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Using formula New Approach of Multiplication Table

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ABSTRACT

The purpose of the current study was conducted to create new approach of the multiplication table. Challenges of multiplication operation to student teachers and students in elementary schools were identified in the longtime school observation. This leads to mental experiment and case study to create the new multiplication table. The new approach of the multiplication table enables to find the multiplication results in a simple way using formula. If X and N are any single digit numbers then the multiple of X and N can be calculated using the formula; XN=X-(N-1) and if N-1= n, and if X-n=m then the multiplication result of XN is equal to nm-n (9-X). This technique enables learners to do more practice, initiate them to think critically, acquire skills, motivate them to play with numbers, ensure their success and confidence. T his new approach encourages students to acquire knowledge through detail exercise and practice. The higher challenge of multiplication operation difficulty to students would be minimized by the systematic approach of teachers; not to spoon feed to memorize the complex table, which is the base and beginning to understand complex concepts.

Keywords: Formula, Mathematics, multiplication.

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1. INTRODUCTION

1.1 Background of the Study

Mathematics is an intellectual discipline that has evolved over millennia and continues to evolve - into a coherent body of knowledge that is admired as much for its aesthetic qualities as for its usefulness. Studied for its own sake, it provides the learner with an appreciation of the power of deductive reasoning and the facility to reach correct conclusions from firmly established facts or intuitive axioms (1, 2 J. In an increasingly complex world, the value of mathematics to all areas of society is acknowledged by policy makers, not just to support the knowledge society but also as an essential life skill for social and economic participation *(2 , 3).*

Many factors have brought about a change in the overall situation of mathematics education. These include the move to universal elementary education in developing countries, the move to universal secondary education in industrialised countries and from the experience gained with worldwide curriculum developments such as the new mathematics movement (45).Math knowledge and understanding among students in the United States was considered to be weak when compared to other high performing countries (6). The 50-plus nation of Africa exhibit huge variability in size, population level, wealth and culture. The variations are also seen in educational development, specifically in mathematics Both primary and secondary level mathematics educations are weak in most Africa countries (7).

Many countries in Africa have been making efforts to improve the quality of mathematics and science education (MSE) at primary and secondary levels. On the other hand, many of those countries are faced with challenges in MSE including negative attitudes of students ,teachers and parents towards MSE and low achievements of national examinations in MSE
(8).

Mathematics is regarded as a “difficult” subject and Irish society is accepting of average levels of mathematical achievement (2). In Florida students initially find multiplication to be very difficult (9). International and domestic comparisons show that

American students have not been succeeding in the mathematical part of their education at anything like a level expected of an international leader (10).

The low achievement of students is occur due to the traditional learning basic facts, such as memorize a number pair and operation Furthermore, drill methods rely on repetition and require little understanding (9). Many students enter fourth grade lacking automaticity with the basic facts, which hinders their performance in most of the fourth grade mathematics standards (10). Mathematics teacher education is a complex, interdisciplinary enterprise requiring knowledge of teaching and learning as well as knowledge of mathematics. This argues strongly for a partnership between mathematics educators and those who teach mathematics (2). In Ireland *Report of the Project Math's Implementation Support Group* recommend that every student has a mathematics class every school day, and that school principals are encouraged to deploy their teachers who hold a qualification in mathematics at junior cycle. Primary school too provides an important basis for mathematics learning later on and it is important that teaching and learning at this level is supported and that there is good communication between primary and post-primary schools (2).

Ethiopia has given emphasis to the expansion of primary education to enhance the socio-economic transformation of its population (12, 13). Since, Ethiopia has been moved to the industrial zone, the country needs well trained man power in the fields of science education and the central missions of all educational institutions / schools are to form and produce good citizens, academically talented and future scientists. Therefore, in order to have students with high science achievement, schools should give special attention to the implement effective science teaching, new science strategic plan, regular students' school attendance and make strong collaboration with various key stakeholders (14, 15).
Different scholars develop different methods to easily understand multiplication results (16, 17). First of all, it must be mentioned that learning the multiplication table is a central subject of mathematics in primary school. Young children gradually develop an intuitive and practical arithmetic that they use to solve problems successfully and confidently in their everyday life (18). Trachtenberg method originator of the startling new system of arithmetic, was of the firm opinion that everyone comes into the world with "phenomenal calculation possibilities" (19).Teaching mathematics with a focus on number sense encourages students to become problem solvers in a wide variety of situations. 'Number sense' relates to having an intuitive feel for number size and combinations, as well as the ability to work flexibly with numbers in problem situations in order to make sound decisions and reasonable judgments (3).

