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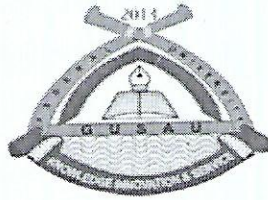
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TEACHING MATHEMATICS IN INTEGRATED QUR'ANIC SCHOOLS UNDER NATIONAL BASIC EDUCATION CURRICULUM IN NIGERIA: MANAGEMENT IMPLICATION

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Abstract

The relevance of mathematics to individual, society and the nation at large cannot be over emphasized. Mathematics is as old as human existence and also remains the soul of the world. This paper tries to highlight the objectives of the curriculum as contained in the National Basic Education Curriculum for integrated Qur'anic schools. The paper discusses nature and structure of the curriculum. It also looks at the problems associated with learning mathematics which was generally divided into two groups; that is problems associated with learning mathematics and learning characteristics of student with mathematics problems negative impact of mathematics of students with learning problems. It further highlights the major teaching methods used in mathematics. The discovery method was recommended at the lower level for the implementation of the curriculum. Two illustrations were presented on how to apply the method and Management Implications were also discussed. Based on the findings of this study, it was recommended that students' negative attitude in mathematics should be discouraged by teachers from the early stage of the integrated Qur'anic schools through effective methods of teaching. Also it was recommended that proprietors of the Qur'anic schools should complement government efforts in the successful implementation of the curriculum in their various schools. It was also recommended that good textbooks be provided to motivate student for greater performance in Mathematics.

Key Words: Teaching Mathematics, Integrated Qur'anic Schools, National Basic Education Curriculum, Management Implication.

Introduction

Education is to a nation what protein is to a young human organism. As a vital tool for the understanding and application of science and technology, the discipline plays the vital role of a precursor and harbinger to the much needed technological and of course national development, which has become an imperative in the developing nations of the world (Bassey, Joshua and Asim, 2015).

Mathematics, according to Aminu (1995), is not only the language of sciences; it is also the essential nutrient for thought, logic and reasoning. Science is the foundation of technology while technology is the bedrock of modern development. Hence, Mathematics is the foundation of science, technology and modern development. For any nation to survive and develop, it has to improve its technology. One of such ways in which this can be achieved is through effective teaching and learning of Mathematics in schools.

It is in realisation to this objective that, the Federal Government of Nigeria has promoted a special programme toward the effective teaching and learning of Mathematics under the National Basic Education Curriculum for (Integrated) Qur'anic schools. Therefore, the focus of this paper shall be to discuss along the following sub-headings: to highlight the objectives of the curriculum, examine the nature and structure of the curriculum. The importance of Mathematics with a particular reference to national development and Mathematics learning problems were also examined. In the process, the paper shall briefly mention the types of teaching methods in mathematics as well as the application of one of the methods to specific example/topic at Quranic School while management implications were also discussed. Recommendations were made accordingly.

Objectives of the Curriculum

According to the Universal Basic Education Commission (UBEC), (2004), the National Basic Curriculum for (Integrated) Qur'anic schools has four basic objectives. These are to provide:

- basic education, elements of literacy, numeracy and life skills for learners in Qur'anic schools;
- training in vocational skill that will assist them (students of Qur'anic schools) in their day to day activities and equip them with income generating skills;
- necessary knowledge for the completion of this programme to be the mainstream in the formal system; and

- to prepare Qur'anic school pupils to transit to the middle level stage of the basic education programme (classes 4-6).

Nature and Structure of the Curriculum for Integrated Qur'anic Schools

The Qur'anic school is an Islamic institution usually owned by an individual/organisation or group of people in a particular community. It is a fact that each Qur'anic school operates its own curriculum on a set of topics, subjects, content and learning activities with its unique learning/instructional materials and evaluation procedures (UBEC, 2004). The newly developed curriculum can only be supplementary and not a substitute to the traditional Qur'anic schools' curriculum.

This curriculum is part of a nine year compulsory basic education curriculum for the Qur'anic school pupils who otherwise may not have the opportunity of enrolling into the formal school system. However, the curriculum covers only the first three year of basic education curriculum. At the end of the first stage, it is expected that pupils should be able to enroll into a formal school system at the fourth(4) level or its equivalent. The curriculum seeks to integrate literacy, numeracy and vocational skills. Specifically, it seeks to teach the following subjects English, Mathematics, life and vocational skills.

