6

Common Errors Committed by Students in Four Fundamental Skills (Addition, Subtraction, Multiplication and Division) at Primary Level

Kusum Bhatia*

Abstract

Students mostly have fear of mathematics, which starts developing at the primary level. The reason being their learning difficulties are not identified and premeditated at this particular stage. These learning difficulties become errors later on, that hinders their learning of mathematics. It is very essential to find out students' learning difficulties and patterns along with learning the process.

The present study is an attempt to find out the common errors committed by students in four fundamental skills. It is to help teachers to know about such errors, so that they can plan their lessons accordingly.

Introduction

Mathematics has always occupied an important place in school curriculum. The Education Commission (1964–66) recommended mathematics as a compulsory subject for students at school level. The course content recommended was partly influenced by international opinion at that time and favoured 'new mathematics', which later pervaded secondary education. It was suggested that content should be presented in a manner, such that too much emphasis is not given on computation.Greater emphasis should be on the understanding of basic principles of mathematics. Later, the National Policy on Education (1986) also considered the importance of mathematics in general education and suggested that it should be visualised as the vehicle to train the child to think, reason, analyse and to articulate logically. Apart from being a specific subject, it should be treated as concomitant to any subject involving analysis and reasoning. As a result of this, efforts were made to expand the

* Senior Lecturer, DIET, Keshav Puram, New Delhi

scope of mathematics teaching. But the application of learning theory to mathematics has not been very significant.

It is observed that in most of the schools today, instructions still conform to a mechanical routine and continue to be dominated by the old besetting evil of verbalism. It remains as dull and uninspiring as ever before.

Mathemaics is considered as one of the most difficult subjects in school. The reason is teaching of mathematics is more oriented to prepare the child for examination. Achievement in the examination is considered as the index of child's level of learning in mathematics.

In this scenario, some children in the class are labelled as slow learners and average, as their weaknesses are neither identified nor remedied at any stage. Gradually, they develop lack of interest in the subject.

Rationale of the Study

In the true sense of teaching, a teacher has to pay attention to;

- Nature of the subject to be presented and child-centred method of presentation.
- Evaluation as integral part of teaching.
- Diagnosing the weaknesses of each student.
- Providing remedial measures suitable for each student.

Evaluation, diagnosis and remedial measures are of paramount importance in classroom teaching. Unfortunately, most teachers perform only the first of their four functions in the name of teaching, if, presenting the subject matter, they hardly find time for evaluation, diagnosis and remedial measures in the class. One way to assist teachers is to make them aware of certain errors, which students generally commit in mathematics.

Genesis of the Study

During School Experience Programmes (SEP) the principle investigator got a chance to observe the notebook of a student of Class IV in one of the Sarvodaya Vidyalayas in the district. In about 35 per cent notebooks, the HCF of 8 and 9 was written as zero. The teacher marked the answer incorrect without giving the right solution. The teacher educator called upon those students and asked the reason for their answer. Some of them replied, "Since there is no common factor between 8(2 2 2) and 9(3 3), therefore the HCF is zero."

Their argument was shocking as they gave strong reasoning behind their answer.

This incident motivated the teacher educator to undertake a systematic study to know the errors committed by the students in mathematics at the primary level. Knowledge of these errors will not only help a teacher to plan his/her lesson well, but also help present teacher educators and authors

of mathematics book at the primary level in suggesting remedial measures for their errors. This will be a concrete step to improve teaching of mathematics at the primary level.

Objectives of the Study

Keeping the rationale and need of the study in view, the following objectives were formulated for the present study:

- To identify learning errors committed by students in four fundamental skills of mathematics, i.e. addition, subtraction multiplication and division at the primary level.
- To provide remedial measures to be adopted by teachers for identified learning errors in four fundamental skills at the primary level.

Duration of the study

Study was conducted in Delhi at Sarvodaya Vidyalayas, namely, SBV Gulabi Bagh and SKV Sarai Rohilla from 8 July to 5 October 2002 and in MCD schools, Jahangirpuri, K-block and G-block from 15 November to 10 December 2002. Study was conducted for the full school timings—8 a.m to 12:30 p.m. along with SEP.

