procedures by classroom teachers at the foundational levels (such as the early childhood level, help to remedy the problems experienced by students at the higher level of education? Could the teacher (at this lower level of education bring in creativity and innovation during instruction and evaluation of the pupils to ensure the needed evaluation effectiveness so as to bridge the gap between foundational education Mathematics and higher education

Mathematics? Could the teacher also make improvisations of instructional materials among other innovations to help save the children from the high cost of instructional materials? Could also a combination of these strategies help to rescue primary education from a depressed economy when the teacher must have performed his onerous task?

Scope of the Study:

The area of Mathematics in which 10 essay type quantitative reasoning (Etqr) are set is arithmetic of early childhood Mathematics.

Purpose of the Study:

Generally, this study aims at ascertaining which of the traditional/routine/ conventional approaches to innovative new idea/original idea approach to evaluation of early childhood in Mathematics will produce better results as regards cognitive performances in arithmetic.

Specifically the Researchers

i) Ascertained the mean cognitive performance scores in arithmetic of two groups of children.
ii) Tested if the mean scores ($\overline{x}$) of the two groups of children differ significantly.
iii) Ascertained the variance of cognitive performance scores in arithmetic of the two groups of children.
iv) Tested if the variances of the scores of the two groups of children differ significantly.

Research Questions

The researchers formulated the following research questions to guide the study:

1. What are the Mean Cognitive Performance, scores (X) of the two groups of children evaluated based on conventional approach and innovative approach of solving early childhood mathematics?
2. What are the variances of the cognitive performance scores of the two groups of children evaluated based on conventional approach and innovative approach of solving early childhood mathematics?

Hypotheses:

The researchers formulated the following hypotheses to guide the study:

HO_1: The mean cognitive performance scores (x) of the two groups of children do not differ significantly at α - level of 0.05.

HO_2: The variances of the cognitive performance scores of the two groups of children do not differ significantly at α - level of 0.05.

Significance of the Study:

The study is considered significant because: the result of the study will add to the existing body of knowledge on the need and importance of innovation to problem solving in the evaluation of early childhood mathematics. The study highlights the main effects of innovation in the evaluation of early childhood mathematics. The study would help evaluators give required consideration to innovation during school and programme evaluation.

Education authorities such as school supervisors will realize the role of innovation in the effectiveness of evaluation in teaching and learning.

Mathematics teachers will see the need to bring in innovation in teaching and learning to enhance better understanding and effective evaluation of children.

The study will help evaluators give consideration to innovation during school and programme evaluation to ensure the required effectiveness.

Design:

The study is a quasi experiment. It involves manipulation of independent variable and watching its effect on the dependent variable, without controlling all the intervening variables of the randomized groups.

I_1 X O

I_2 X O

Where I = Intact group

X = Treatment

O = Post test

Population:

The population was made up of 50 nursery 3 children in schools in Okigwe in Imo State, Nigeria.

Sample and Sampling Technique:

The sample selected was 50 children, 25 for group A and 25 for group B. The sampling involved intact group.

Instrument for Data Collection:

Essay type test items ($Etti_s$) were used. There were two sections, sections 1 and 2. There were 10 items in all.

Validation of Instrument:

The items were validated by five experts of educational Mathematics, Measurement and Evaluation. The experts read through the items to ensure the correctness of expressions, the appropriateness of tasks/exercises and the correctness of the solutions. A test blue print was developed to ensure content validity.

Reliability of the Instrument:

The reliability of the instrument was done using Kudder-Richardson (K-R) formula 21 and the index obtained was 0.80. This was to ensure that they exhibit the degree of consistency they are expected to.

Table 2: Test Scores of the Two Groups of Children

Group	Scores	Total	Mean ($\bar{X}$)
Innovation Method Group A	75, 65, 71, 69, 70 85, 55, 90, 50, 72 68, 60, 80, 82, 58 56, 84, 74, 66, 70 70, 73, 67,77, 63	1750	70
Conventional Method Group B	63, 57, 64, 55, 53 67, 52, 68, 55, 65 66, 54, 60, 43, 77 61, 59, 62, 58, 60 60, 62, 58, 53, 67	1500	60

Mean Score $\bar{X}$ for group A (Innovative method Group)

$= \frac{1750}{25} = 70$

Mean Score $\bar{X}$ for groups B (Conventional Method Group)

$= \frac{1500}{25} = 60$

$S^2 = 8.2$

$S_B^2 = 5.1$

$n_A = 25$

$n_B = 25$

$$\therefore t_{cal} = \sqrt{\frac{[25(8.2) + 25(5.1)]\,(25+25)}{(25+25-2)\,x25}}$$

$$= \frac{9}{4} = \mathbf{2.25}$$

Result

Table 3: t – test Statistics Summary Table

Sample sizes (n), means ($\bar{X}$), standard deviation (S) calculated t – test statistics (t_{cal}), degrees of freedom (df), tabulated – test value (t_{cal})and decision.

Sample	**n**	$\bar{X}$	**S**	t_{cal}	**df**	t_{tab}	**Decision**
Innovative Method Group A	25	70	8.2	2.25	48	2.01	Significant $H0_1$ rejected
Conventional Method Group B	25	60	5.1				

The results of the table show that both groups have sample size of 25 each. The mean score for the innovative group was 70 while its variance was 8.2 while the mean score for the conventional group was 60 and its variance was 5.1 Null hypothesis was rejected because significant difference existed between the two groups. The innovative group performed better than the conventional group.

Table 4: F-test for Variance Summary Table

	S^2_A	S^2_B	F_{tab}
S^2_A	1.00	2.02 Significant $H0_2$ rejected	1.69
S^2_B	2.02 significant, $H0_2$ rejected	1.00	1.69

The results of F-test for variances show that the tabulated result was lower than the calculated result, leading to the rejection of null hypothesis. Significant difference existed between the two groups. The innovative group performed better than the conventional group.

Discussion of Result:

The results show that the mean performances and variance of the innovative method group differ significantly from those of the conventional method group. Null hypotheses were rejected, showing that the innovative method group with a mean score ($\bar{x}$) of 70 and variance of 8.2 performed better than the conventional method group with a mean score ($\bar{x}$) of 60 and variance of 5.1

Implication of the Study:

The result of the finding show that some children can perform specific tasks more successfully using innovative ideas than when they use the routine (conventional) ways of problem solving in primary school mathematics.

Limitation:

The result of this study was limited by some constraints. The researchers were unable to assess pupils in junior primary school and also could not assess pupils in other areas of Mathematics because the scope of this study is based on arithmetic of senior primary school mathematics.

Conclusion:

Much consideration should be given to innovation during instructional delivery and school programmes evaluation to enable children do well in primary school mathematics and as a necessary guide for further education. This is so because the results of this study show that the innovative group performed better than the conventional group.

Recommendations:

The researchers recommend that this study be carried out in different subject areas at various educational levels and that:

1. Children should be encouraged by their Mathematics teachers and other relevant stake holders in education to bring in innovation during problem solving to enhance divergent thinking.
2. Early childhood educational evaluators should bring in innovation during school programme and curriculum evaluations.
3. Programme planners/curriculum experts should endeavour to utilize innovation during programme planning in early childhood Mathematics.
4. Early childhood Mathematics teachers should facilitate problem solving using innovation.
5. Children who distinguish themselves in innovation in Mathematics should be encouraged using scholarship awards by government and other educational stake holders as well as encouragements using other motivational facilities.

6. Workshops, seminars, conferences and debates on innovation should be organized from time to time by government and other relevant agencies for both teachers and pupils.

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