According to UBEC (2004), the curriculum was specifically designed for the two groups of pupils. The first group consists of the learners who concurrently attend both Qur'anic school and the formal school system. The second group consists of migrant children who attend Qur'anic schools only and survive through alms begging and other menial jobs. It must be noted that, NBEC was specifically designed for this second group, that is, the migrant children popularly known as the 'Almajiri. However, this paper shall not be restricted to the last group but shall discuss the two groups as identified in this study.

Importance of Mathematics in National Development

It is obvious that the current situation in Nigeria is different compared to the 1960s because of the emphasis on the shift towards science and technology as manifested in the adoption of the 6-3-3-4 and 9-3-4 educational systems respectively. These policies make Mathematics as one of the core subjects for the attainment of technological advancement and scientific development. Omosidi (2002) noted that mathematics has become a tool for economic survival of everyman in everyday interaction. An ordinary person in the society needs to compare and estimate value of articles, determine prices of food stuff and measure distance

and time. In addition, knowledge of additions and subtractions is vital to the society and market and especially in the shops for buying and selling.

Apart from being an intellectual stimulant Mathematics is the key to science. Also, it is an indispensable partner in the technological progress of a nation, as it's content helps learners to understand science (Omosidi, 2016).

In his contribution, Tijani (2002) also agreed that Mathematics serves as a tool in science. Tijani (2002) added that in many schools today, the choice of science subjects at a certain level of education is much related to ability in Mathematics. Therefore, proficiency in Mathematics is important to the study of science not only at the advanced level but also at the elementary level.

According to Faleye (1999), Mathematics is the discipline of thought. The ability to think along specific terms becomes inherent. Hence, one gains through the sense of deductive and inductive reasoning. Mathematics helps to develop the reasoning ability of an individual. If an individual is good in Mathematics, he is expected to have adequate knowledge of phenomena of life.

Mathematics develops and improves human thinking and reasoning faculty by nourishing his philosophical mind generally. A mathematician can adjust and tolerate with ease in any given task. Engineering is the power of a nation's technology. Mathematics provides the model, symbol, physics and logic that are needed in the process of mechanisation.

Furthermore, Mathematics can be applied to political system that is, for innovation and collection of viable data for political planning. Equitable distribution of amenities, numerical data for development plan and generating statistics of the populace in election matter.

Mathematics Learning Problems

It may not be out of place for students and teachers to face problems in teaching/learning Mathematics in integrated Qur'anic schools, just like their counterparts in the western schools. Research in the area of mathematics and students with learning problems is lacking in comparison to research in the areas of reading and language skills for these students. However, research can be informed of how best students can be helped with learning problems of both Mathematics concepts and Mathematics skills (Elliott, Kratochwill, Cook, and Travers, 2000). Since the new curriculum is intended to prepare Qur'anic school pupils to transit to the middle level stage of the basic education programme, it would be of benefit to assume that the learning difficulties of students in Western schools would also surface in Quranic schools.

However, two critical areas of research reveal why students have difficulties in learning Mathematics. These two areas include the learning characteristics of the students with Mathematics learning problems, and instructional issues that negatively impact on learning characteristics of these students (Elliott, et al 2000).

Learning Characteristics of Student with Mathematics Learning Problems

There are several research-based characteristics that negatively impact students' ability to learn Mathematics. The following learning characteristics represent substantial barriers to students' success in Mathematics:

- i. **Learner Helplessness:** is the result of students' continued failure in Mathematics and the temptation educators have to 'get them through' a current set of problems. Without these experiences, students learn more accurately and they are taught as if they cannot learn Mathematics.
- ii. **Passive Learning:** learner helplessness and metacognitive deficits (described below) produce a passive learning approach to Mathematics. This prevents students from being 'active' learners. For example, a student may be confronted with the problem, 8×4 , he is not able to solve it. Although he may understand the rule of repeated addition (that is $8+8+8+8=32$), but may not be able to apply this knowledge to the 'new' situation. Due to the prior experience with failure in Mathematics, learner is unwilling to take risks. Additionally, metacognitive deficits may be prevented from applying this strategy 'automatically'.
- iii. **Memory Problem:** successful learners are able to retrieve from memory, critical information when solving problems. Students with memory problems often have difficulty doing this. They have a 'faulty' or inefficient memory retrieval mechanism. Difficulty with retrieving information from memory is especially problematic when students are confronted with multi-step problem-solving situations. As the problem-solving, students often come to a point in the solving – process where they cannot retrieve from memory what they should do next.
- iv. **Attention Problems:** students with attention problem often 'miss' important information they have gaps in their knowledge base which become barriers for accurate problem-solving. For example, students may miss the 'subtract' step in the 'divide, multiply, subtract, bring down' long division process.