2. STATEMENT OF THE PROBLEM

The researcher has got a chance to observe different natural science and mathematical classes in primary schools during the evaluation of college practicum students. Especially practicum student teachers have problems in teaching mathematics and natural science, including subject matter knowledge, teaching methodology and readiness to teach the subjects. These result in negative attitude of students towards mathematics and natural science. In U.S National Mathematics Advisory Panel concluded the success of students in mathematics includes, teacher's mathematical knowledge, instructional practices and instructional materials (10) which are the problems of Ethiopian education (8).
The difficulty of teaching natural science and mathematics is not only a regional or our country problem but it is worldwide. In Hong Kong, school children were taught the multiplication table in Primary two. However, the majority of students in Primary three, four or even five would still make silly mistakes in simple multiplication or division as they have trouble with the multiplication table. This often leads to frustration, low self-esteem, lack of confidence and loss of interest in mathematics. Something must be wrong and something must be done (20). Most Mathematics textbooks and teachers uses the traditional ways of memorizing the multiplication table column by column. By the time children get to the last two columns, their memory of the first few columns diminishes and all kinds of errors and mix-ups will surface. This often leads to loss of interest, self-confidence and self-esteem. Stacey Braddock concluded that basic multiplication fact proficiency is developed in an environment that focuses instruction on deeper meaning. Students were forced to think about numbers instead of being spoon fed answers to multiplication problems (9).
Students learn the four operational systems in primary schools especially from grade 1-4 in Ethiopia educational curriculum. No matter or no such great problems when they learn addition and subtraction, they can understand concepts even using models and materials. Besides teachers have too. But when Multiplication and division was given in the class confusion begins there for both the practicum teachers and students. These confusion and difficulty of the subject matter was transfer to the next grade level, to high school, college and university. The problem of mathematics knowledge influence the knowledge of other subjects mainly natural science. This makes me to formulate simple multiplication table to solve the above mentioned problems.

From this it is possible to have the following research questions;

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- How the burden of memorization of the complex multiplication table would solve to have effective mathematics teaching?
- What method or formula is applicable in multiplication table?
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a. Objective of the Study

This research was conducted for the following reasons

- ✓ To provide new approach of multiplication table.
- ✓ To create formula that reduce the confusion and memorization of the complex multiplication table to students as well beginner teachers.
- ✓ To produce basic mathematical formula which latter uses a means of introduction for higher level of thinking.

b. Significance of the study

The purpose of this study was to produce new approach of multiplication table that enables to multiply numbers in simple way using formula. Now a days in our country the results of students in any educational level in mathematics and natural science subjects was unsatisfied. Students cannot solve simple problem although they were completing grade 10 or 12 (8). What was wrong in the implementation and application of these sciences? What things will be expected from students and teachers to fulfill the minimum learning competency of the Educational Policy? This study was not able to answer these questions. But the researcher agreed that each of us must involve digging out the problems of the effectiveness of teaching science in the country at each grade level.

Generally the importance of this study will be

- ✓ When we teach mathematics in lower grades we start from addition then subtraction, multiplication and division. Students were confusing in memorizing the multiplication table this research reduces memorization and using simple formula they can get the multiplication result.
- ✓ It provides learners in more experiences and skill when they learn the new approach of multiplication table
- ✓ Give more chances to play with numbers.
- ✓ It serves as a reference for other researchers.

3. MATERIALS AND METHODS

For eight years the researcher has got the chance to observe college practicum student teachers. The researcher greatly attracted by natural science and mathematics teachers; interaction with students and their difficulties. Subject knowledge and the teaching methodology were the main challenges in the class. Of those challenges one day of the researcher's class observation the teacher ask grade 5 students the multiplication result of 8x7 equals what? One student said 54, the other said 56, the teacher and the whole class disturbed with this confusion. From this point of view "How the burden of memorization of the complex multiplication table would solve to effective mathematical teaching? And what method or formula is applicable in multiplication table? " come to a question of in the observers mind.