Sample of the Study

All the students in the primary classes, i.e. Classes I to V of the above mentioned schools were selected for the study.

Number of students in each class and total number of students in the primary classes of the SBV, Gulabi Bagh; SKV, Sarai Rohilla; MCD Primary Schools, Jahangirpuri, K-Block and G-block are given in the following table.

S.No.	Name of the School	I	II	III	IV	V	Total
1.	SBV, Gulabi Bagh	39	60	53	79	60	291
2.	SKV, Sarai Rohilla	76	65	70	72	82	365
3.	MCD Primary School, K-Block, Jahangirpuri	218	202	239	230	188	1077
4.	MCD Primary School, G-Block, Jahangirpuri	82	109	82	67	85	425

Profile of the Students

Students of the schools belong to lower middle class and lower class as far as their social and economic status is concerned. Very few students of Sarvodya Schools belong to middle income groups. Girls have their mothers at home. Most of them either get very less time or no time at home to study.

In MCD schools, students are from very poor families. They have nobody to motivate them to study at home. Mid-day meal, free books and free uniform (to some of them) are the attractions for attending schools. Many of them belong to *jhuggi-jhopri* (slums) cluster and are rag pickers. A few first generation learners are there in Sarvodya Vidyalyas, whereas their number is more in MCD schools.

Methodology of the Study

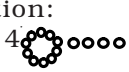
Students were given problems from four fundamental skills at primary level. These problems were graded according to the class and level of students.

Number of students who attempted the problems correctly were noted. Students who committed errors in attempting the problems were called upon. A discussion was held with these students individually by the investigator, the pupil teachers from DIET and by their own class teachers to know the reason behind their errors. Their responses and arguments were noted. Students who, committed errors in calculations had learning gaps, lacked previous knowledge and the problem was carelessly noted down.

Remedial measures including teaching aids and activities were suggested to their class teacher. Only some of these measures were tried out with the students due to limited time of SEP.

Percentage of students committing errors in solving different problems from four fundamental skills were also calculated.

Results

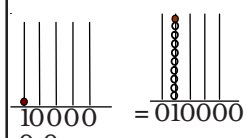
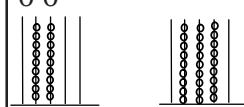
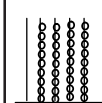
Class	Problem	Solution	Error	%	Possible Reason for Error	Remedial Measures
II	Add the following: 14 +17	14 + 17 211	Carry over is not used	48	Addition of one digit is done: 4 + 7 11 Same process is carried for addition of two digit number...	1.1 Give sufficient practice of 'a place value' before starting addition of two digit numbers with carry over. 1.2 Use beads and *mala* for explaining the solution: 14  +17  31 
II	32 + 18	32 + 18 4..	Addition from the left hand	23	While writing two digit numbers, they write digit	2.1 Use activity 1.2 to explain the solution.

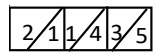
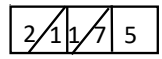
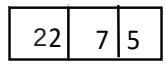
			side.		at ten's place first.	2.2 Perform addition using match sticks. 32  +18  Add single match -stick, if they are 10 or more, make their bundles 1  32  +18  50
III	137+17+ 240	137 17 +240 547	Wrong arrange-ment of numbers in columns	57	Lack of concept of place value	3.1 Arrange the given numbers in place value chart. 137+17 +240= H T O 1 3 7 1 7 2 4 0 3 9 4 Here expand 17 and explain, there is no hundred place in 17, so hundred place will go empty or 0 can be put there.
III	259 +394	1 252 394 547	Addition and carry over from left-hand side	15	Lack of concept of addition and place value	4.1 Solve the problem using expanded notion. 252= 2hundred+ 5 tens + 2ones +394