- v. **Metacognitive Deficits:** metacognitive involves the ability to apply appropriate learning strategies, to evaluate their effectiveness and to change strategies when current ones are not successful. Metacognitive deficits become more pronounced as students are expected to apply strategies and other information they have learned to new concepts and skills. The multiplication/repeated addition illustration under passive learning is one example of how metacognitive deficits affect Mathematics learning.

Mathematics instruction and the negative impacts on the learning characteristics of students with learning problems:

- i. **Spiral Curriculum:** Although, the intent of a spiraling curriculum is good, but the way it is often operationalised can be very detrimental to students with Mathematics learning problems. Most notably, students with learning problems often do not have the opportunity to get the chance to master a concept/skill before the class moves to the next concept/skill. When they revisit the concept/skills the following year, these students don't have it in their skill repertoire because they never mastered it. This situation creates significant gaps in knowledge as they move through the elementary and secondary levels.
- ii. **Teaching Understanding vs. Algorithm Driven Instruction:** The tendency for educators to embrace one way of teaching understanding without teaching algorithms places students at risk of never developing the skills necessary for solving real life arithmetic problems. Likewise, an emphasis on algorithms without teaching the conceptual understanding that underpins the algorithm creates procedural without conceptual understanding.

Neither of these options bode well for students with learning problems. Students with learning problems often receive a heavy emphasis on algorithm instruction because that's what we 'see' them struggle with. Students may always have difficulty performing algorithms effectively because of the various learning characteristics that negatively impact on them. However, without teaching them conceptual understanding when we are teaching algorithms, they cannot understand foundational Mathematics concepts either. Teaching one and not the other places these students in a precarious position. They become masters of neither of the important skills.

- iii. **Cyclical Reforms:** Like reading, mathematics undergoes periodic 'reforms' which are cyclical in nature. While reading instruction moves between phonic-driven and whole-language instructions, Mathematics moves between algorithm driven instruction and teaching conceptual understanding. While successful learners can manage the transition these cyclical reforms make during their school career, students with learning problems do not manage such transitions well, causing significant gaps in conceptual and skill acquisition.
- iv. **Application of Effective Teaching Practices for Students with Learning Problems:** Students with Mathematics learning problems need research-supported instructions in order to learn Mathematics. Moreover, these instructions must meet their unique learning needs. The good news is about knowing what is good for these students. The bad news is that such practices are poorly integrated in many mathematics textbooks/series and therefore are not implemented systematically in the classroom. The result for these students is instructions that do not meet their learning needs and therefore limit success.

Methods of Teaching Mathematics

No single method of teaching can be described as the best. The combination of methods for teaching Mathematics at various levels of education is the most viable. In Mathematics, some methods are available for various categories of Mathematics teachers at different stages of educational system. These according to Akinsola (2003) include: Synthetic and analytic methods; Deductive and inductive methods; Discovery method; Heuristic method; Analytic method; and Laboratory method.

Discovery method is recommended for the purpose of the level for which the curriculum is meant, that is pupils of Qur'anic integrated school, which is the equivalent of primary 1-3 of the formal school system. Brunner in Akinsola (2003) advocated for discovery learning and held this had greater acceptance, at least in schools throughout the world today. Brunner wrote "Toward a theory of instruction", in which he explained how his ideas be translated into practice in the classroom situation. Brunner emphasized on discovery and 'hand on' learning was in accord with Piaget's ideas. Certainly the constructive nature of his theory appealed to teachers and many of his principles are still employed by practicing teachers.

Brunner argued that teachers should teach the 'structure' of subjects. He advocated the introduction of the real process of a particular discipline to students. For example, when

learning history, students should become involved in genuine historical enquiry. This might involve examining a bridge, a building, or even a head stone in a cemetery, then using the information acquired to trace records of various kinds in order to answer the questions generated about the origins, purposes, and history of that structure, or the life of the person concerned.

Akinsola (2003) emulated three stages in Brunner's theory of intellectual development as follow: Enactive where a person learns about the world through actions or objects; Iconic where learning occurs through using models and pictures; and Symbolic which describes the capacity to think in abstract terms.

Brunner's underlying principle for teaching and learning is that a combination of concrete, pictorial then symbolic activities will lead to more effective learning. The progression is: start with a concrete experience then move to pictures and finally use symbolic representation. Is that path familiar to any of the readers? Are there similarities between Brunner's principle and the procedure suggested for teaching numeracy? Have you ever taught Algebra using this procedure? It works!

