

# Appraising the Efficacy of Mental Math Strategy on Acquisition of Numeracy Skills: A Case of Literacy Programme in South West, Nigeria

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## ABSTRACT

The implementation Literacy programme in South West, Nigeria is specifically meant to address the high level of illiteracy. Descriptive survey research design was adopted for this study. The study population comprised clientele of Literacy programme in South West, Nigeria (Ogun, Osun, Oyo, Ondo, Lagos and Ekiti States). The sample size of the study was Three hundred (300) respondents, selected through a purposive sampling technique. Data was collected through self-developed research instrument, entitled "Questionnaire on Appraising the Efficacy of Mental Math Strategy on Acquisition of Literacy Skills in Literacy Programme in South West Nigeria", developed on Four Likert Rating Scale (Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD)). It was complemented by primary data (Focus Group Discussion "FGDS"). The research instrument was validated by an expert in Test and Measurement, while its reliability was determined through test retest method at two weeks interval. 0.68 coefficient reliability was obtained. The research questions were analysed, using descriptive statistics (frequency counts, simple percentages and means), while the qualitative data was transcribed and analysed qualitatively. Based on the results, conclusion was made that the mental math strategy could enhance the performance of clientele on numeracy and computation skills in literacy programme of South West, Nigeria. Also, that the strategy could also facilitate and motivate clienteles interests towards learning numeracy and computation in the programme. Based on

the conclusion, recommendations were made that facilitators should be encouraged to be using the strategy during numeracy lessons. Also, emphasis should be stressed on the usage of the strategy (Mental Math) in Literacy programme in South West, Nigeria.

**Keywords:** Efficacy, Mental math, Strategy, Literacy programme, Skill acquisition, Numeracy

## BACKGROUND OF THE STUDY

From the avalanche of available reports, Nigeria is among the nations that have been categorized as E-9 Nations in the world. According to Egunyomi (2015), E-9 Nations are countries that have illiterates as highest in the numerical strength of their populations. This includes; Brazil, Egypt, India, Nigeria etc. This negates world agendum or agendas on education and literacy, amplified at several conferences, seminars, summits and for Education for All (EFA) and the Dakar Framework for action easily come to mind in this contention. The sixth goal of EFA focuses on improving all aspects of the quality of education and ensuring excellence of all. Ogundare (2004), stressed that education for all is a matter of contribution from all.

The implementation of Universal Basic Education in Nigeria is a way of fulfilling the nation's commitments to eradication of illiteracy and provision of basic education to the teaming population.

... where the right to education is guaranteed, people have a greater chance to enjoy other rights. Knowledge opens mind to the world, to other cultures, languages and ways of thinking. It empowers people, gives them a voice and unlocks their full potentials (United Nations Education Scientific and Cultural Organization, 2002).

From the above information therefore, actions to reduce illiteracy in the society is not Nigeria's agenda alone, rather a global mission. Literacy education is a basic human right and key to life-long learning. For a considerable period of time, literacy or education has been acknowledged, throughout the world as a basic human rights. Erinsakin (2012), stressed that it is a cogent tool to guarantee social progress and advancement. According to Afe (2000), education is a tool to achieve integration of individuals into the society, so that he/she could achieve self-realization, develop national consciousness, promote unity and strive for social, economic, political, scientific, cultural and technological progress.

Oyekola (1993) , corroborated by Sarumi (2009), posited that for people to be developed socially, economically, politically and other areas of human endeavour, there is the need to liberate citizens from traditional forms of beliefs, attitudes and education which could be achieved through a functional literacy practices. This provides a major justification for implementation of literacy education. Sarumi (2001), identified the following as benefits or rationale for implementing literacy education; literacy education expands the consciousness and fast-track national development etc. Human development is a foundation of economic and social development, as well as sustainable development; empowerment, wealth creation and building a nation where peace, freedom and democracy are thriving. All these and many more can be achieved through not just a literacy education but a

sound and a well implemented functional literacy education. Literacy is the ability to read, write and carry out a simple numeracy tasks (Erinsakin, 2018). However, the reality today is that literacy involves more than the ability to read, write and calculate.