3.2 Detail analysis of results multiplication of 7,8, and 9

Formulas are simple ways and are solutions to get multiplication results; But what formula? How the formula is created? Another challenge for the researcher. Lastly the researcher wrote a multiple equation such as 8x7 =56 how formula is created for this; subtract from 8 and 7, 3 and 1 respectively, to get 56 but hopeless. Next I listed the multiplication results of 7,8 and 9 as shown in table 1. Multiplies of 7 are 7, 14, 21, 28….. The researcher tried to set common differences between the first, the second, the third and the others rows. From detail analysis the researcher has found that there is a relationship between the multiplier and the tens value of the multiple results. If 9x5, then the tens value of the product is 5-1, and the first place value is 9 minus tens value. But this does not work for other numbers, efforts were continued and the present study was formulated through mental experimentation. From 8-1 using table 1 the relation was synthesized and the formula was created.

Table 1.Detail analysis of results multiplication of 7,8, and 9

X	7	8	9
1	7	8	9
2	14	16	18
3	21	24	27
4	28	32	36
5	35	40	45
6	42	48	54

7	49	56	63
8	56	64	72
9	63	72	81
10	70	80	90

Generally this research uses different methods to complete the study. Long term observation in elementary schools when practicum students taught, challenges of subject matter knowledge, their teaching methodology, the way of assessment of teachers and the way of memorization of concepts in both students' teachers were assessed. The research were focused the multiplication operation challenges. Since a single case was taken and coming to understand its activity within important circumstance in the other way it is considered as a case study (Stake R. 1995). Lastly mental experiment through trial and error was highly utilized to create the multiplication formula.

3. RESULTS

Understanding the multiplication table for students is difficult after they learn addition and subtraction which is easy relatively the multiplication and division mathematical operation. The Ethiopian educational curriculum text books in elementary schools the context of the multiplication operation was done as follow; 9x8 means 9+9+9+9+9+9+9+9 to get the result adding these numbers is challenge especially for primary school students, so people prefer simply memorizing the product from the common multiplication table; which results in confusion.

This study solves the difficulties of multiplication. According to the result of this study if X and N are any single digit numbers the multiple of X and N can be calculated using the formula; XN=X-(N-1) and if N-1= n , and if X-n=m then the multiplication result of XN is equal to nm-n(9-X).

4.1. Multiplication of Single Digit Numbers

In using formula the new approach of multiplication can be calculated using the following steps.

Step 1. Write the multiplication equation
Step 2. Subtract 1 from the multiplier
Step 3. Subtract the result of step 2 from the multiplied number
Step 4. Write the subtraction results step 2 and 3 in the tenth and first place respectively
Step 5. Subtract n (9-X) from the result step 4

Where n is the tenth place and
X is the multiple numbers.

Example . Calculate the result of 7x6

Step1. 7x6
Step2. 6-1=5
Step3. 7-5=2
Step4. 52
Step 5.n tenth place is 5 and X =7
So9-X is, 9-7=2
Implies 2x5=10: There for 52-10=42

From this we can conclude that 7x6 is equal to 42. If the multiple number is 9, by one digit for step 5 the result is zero, so any number minus zero is the number itself, implies the multiplication of nine is the easiest number to calculate the product relative to the other numbers. *In general in the case of this approach the formulas were listed in table 2.*

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Table2. The multiplication formula for single digit numbers

Number	Multiplication equation	formula	Result
9	9xN	9- (N-1) If N-1= n and 9-n=m	nm
8	8XN	8-(N-1) if N-1=n and 9-n=m	(nm)-n
7	7XN	7- (N-1) if N-1=n and 9-n=m	(nm)-2n
6	6XN	6-(N-1) if N-1=n and 9-n=m	(nm)-3n
5	5XN	5-(N-1) if N-1=n and 9-n=m	(nm)-4n
4	4XN	4-(N-1) if N-1=n and 9-n=m	(nm)-5n
3	3XN	3-(N-1) if N-1=n and 9-n=m	(nm)-6n
2	2XN	2-(N-1) if N-1=n and 9-n=m	(nm)-7n
1	1XN	1-(N-1) if N-1=n and 9-n=m	(nm)-8n

Notice . N is the multiplier

- *n is put in the tenth place and m is in the first place*
- *The formula used up to N = X+1*
- *The tenth place that subtract from nm is multiplied by nine minus the multiplier (9.X).*

4.1 Discussion

A study done by Bruce Sherin and Karen Fuson argued that the development of strategy use in multiplication is not driven by central conceptual developments. But it would be a mistake to take this as implying that learning of multiplication need only be based on repeated practices with isolated facts. It is not appropriate to think of the end of products of learning as a straight forwardly internalized version of the multiplication table consisting of individual and separate cells (21). Based on this concept the result of this study gives learners more chances to practice and to play with numbers based on simple techniques or using formula. To calculate the multiplication of single digit numbers it is possible to use the formula XN=X-(N-1), and if N-1=n and X-n=m then the result is nm-n(9-X).