Discovery method as its name implies is suitable for teaching mathematics at primary and post-primary schools in line with Brunner's theory. While using this method in teaching, the teacher only serves as a helper as the students carry out the assigned task. It is believed that whenever a teacher uses discovery method, and the learner learns through it, learning always remains longer and enduring.

According to Akinsola (2003) the advantages of the method to students include: knowledge acquired lasts longer; there is intrinsic satisfaction; broad future application; increases intellectual potentialities, encourages spirit of inquiry and exploration; often occurs under democratic atmosphere; it answers the question, what, how and why of a particular learning and it is student-centered.

Akinsola (2003) further stated that the disadvantages of the method also include: it's too time consuming; less is covered within a stipulated time; may discourage the below average student; objectives are difficult to state in behavioural terms and could be expensive.

Application of the Discovery Method

Hypothetical examples of how to use discovery method in teaching counting in Qur'anic integrated schools can be illustrated thus:

Example 1

Concrete objects such as bottle tops (corks), seeds, and matchsticks could be used to introduce the idea of counting. Counting bars and square number charts could also be used to count numbers not greater than 100. The place value may be introduced using abacus or by counting in groups of tens and units. To teach the writing of numerals up to one hundred, the teacher may use hundred square number chart as shown below.

Table 1: Square Number Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	98	98	99	100

Consider the lesson plan for example one

Class	Primary One
Average Age	6 years
Date	20th March, 2009
Duration	30 minutes
Subject	Mathematics
Topic	Counting
Instructional Materials	Bottle tops, seeds and match-sticks
Reference Books	Longman Primary Mathematics Pupils Book
One	
Performance Objectives	At the end of the lesson, the pupils should be able to: 1. Count 1-100 2. Count in groups of thousand units.
Previous Knowledge	The pupils have been counting sticks, seeds and bottle tops in the past.
Introduction	The teacher introduces the instructional materials for the counting exercise such as

Presentation (Step 1)

matchsticks, seed and bottle top (corks) to the pupils

(Step 2)

The teacher starts the lesson by counting from 1 to 100 with the aid of a square number chart pasted on the blackboard (see table 1).

The teacher counts while the pupils respond after the teacher several times.

(Step 3)

The teacher allows the pupils to count from the square number chart on the chalk board several times in groups.

Evaluation

The teacher evaluates the lesson by asking the pupils questions based on the lesson, such as how many units or tens does 1-60 contain?

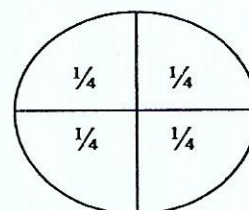
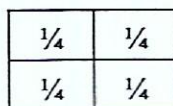
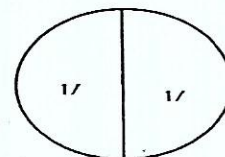
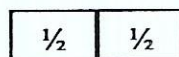
Conclusion

The pupils copy the square number chart in their various notebooks.

Example 2

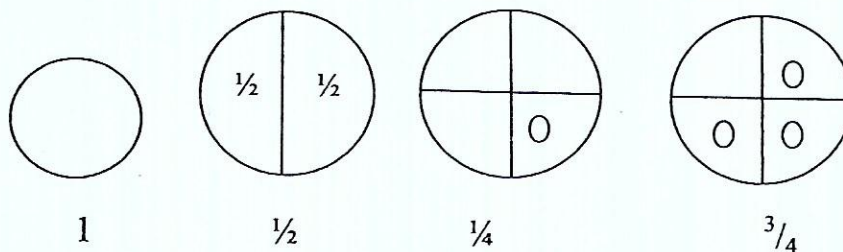
An example of how to teach fractions to the same level using the discovery method illustrated below.

The introduction of fraction must start with practical activities. For instance the teacher should provide pupils with paper cut-out of circles, rectangle, and squares. The pupils are then asked to cut them with scissor into two, three or four equal parts after a demonstration by the teacher. The pupils may also be given pencils and asked to mark where they plan to cut to make the division easier. The teacher should equally draw the cutting on the board with their respective fraction symbols as demonstrated in the figures below:



Let us consider the lesson plan for the same topic under discussion

Class	Primary One
Average Age	6years
Date	26 th March,2009
Duration	30minutes
Duration	Mathematics
Topic	Fractions
Instructional Materials	Orange, sticks, pieces of string, paper rectangle, squares and circles.
Reference Books	Longman Primary Mathematics Pupils' Book One
Performance Objectives	At the end of the lesson, the pupils should be able to: 1. Say what fraction is 2. Sort out different types of fractions from whole by using concrete objects.
Previous Knowledge	The pupils have been showing objects amongst themselves e.g. orange, bread and banana.
Introduction	The teacher now brings out some of the instructional materials such as oranges, sheets of paper, rectangles and squares. The teacher illustrates to the pupils how to cut single object in to different equal parts e.g. $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$.
Presentation (Step i)	The teacher presents the lesson by explaining fraction through practical work to the pupils on the black board e.g



Step ii

The teacher reads and names the parts of fraction while the pupils respond several times after the teacher.