						3hundred+ 9 tens+4 ones 5hundred+14tens + 6 ones 646. =6 hundred + 4 tens + 6 ones 4.2 Mention here that at any place, ones, tens or digit can be 9. If it is 10 or more then it has to be added to next higher place.
IV	+ 1249 + 1634 + 7186 _____	1249 + 1634 + 7186 10059 1249 +1634 +7186 9969	Forget to add carry over at ten's place. Forget to add carry over at hundred's place.	18	Careless mistake	5.1 Addition concept is clear but needs to be strengthened by giving sufficient practice of such sums. 5.2 Use work-sheets for practice 5.3 Transition for addition of smaller numbers to larger numbers and from without carry over to carry to should be slow and gradual.
IV	132 boys and 243 girls went to a camp. Calculate the total number of students who went	132 243 _____ 132 +243 375	Unable to comprehend the problem Unable to write the statement and answer of the problem	24 65	Lack of reading and comprehension of the problem. Lack of practice of writing state--ment with the problem	6.1 Read the problem with the students at least two or three times. Ask them, what is given in the problem and what is to be calculated. 6.2 With the help

	to the camp.	in systema -tic manner.			like:	of students make a simple statement at the initial stage boys =132 girls =243 total students=375 **6.3** Finally give them practice of writing full state--ment: No. of boys who went to camp = 132 No. of girls who went to camp = 243 Total number of students who went to camp =375
IV	Find the difference 3419 -2323	3419 - 2323 11	Subtraction from left-hand side	11	Convenient to subtract 2 from 3	7.1 Solve the problem with students' partici--pation, like asking them at every step: Name the digits at unit's placeAns: 9 and 3 (prompt them they don't answer). What to be subt--racted at the unit's place 3. 3 is to be subtracted from which number Ans: 9. So 9-3 is 6 Likewise proceed for ten's place, hundred's place
		3419 - 2323 13	Calculaton mistake	13	Careless mistake	

						and thousand's place.
III	Find 645-32	645 – 32 325	Wrong arrangement of numbers in columns	32	Lack of concept of place value	8.1 Solve the problem using place value chart as suggested in 3.1
II*	72 –19	72 –19 67	Misconcep--tion of subtraction	62	At one's place, 9 is bigger, so 2 is subtracted from 9 and at ten's place 1 is subtr--acted from 7	9.1 Give the concept of place value again and explain. As in addition one's place gives its digit at ten's place to ten's place, likewise one's place can borrow from ten's place in case of Substraction 1 ten=10ones 6 12 7 2 -1 9 5 3 In beginning do cut 7 and write 6, at one's place write 12 for 2 then subtract 9 from 12.
IV	Ramesh had 526 oranges. He gave 129 oranges to Karan.	526 - 129 526 - 129 655	Unable to comprehend the problem Add the numbers	12 11	Lack of reading skill Unable to comprehend	10.1 Use measures 6.1, 6.2 and 6.3 for the present problem. 10.2 Give sufficient practice of problem sums to students.

	How many Oranges were left with him?	526 - 129 397	Solve the problem without writing its statement	38	Unable to write statement of the problem.	10.3 Use work sheets for problem sums on subtraction.
		526 - 129 403	Subtracted 6 from 9 at one's place.	15		
		526 -129 407	Forgot to reduce 1 ten at ten's place.	8		
III	Find the difference of 10000 and 6289	6289 -10000 52890	Subtracted the larger number from the smaller one	5		**11.1** Clear the concept of sub-traction using matchsticks, abacus, beads etc.
		10000 –6289 16289	Subtracted the upper number from the lower one.	8	Lack of understanding of concenpt of subtraction and place value system.	 10000 = 010000 0 0  091000 = 099100
		10000 –6289 4821	Subtracted each of the digit out of 10 instead of 9.	22		 099 ~~910~~ 10 099910 +10000 6289 3711
III	325 7	325 7 211435	Carry forward is not done.	17	Concept of place value is not clear.	12.1 Clear the concept of place value to the student.