Stacey Braddock concluded that basic multiplication fact proficiency is developed in an environment that focuses instruction on deeper meaning. My students were forced to think about numbers instead of being spoon fed answers to multiplication problems (9). Similarly another scholar stated multiplication program based on systematic practice, aimed at improving children's recall of basic multiplication facts (17).

Use of concrete materials, pictures, diagrams, and discussion increases students' familiarity with the process of multiplication and assists in their observation of regularities and patterns. For example, to learn the basic multiplication facts contained within the 0 to 9 times tables, over 100 multiplication combinations need to be mastered. Understanding *commutativity* – that the order of the two numbers does not affect their product (e.g., 5 x 8 = 8 x 5) – reduces the combinations by about half (17), and Creative learning activities (23), help to develop students achievement. The study of this research creates new approach of multiplication table using formula. This type of system was supported by researchers. For instance Trachtenberg system, in the method the most obvious and immediate benefit is a very practical one: the increased skill in calculation itself. Nowadays the trend of things is such that skill and accuracy in calculating is becoming a necessity for everyone (19). Multiplication program based on systematic practice, improves children's recall of basic multiplication facts (17, 6). Escalante was a well known finger multiplication trick to capture chuco's attention and finger multiplication techniques were universal (16).

Dividing the system of mathematics into parts going from the simplest element to the most complicated may represent, as a first approximation only, but quite logically, a curriculum of study for the training of mathematicians (4). In detail this theory is explained as follows.

5. MULTIPLICATION OF NINE

Multiplication of 9 can be calculated by using the formula 9XN =9-(N-1)= if N-1 =n and 9-n=m then nm is the result. Example 9x7=9-(7-1); N is 7, N-1, which is (n) is 6 and 9-6 which is (m) is 3 implies 9x7 is equal to 63. Based on this approach the multiplication of 9 can be calculated based on the following steps.

Step 1: write the multiplication question
Step 2: Subtract 1 from the multiplier, this is the tenth place
Step 3: Subtract from 9 the result that you get from step 2, this is first place.
Step 4: Write the subtraction results step 2 and step 3 in the tenth and first place respectively,

Thus, Escalante have established that is a two digit number is a multiple of 9n then the sum of its digits is a multiple of 9, and the place value form reveals that (n-1) and (9-(n-1))are the tens digit and units digit respectively, of the product (16). That was online with this study. Escalante had also formulated complex multiplication formula for high school and college students. But the different of this work from Escalante were that Escalante's used the finger multiplication trick and this method used for multiple of 9 0nly, while the other complex multiplication method of the Escalante was not parallel to the present study. The present study creates a formula for all one digit numbers as shown in table 2 and 8. The multiplication table shows not only the result but also how the result was coming. According to this finding number nine may be considered as a special number because1, The multiple of 9 is simple 2, To get multiple of other numbers we use it (9-n), In Hong Kong Mr Yeung Kim Wai Thomas and Mr Leung Hing Keung done in the title New ideas in teaching the Multiplication Table in Primary Mathematics Education were also found similar results (20).

Table 3. Using Formula the Multiplication table of nine

9XN	N-1=n	n Tenth place	9-n=m	First number m	Result nm
9X1	1-1	0	9-0	9	9
9X2	2-1	1	9-1	8	18
9X3	3-1	2	9-2	7	27
9X4	4-1	3	9-3	6	36
9X5	5-1	4	9-4	5	45
9X6	6-1	5	9-5	4	54
9X7	7-1	6	9-6	3	63
9X8	8-1	7	9-7	2	72
9X9	9-1	8	9-8	1	81
9X10	10-1	9	9-9	0	90

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From table3 that multiply 9 from 1to 10 , N-1 that is n were 0,1,2,3,4,5,6,7,8,and 9 that is the tenth place and 9-n were 9,8,7,6,5,4,3,2,and 1 the first place respectively to the tenth place . So the results were 09, 18, 27 … as shown in table 3. Writing a zero before a number, as in 09, has no effect on the actual value of the number (19), So simply the multiplication of 9 is shown in table 4.