Step iii	The teacher allows the pupils to read the diagram several times from the chalkboard. Call on individual pupils to read.
Evaluation	The teacher evaluates the lesson by asking the pupils questions based on the lesson e.g. name some objects that can be divided into fractions?
Conclusion	The pupils practice drawing of objects and Divide them into various fractions.

Management Implication

Management is the process of making the most effective use of available resources, whether in form of human, materials, financial or time (Hartzell, 2006). The human resources are responsible for the management of an organization, that is, for the planning, coordinating, directing and running of its operations, for the effective implementation of its policies and the attainment of its goals. Akinnubi (2016) described management as the process of planning, organising, leading and controlling the efforts of an organisation members as well as, using all other organisational resource to achieve stated organisational objectives. However, management can simply be defined as the process of organising, planning, staffing, controlling, motivating and directing human activities and other resources (money, material and time) towards achieving specific organizational goals and objectives.

In order to achieve the objectives of this curriculum programme, the fundamental functions of management need to be applied by the authority connected with the implementation of the curriculum of integrated Qur'anic Schools in Nigeria. Therefore, the following steps are recommended:

1. The Integrated Qur'anic Schools pupils need to be re-organised into semi-formal education system, if formal education system cannot be immediately achieved. The pupils need to be grouped into classes and qualified teachers of Mathematics be employed for this purpose.
2. Planning is the bedrock of any formal system. Therefore, enrolment plans needs to be put in place using the present enrolment figures. Hopefully, this would enable the planners to determine the resources needed for the programme.
3. In order to have a successful curriculum, qualified mathematics teachers should be employed. Training and re-training of the current teachers in the system should be

encouraged through organized workshops, seminars, and in-service training to obtain Degree or Post-graduate degree in education.

4. Day to day monitoring of the general activities of the schools under consideration is necessary more than ever before, so as to achieve the quality objective of the curriculum should be re-oriented toward this direction.
5. Finally, there should be a systematic process of coordinating teachers' efforts to achieve the objectives of the curriculum in the implementation process. This is because, it involves people (teachers) as the most dynamic resources of the school system.

Conclusion

Mathematics is the "Mother" of all science subjects. An in depth knowledge of the subject is expected to aid the understanding of other science subjects. In view of this, mathematics teachers should endeavor to make the teaching of the subject interesting to students so that the general notion that mathematics is too difficult would be eliminated right from the early stage of learning. Finally, it is expected that the usual practice in the formalized primary schools where a teacher is attached to a particular class to teach all the subjects include mathematics should be discouraged.

Recommendations

The curriculum for integrated Qur'anic schools is a new policy in our educational system. As a result, it needs proper implementation by all stake-holders in the system; Based on this, the following recommendations are suggested:

1. It is certain that good results cannot be achieved if the school child has no enthusiasm for his work; if there is no strain on his part, no matter how much effort the teacher may put into explanation, individual consultations and supplementary lesson, little would be achieved. Thus, usual negative attitude of students in mathematics should be discouraged by teacher right from the early stage of the integrated Qur'anic schools through effective methods of teaching.
2. Since the present teachers in most of the Qur'anic schools are not trained to teach mathematics aspect of the curriculum, there is the need for trained and qualified teachers to handle mathematics aspect of the curriculum.
3. The teacher's work goes for nothing unless the pupils go deeply into the essence of the matter and tries to comprehend the subject himself.
4. Loss of interest in learning at some stage rise to indifference and apathy; indifference gives rise to laziness, and laziness give rise to idleness and loss of ability. That is why it is important to rethink the methods of teaching mathematics, so as to make its study interesting.
5. Mathematics teachers should learn to direct their attention towards the facilitation of students' understanding and conceptualization rather than drill and practice of rote procedures.
6. The present textbook in mathematics for formal primary schools is quite adequate to be adopted for various classes of integrated Qur'anic schools.
7. The proprietors of the Qur'anic schools should be called upon to appreciate the government efforts in the successful implementation of the curriculum in their various schools.

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