		3 325 7 2175	Forget to add carry over at hundred place.	6	Careless mistake	12.2 325 x 7  325 x 7  325 x 7  The reason for making diagonal in boxes in product is to separate tens and ones. Ones will be written in the product whereas tens will be carried to the next place. 12.3 Give sufficient practice of such questions before starting. Multiplication with 2 digit and more.
IV	35 x75	3 2 35 x75 175 245 420	Product is not carried out properly	21	Lack of under-standing of multiplication	13.1 Use expen--ded form to carry out the product. 35 = 35 x 70 + 35 x 5 x75 x 70 x 5 175 2450 175 2450 2450 2625 +175 2625

V	125 103 ——— ———	125 103 375 0000 1250 1625 ———	Product is not carried out properly	22	Lack of understanding of multiplication	14.1 Use the similar measure as suggested in 13.1 125 125 125 x103 x3 x100 375 375 12500 000x 125xx 12500 12875 +375 ——— 12875 ———
III	900 ÷ 3	3 3⟌900 9 00	Division is not carried out properly	18	Lack of understanding of division	15.1 For division, divide the digit at highest place first. 9 hundred ÷3=3 hundred 0 tens÷3=0 tens 0 ones÷3=0 ones
III	481÷4	12 4⟌481 -4↓ 8↓ - 8 1	Division is not carried out properly	15	Lack of understanding of process of division	16.1 4hundred÷4=1 hundred 8tens ÷4=2 tens 1ones÷4=0 ones i.e. 12 0 4⟌481 -4↓ 8↓ - 8 1 -0 1
IV	8051÷4	212 4⟌8051 -8 ↓↓ 05 -04 11 -08 3	Division is not carried out properly	19	Lack of understanding of process of division	17.1 8 thousand÷4=2 thousand 0 hundred ÷ 4=0 hundred 5 tens÷4=1tens 1 remainder

						11 ones ÷ 4 = 2 ones 3 remainder Thus 8051 ÷ 4 = 2012 and 3 ramiander
IV	If 250x15= 3750 find 250x14	250 x14 1000 2500 3500	Unable to comprehend the problem	67	Unable to use properties of multiplication	**18.1** 250x14=250x(15-1) =250x15-250x1 =3750-250 =3500 **18.2** This problem can be solved using tables as well. 250x14=3750-250 =3500 **18.3** Practice of such type of problem should be given to students.It will be helpful in performing division.
V	Neeta bought 60 flowers to keep them equally in 5 pots. How many flowersdid she keep in each pot?	60 x 5 300 12 5⟌60 - 5 10 - 10 0	Unable to comprehend the problem	12 42	Unable to comprehend the problem Unable to write statement of the problem.	**19.1** Make the student aware of certain words related to each skill. **19.2** Whenever we talk of equal distribution or dividing certain things equally then division will be carried out.

		60 +5 65		10		**19.3** Give the students practice of writing statement with such type of problems. 60 Flowers are to be kept equally in=5 pots Each pot will get =60 flowers ÷ 5 pots i.e., 12 flowers per pot.
V	Write division facts for 12 5=60		Unable to comprehend the problem	100	Unaware of multiplication and division facts	**20.1** It is very essential to make the students aware of multiplication and division facts 12 5=60 60 ÷12 =5 and 60 ÷5= 12 12 5=60 can be interpreted as product of 12 and 5 is 60. That means 12 is a factor of 60 and 5 is a factor of 60 60 is a multiple of 12 60 is a multiple of 5

						20.2 Likewise students should be made aware of addition and subtraction facts. **20.3** Division is a skill which requires mastery of addition, subtraction and multiplication.