Table 4. Simple way of Multiplication of nine

9XN	n Tenth place	First number m	Result nm
9X1	0	9	9
9X2	1	8	18
9X3	2	7	27
9X4	3	6	36
9X5	4	5	45
9X6	5	4	54
9X7	6	3	63
9X8	7	2	72
9X9	8	1	81
9X10	9	0	90

5.2 Multiplication of 8, 7, 6, 5,4,3,2 and1

The multiplication of eight can be calculated using the formula
8XN=8-(N-1) and if N-1=n which is the tenth place and
=8-n=m which is the first place so the multiplication result is
8XN=nm-n
Example 8x6= 6-1 =5 tenth place which is n
8-5=3 first place which is m
=nm means 53 when we subtract n which is 5
=53-5=48
So the multiplication of 8x6=48

Table5. Multiplication table of eight

8Xn	N-1=n	n Tenth place	8-n=m	m First number	nm-n	Result nm
8X1	1-1	0	8-0	8	8-0	8
8X2	2-1	1	8-1	7	17-1	16
8X3	3-1	2	8-2	6	26-2	24
8X4	4-1	3	8-3	5	35-3	32
8X5	5-1	4	8-4	4	44-4	40
8X6	6-1	5	8-5	3	53-5	48
8X7	7-1	6	8-6	2	62-6	56
8X8	8-1	7	8-7	1	71-7	64
8X9	9-1	8	8-8	0	80-8	72
8X10						80

From table5 that multiply 8 from 1to 9 , N-1 which is n were 0,1,2,3,4,5,6,7,and 8 that is the tenth place and 8-n were 8,7,6,5,4,3,2,and 1 the first place respectively to the tenth place . So the results were 08, 17, 26, 35… as shown in table 4, then subtract n (tens place) from the result nm you get the calculation value of 8XN (table 6).

Table 6. Simple way of Multiplication of eight

8Xn	n Tenth place	m First number	nm-n	Result nm
8X1	0	8	8-0	8
8X2	1	7	17-1	16
8X3	2	6	26-2	24
8X4	3	5	35-3	32
8X5	4	4	44-4	40
8X6	5	3	53-5	48
8X7	6	2	62-6	56
8X8	7	1	71-7	64
8X9	8	0	80-8	72
8X10				80

To find the multiplication value of 7 see the example next and table 7.

Example 7x5= 5-1 =4 tenth place which is n
7-4=3 first place which is m
=nm means 43 when we subtract 2n
=43-8=35
So the multiplication of 7x5=35

Table 7. Multiplication table of seven

7XN	N-1	n Tenth place	7-n=m	m First number	nm- 2n	Result nm
7X1	1-1	0	7-0	7	7-0	7
7X2	2-1	1	7-1	6	16-2	14
7X3	3-1	2	7-2	5	25-4	21
7X4	4-1	3	7-3	4	34-6	28
7X5	5-1	4	7-4	3	43-8	35
7X6	6-1	5	7-5	2	52-10	42
7X7	7-1	6	7-6	1	61-12	49
7X8	8-1	7	7-7	0	70-14	56
7X9						63
7X10						70

Examples for multiplication 6,5 and 4

Following similar steps it is possible to calculate multiplication results as shown next.

Examples 1. 6x5 ; 5-1=4
6-4=2
42-12
30
2. 5x4; 4-1=3
5-3=2
32-12=20

If the multiplier is greater than the multiple numbers then by using the commutative property it is possible to make easy.

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Example. To calculate the multiplication of 3x4 change to 4x3
5x6 change to 6x5
7x9 change to 9x7 and using the new techniques it is possible to find the results.