It is in the light of the above that the Federal Government of Nigeria began Literacy programme dated back to the Colonial era but gained an accelerated momentum after the counting independence in 1960. The Universal Primary Education (UPE) 1976, Universal Basic Education (UBE) 1999, National Teachers' Institute (NTI). Also, there are numbers of institutional based literacy programme, such as UNIVA Functional Literacy Programme (UFLP), Nigeria. UFLP was initiated and formulated within the context of UNESCO's Literacy Initiatives. For empowerment (LIFE) and it is being implemented by UNIVA, a registered Non-governmental Organizations (NGOs) based at the University of Ibadan (Department of Adult Education) (UNESCO Institute for Literacy Learning, 2009).

According to Aderinoye (2007), "The programme has helped to improve the socio-economic status and living standard of its participants. It is UNIVAS' conviction that the promotion of literacy is a crucial instrument to guarantee social empowerment, poverty alleviation and development".

However, in the context of this study, the Literacy programme, specifically in the South West, Nigeria, comprised Ondo, Oyo, Osun, Ogun, Ekiti and Lagos States draw its operational philosophy from the National Policy on Education (NPE) (1981). However, it has been observed that the acquisition of literacy skills, specifically, numeracy skills, clientele's performance is not encouraging based on the extant reports on the programme. Thus, resulted into adoption of several strategies or met effective mastering of the skills, such as; mental math and other strategies or method of teaching mathematics. Mental math mean looking at two numbers and

knowing how to manipulate them in order to make an easier to solve (Gray, 2015). Further, it was stated that in strategy makes the teaching of Mathematical topics and numeracy tasks very lively and motivating.

Several studies had been conducted on Mentalmath as instructional strategy on teaching and learning. Observable, much of the researches had been self-reported, meaning that little has been done on it empirically. It is against this backdrop, this study was carried out on appraising the efficacy of Mentalmath strategy on acquisition of numeracy skills: A case of literacy programme in South-West, Nigeria.

### **Statement of the Problem**

It is truism based on the available reports that Nigeria is among E-9 nations of the world. Thus, informed the commitment of Nigerian governments to Literacy programme implementation, which had hitherto informed the adoption of several policies and programmes on literacy promotion. However, clientele performance in numeracy skills is very discouraging and a source of worthy to the stakeholders in Literacy education of the avalanche of reports on the programme as not encouraging. Thus, resulted into adoption of using many instructional methods like, Mentalmath. Thus, necessitated this research.

### **Objectives of the Study**

The general objective of the study was on appraising the efficacy of Mentalmath strategy on acquisition of numeracy skills in Literacy programme in South-West, Nigeria. Specifically, the objectives of the study were to:

- i. ascertain the relationship between Mental math and acquisition of numeracy and computation skills in Literacy programmes in South-West Nigeria; and
- ii. determine the level of clienteles' attitudes towards using Mental Math strategy in numeracy and computation tasks performance in Literacy programme of South-West, Nigeria.

### **Research Questions**

Two research questions were formulated to guide the study.

- i. Can mental Math strategy enhance effective acquisition of numeracy and computation skills in Literacy programme in South West, Nigeria?
- ii. Can Mental math strategy facilitate and motivate clienteles' interests towards effective task performance in numeracy and computation skills in Literacy programme in South West, Nigeria?.

### **Significance of the Study**

The results of the study are significant to the stakeholders in literacy programme in Southwest, Nigeria.

1. The findings of the study will enable government at all levels, being a major provider of the programme to establish the relationship between mental math strategy and effective of numeracy and computation skills in literacy programme.
2. The results of the study will also reveal, whether using or not Mentalmath as instructional method can enhance numeracy and computation skills of the clientele in Literacy programme in South West, Nigeria.
3. The findings of the research will reveal the clientele of literacy programme attitudes and perception of numeracy and computation skills in South West, Nigeria.
4. The study will add to the extant literature in the area of the study, thus, serves as a good source of reference to researchers in future.