Conclusion

Identification of learning errors and their analysis lead the investigator to the following conclusions regarding teaching of mathematics at primary stage:

1. More than 50 per cent students at the primary level lack the concept of place value. This concept is not given due weightage by the teachers in the school. This is one of the root cause for students making errors in four fundamental skills of maths. Concept of place value should be practised thoroughly using various activities and teaching aids.
2. Teaching of four fundamental skills is very mechanical. 23 per cent students perform addition from left hand side. 11 per cent students perform subtraction from left hand side. 62 per cent students are not able to perform subtraction with borrowing properly (carry over) by end of Class II.
3. More than 60 per cent students are unable to write statement for word problems. Either they do not comprehend the problem or they are not able to write statement. Students should be given sufficient practice for writing statement of word problems.
4. Students were unaware of addition, subtraction, multiplication and division facts. These facts are essential to learn at the primary level not only for better understanding of four fundamental skills, but also for learning other concepts of mathematics like factors, multiples, HCF, LCM, etc.
5. Use of certain aids like abacus, beads and *malas*, bundles of matchsticks, etc. are must for teaching mathematics at the primary level effectively and successfully.

Scope for future study

Remedial measures mentioned in the study are all suggestive. These can be tried out. Same study may be conducted for other topics of mathematics and other subjects like hindi, social science, etc. at the primary level.

References

Alder. 1966. Mental growth and the art of teaching. *The Arithmetic Teacher*. 576–584.

Benerjee. 1990. 'Criterion referenced measurement—a perspective,' in *Criterion Referenced Measurement*. NCERT, New Delhi.

Biggs, J. 1968. 'The teaching of mathematics in the primary school.' Commonwealth Secretariat, London.

Bhatia, K. 1955. 'Identification and remediation of learning difficulties in some Mathematical concepts.' Ph D. C.I.E, Delhi University.

Coxford, A. F. 1963. 'Jr. Piaget Number and measurement.' *The Arithmetic Teaching*, 10, pp. 419–427.

Das, R C. and Barua, AP. 1968. 'Effect of remedial teaching in arithmetic, a study with grade IV pupils,' State Institute of Education, Assam.

Dutta. 1968. 'Learning disabilities in the reasoning power of the students in geometry—diagnosis and prevention.' Ph.D. Education, Kalyani University.

Mehta, A.C. 1995. *Education for All in India*. Kanishka Publishers and distributors, Delhi.

National Policy of Education. 1986. Ministry of Human Resource Development. Government of India, New Delhi.

Errors made by students in skills such as speaking and writing have been treated as important information to help teachers direct the foci of their teaching. Teachers need to pay attention to the most serious errors before addressing other errors. Hence, this research was aimed at finding the most serious errors produced by students at one of the junior high schools in Indonesia, i.e. State Junior High School No 7 in Banda Aceh.Â addition, J ames (1998, p. 486) writes that lexical er rors are another most co mmonly found error in EFL student. writing. These errors can be caused by carelessness, L1 and L2 interference, over-generalisationÂ committed by the students in their recount e ssays. Errors in omissions are made when essential elements such as. The students who participated in the hazing avoided litigation by issuing apologies to the family. The family received a confidential financial settlement and is working with the school board to develop a district wide anti-hazing policy. Make no mistake, this was a fairly straightforward, painless resolution for the school. Students in Solving the Four Basic Fundamental Operations: Addition, Subtraction, Multiplication and Division of Natural. Numbers. Creative Education, 7, 1820-1833. http://dx.doi.org/10.4236/ce.2016.713185. Difficulties of 6th Grade Elementary School. Students in Solving the Four Basic. Fundamental Operations: Addition, Subtraction, Multiplication and.Â grade students of elementary schoolâ€ provides used procedures by students in division operations with natural. numbers. These procedures were categorized in: mental calculation, use the subtraction and not use the subtrac Methods in Student Assessment. Below are a few common methods of assessment identified by Brown and Knight that can be implemented in the classroom.[1] It should be noted that these methods work best when learning objectives have been identified, shared, and clearly articulated to students.Â It enables students to develop transferable skills in other areas of learning that involve group projects and teamwork, critical thinking and problem-solving, as well as leadership roles in the teaching and learning process. Things to Keep in Mind about Self-Assessment.Â In addition to the various methods of assessment listed above, classroom assessment techniques also provide a useful way to evaluate student understanding of course material in the teaching and learning process.