Table8. Using Formula the New Approach of Multiplication table

x	1	2	3	4	5	6	7	8	9
	n m 8n	n m 7n	n m 6n	n m 5n	n m 4n	n m 3n	n m 2n	n m -n	n m -0
1	0 1 0	0 2 0	0 3 0	0 4 0	0 5 0	0 6 0	0 7 0	0 8 0	0 9
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
2	1 0 8	1 1 7	1 2 6	1 3 5	1 4 4	1 5 3	1 6 2	1 7 1	1 8
	2	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**
3		2 0 14	2 1 12	2 2 10	2 3 8	2 4 6	2 5 4	2 6 2	2 7
	3	**6**	**9**	**12**	**15**	**18**	**21**	**24**	**27**
4			3 0 18	3 1 15	3 2 12	3 3 9	3 4 6	3 5 3	3 6
	4	8	**12**	**16**	**20**	**24**	**28**	**32**	**36**
5				4 0 20	4 1 16	4 2 12	4 3 8	4 4 4	4 5
	5	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**
6					5 0 20	5 1 15	5 2 10	5 3 5	5 4
	6	**12**	**18**	**20**	**30**	**36**	**42**	**48**	**54**
7						6 0 18	6 1 12	6 2 6	6 3
	7	**14**	**21**	**28**	**35**	**42**	**49**	**56**	**63**
8							7 0 14	7 1 7	7 2
	8	**16**	**24**	**32**	**40**	**48**	**56**	**64**	**72**
9								8 0 8	8 1
	9	**18**	**27**	**36**	**45**	**54**	**63**	**72**	**81**
10									9 0
	10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**

In this table n=multiplier minus 1; (N-1)
m=multiple number minus n ;(X-n)

Based on this approach if the product is nm and n and m were the tens and first place respectively then subtraction will follow 0n to 9, 1n to 8, 2n to 7, 3n to 6, 4n to 5, 5n to 4, 6n to 3, 7n to 2 and 8n to 1. The number that multiply n is equal to 9-N, When N is the multiplier implies N+n=9 (table 8).

Example ;7x6

Using X-(N-1).find n and m
7-(6-1)=n is 5 and m is 2
52 is nm then subtract nx(9-7): which is 2n
52-10
42

Following the same step the multiplication of 1 can be calculated using the formula; *1-(N-1) if N-1=n and 9-n=m* and the result is nm-8n. But it was complex and works only up to 2.

Bruce Sherin and Karen Fuson stated that any number times 1 equal to the number itself Nx1=N (21).

Based on this study finding Nx1 =N-(1-1) and 1-1 =0, which is n and N-0=N; which is m so the result is nm (0m; writing 0 before any number is not any change with the number). That is why any number if that was multiplied by 1 is equal to the number itself.

The multiplication result of 1 can be calculated simply as follow

1x8 means equal to 8x1 commutative laws,

And 8x1 means 8- (1-1)

8-(0); Any number minus 0 is equal to the number it self

8

6. CONCLUSION AND RECOMMENDATION

6.1 Conclusions

Understanding the multiplication table for students is difficult task in primary schools. This mathematical challenge has great influence in their academic achievement. If X and N are single digit numbers using this new approach formula from learners it is only expected to find n and m that are the tens and first place value respectively. It eliminates the memorization of the complex multiplication table which is the result of confusion. This is also the main tackle of learning mathematics in elementary schools, results in viscous challenges to any academic achievement especially to natural science. But using such systematic approach it is possible to increase the performance of student's activity. This new approach of multiplication table creates chances to play and exercise with numbers for the learners. From this point of view it is possible to recommend the following points.

When teaching was performed teachers should be use systematic way of teaching to give how to know science and mathematics, but not to teach the knowledge of science and mathematics. Teachers should be update themselves with the current situation of the subject and contents they teach. Many researchers found that different approaches to get the multiplication results, but in our country curriculum the common method where used to teach the multiplication table in any grade level text books. There is a problem given emphasis to international research results in Ethiopia (24).

The research may initiate others to investigate and solve problem in classes related to multiplication of numbers. The nation must continue to build capacity for more rigorous research in education so that it can inform policy and practice more effectively (10)

Any concerned body and educational stakeholders should revise the curriculum and give short term trainings to mathematics teachers. The Amhara educational bureau and the Ministry of Education (MOE) should give great attention to mathematics because it is the base of knowledge and use to think citizens critically, but from the researcher observation the MOE and/or the Amhara regional bureau focuses and given more emphasis to language, professional courses and social studies.

Those candidates training in teacher education program were not interested since most of them joined the program because of lack of any other job opportunities. (25), another challenge for the problem of the quality of education, and again solutions should be given for such problems to achieve the country educational goals.

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