### **LITERATURE REVIEW**

#### **Mental Math Instructional Strategy**

Mental math is one of the instructional methods that are often used to teach learners on how to solve Mathematical questions. The ability to calculate, using mind is an impressing way of solving daily challenges we encounter. Mental math involves, using, only mental ability without written materials like (pen, pencil and

calculators), especially when computing materials are not at learners' disposal. Reys (1985), stated that the strategy (mental mathematics) is a strategy or mental task or activity in which students do Mathematical activities without making use of computer, calculators or writing instruments. Longman (2010), defined Mental math as a process of carrying out numeracy tasks multiplication, addition, solving and subtraction. Mental math has been found to a strategy that can be used to solve many Mathematical activities in mind. Rubenstein (2001), stated the following as topics which Mentalmath application could be used to tackle: Algebra, Pre-calculus programme, Geometry and Measurement. Anderson et al (1990), stated that Arithmetic involves various cognitive processes and strategies but depending on the types of operation, numerical symbols used.

Mental math aids cognitive thinking. Cognitive thinking is very important because it enhances learners' abilities to solve problems, as well, develops their creative thinking (Rheta, 2001).

Some reasons have been adduced to justify the use of Mentalmath, as instructional method. These include:

- It enhances children's ability to concentrate
- It makes children to be interested in learning math
- It makes children to have self-confidence
- It assists them with the application skills in math
- It minimizes errors in problem solving
- It is strongly associated with betterment skills
- It stimulates both sides of the brain

Reys (1985), noted that development of mental calculation skills stimulates higher level of mathematical skills. Hazekamp (1986), opined that it enables children to possess ability to recognize and work with numbers that are multiples of power of ten. Also, students can develop more flexibility that will make them to think

of number in many ways and forms (Beishuizen, 1997).

The use of Mentalmath instructional method to teach numeracy skills in literacy programmes has its own antecedent challenges. It became difficult to students at time to use the method, effectively because it tasks them, mentally. However, scholars, especially the Mathematicians, have found the method very good and results oriented.

## **METHODOLOGY**

Descriptive survey research design was adopted for the study, because results generated from the same size of the study was generalized on the entire study population. The study population comprised the clientele of Literacy programme in South West, Nigeria, while the sample size was Three hundred (300) subjects. Purposive sampling technique was used to select Fifty (50) respondents from the Literacy programme centre that was first established or created in the states in South West, Nigeria (Ogun, Osun, Ondo, Oyo, Ekiti and Lagos).

Data was collected through a self-developed research instrument by the researchers, entitled "Questionnaire on Appraising the Efficacy on Mental Math Strategy on Acquisition of Numeracy Skills: A case of Literacy Programme in South West, Nigeria", developed on Four Likert Rating Scale (Strongly Agreed (SA), Agreed (A); Disagreed (D) and Strongly Disagreed (SD), complemented by Focus Group Discussions (FGDs). One section of FGDs was held at each of the Literacy Programme centres selected from the six states.

The research instrument was validated by an expert in Test and Measurement at Adeyemi College of Education, Ondo, Ondo State, Nigeria, while its validity was determined, through test retest method at two weeks interval. 0.69 coefficient reliability was obtained. Two research questions were formulated to guide the research and analysed, using descriptive statistics (frequency counts,

simple percentages and mean), while data from FGDs was transcribed and analysed, quantitatively.

## Presentation of Findings and Discussion of Results

**Research Question One:** Can Mentalmath strategy enhance effective acquisition of numeracy and computation skills in literacy programme in South West, Nigeria?

**Table 1:** Showing frequency counts, simple percentages and means on can mental math enhance effective acquisition of numeracy and computation skills in literacy programme in South West, Nigeria.

S / N	I	T	E	M	S	S	D	D	A	S	A	Mean	Remarks	
1	.	Using	Mental	Math	strategy	positively	influence	my	performance	in	numeracy	and	computation	skills
						1	6	2	4	5	9	2	0	1
						5.3%		8%		20%		67%		
2	.	The	use	of	Mental	math	strategy	has	no	positive	influence	on	my	effective
						1	1	4	5	6	8	0	7	0
						38%		19%		27%		23.3%		
3	.	Mental	math	increasing	learning	rate	in	learning	numeracy	skills				
						1	4	2	6	3	0	2	3	0
						4.7%		9%		10%		77%		
4	.	The	rate	at	which,	I	learn	numeracy	and	computation	skills	are	retarded	when
						2	0	0	5	0	2	8	2	
						67%		17%		9.3%		7.3%		
5	.	Mental	math	is	the	most	appropriate	instructional	strategy	that	can	make	me	to
						4	5	2	5	5	0	1	8	0
						15%		8.3%		17%		60%		
6	.	Mental	math	strategy	does	not	develop	my	thinking	than	other	strategies,	while	learning
						1	9	0	6	0	4	0	1	0
						63.3%		20%		13.5%		3.3%		
		T	o	t	a	l								
						5	7	4	2	4	1	2	8	7
						32%		13.2%		16%		40%		

Table 1 presents result on research question one, which states that can Mental math enhance effective acquisition of numeracy and computation skills in literacy programme in South West, Nigeria. On item (1), 201 (69%), among the respondents that responded strongly agreed, 59 (20%) agreed, 24 (8%) disagreed, while 16 (15.3%) strongly disagreed. On item (2), 10 (23.3%) strongly agreed, 80 (27%) agreed, 56 (19%) disagreed, while 114 (38%) strongly disagreed.

On item (3), 230 (77%) strongly disagreed, 30 (10%) agreed, 26 (9%) disagreed, 14 (4.7%) strongly agreed, 50 (17%) disagreed, while 200 (67%) strongly disagreed. On item (5), 180 (60%) of the respondents strongly agreed, 50 (17%) agreed, 25 (8.3%) disagreed, while 45 (15%), strongly disagreed.

Finally, on item (6), 10 (3.3%) strongly agreed, 40 (13.3%) agreed, 60 (20%) disagreed, while 45 (15%) strongly disagreed. Generally, the results reveal an average mean of rating scale of four, ( $x = 2.6$ ) which lesser than ( $x = 2.5$ ) of the mean rating scale of four. Thus, indicates that Mentalmath strategy could enhance effective acquisition of numeracy and computation skills in literacy programme in South West, Nigeria. The results seem to

agree with the Rheta (2001), that Mental math enhances students' ability to establish cognitive thinking while solving mathematical problems and also develop their creative thinking. The results was further corroborated by the responses obtained from the respondents, using FGDs.

Male respondents stated that;

*The use of the strategy by our facilitators during numeracy lesson is very good. It has been enhancing my thinking ability, thus enables me to perform some numeracy tasks without using calculator or manipulating objects.*

**FGDs – Literacy Programme Centre, Ondo State.**

Another female submitted that:

*Mental math has improves my ability to do subtraction, addition and manipulation without using objects. At this level of carrying out numeracy tasks the strategy is good and appropriate.*

**FGDs – Literacy Programme Centre, Osun State –**

Similarly, a female respondent stated that:

*Initially, the strategy was very stressful to me in terms of thinking and getting answers, accurately, but now, I have found the strategy very good, during numeracy lessons*

**FGDs – Literacy Programme Centre, Ogun State**

The submissions of scholars on the results were further buttressed by the responses obtained from the respondents during the FGDs.

A female respondent submitted that:  
*The use of mental math strategy has motivational effect on me. I always willing and interested in responding to questions on tasks on numeracy skills during lesson whenever, the strategy is adopted.*

**FGDs – Literacy Programme Centre, Oyo State.**

Another male reiterated that:  
*The use of mental math during numeracy classes make classroom setting very lively.*

*Every clientele is always active in the class during numeracy lesson*

**FDGs – Literacy Programme Centre, Lagos State**

Also, a female respondent maintained that:

*You see, everybody in the class is always at alert to listen and answer questions during lesson. I think mental math is the best strategy that facilitators should be using, while teaching numeracy skills in this programme.*

**FGDs – Literacy Programme Centre, Ekiti State**

Research Question Two: Can Mental Math strategy facilitates and motivate clientele’s interests towards effective task performance in numeracy and computation skills in literacy programme in South West, Nigeria?

**Table 2:** Showing frequency counts, simple percentages and mean on can mental math strategy facilitates and motivate clientele’s interests towards effective task performance in numeracy and computation skills in literacy programme in South West, Nigeria.

S / N	I	T	E	M	S	S	D	D	A	S	A	M e a n	R e m a r k s	
7	.	Mental math strategy usage motivate me to learn numeracy and computation skills	1	8	2	2	4	2	2	2	1	8	3 . 5	Accepted
			6%				7.8%		14%		73%			
8	.	I am not motivated to learning numeracy and computation skills through the mental math strategy	2	1	4	3	6	2	8	2	2	1	5	Rejected
			71.3%				12%		9.3%		7.3%			
9	.	Mental Math strategy is the best strategy that can stimulate my interest in learning numeracy and computation skills	1	8	1	2	6	0	2	1	0	3	5	Accepted
			6%				4%		20%		70%			
10	.	Mental math does not make me to have interest in learning numeracy and computation skills	1	6	2	0	4	8	2	1	6	3	5	Accepted
			5.3%				4%		16%		72%			
11	.	The use of Mental math strategy make learning of numeracy and computation skills very interesting to me	2	3	3	3	7	1	4	1	6	1	4	Rejected
			78%				12.3%		4.7%		5.3%			
12	.	I do not have interest in learning numeracy and computation, because of the adoption of mental math strategy	2	4	0	2	0	2	3	1	7	1	4	Rejected
			80%				6.7%		7.7%		5.7%			
		T o t a l	7	3	9	1	4	7	2	1	5	2	5	Accepted
			52.7%				10.5%		15.3%		21.3%			

Table 2 presents results on research question 2 which states that: can mental math facilitate and motivates clientele’s towards effective task performance. On item (7) 218 (73%) among the respondents responded strongly agreed, 42 (14%) 22 (7.3%) disagreed, while 18 (6%) strongly disagreed.

On item (8), 22 (7.3%) strongly agreed, 28 (9.3%) agreed, 36 (12%) disagreed, while 214 (71.3%) strongly disagreed. On item (9), 210 (70%) strongly agreed, 60 (20%) agreed, 12 (4%) disagreed, while 18 (6%) strongly disagreed. On item (10), 216 (72%), strongly agreed, 48 (16%) agreed, 20 (4%)

disagreed, while 16 (5.3%), strongly disagreed.

On item (11), 16 (5.3%) strongly disagreed, 37 (12.3%) disagreed, while 233 (78%) strongly disagreed. Finally, on item (12), 17 (5.7%) strongly agreed, 23 (7.7%) agreed, 20 (6.7%) disagreed, while 240 (80%) strongly disagreed. A panoramic view on the results reveals that the average mean of rating scale of four ( $x = 2.5$ ) is not lesser than the average mean of four ( $x = 2.5$ ). Thus, indicates that the use of mental math as instructional strategy could facilitate and motivate clientele’s interests on skill performance in numeracy skills in literacy programme in South West, Nigeria.

The finding is in consonance with Gray (2015), opinion that instructional method Mentalmath makes teaching of numeracy and mathematical topics very lively to the learners. Students are always willing to participate in the activity in the class.

## CONCLUSION

Based on the findings of the study, conclusions were made that; Mental math as instructional strategy could effectively enhance acquisition of numeracy and computation skills, besides facilitating and motivating clientele's interests towards skills performance in Literacy programme in South West, Nigeria.

## Recommendations

The following recommendations were therefore made based on results of the research;

Much emphasis should be stressed on the use of mental math as instructional strategy during numeracy and computation skills lesson in the literacy programme in South West, Nigeria.

The facilitators should be encouraged to adopt the strategy, while teaching numeracy skills in South West, Nigeria.

Facilitators should be made to undergo training and re-training programmes, periodically to intimidate them on the use of Mentalmath instructional strategy while teaching numeracy and computation in South West, Nigeria.

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