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Diagnosis Based Remediation on Attainment of MLL in Mathematics among V Standard Students from Shimoga District

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ABSTRACT
Naturally in urban areas, majority of students belonging to the higher ability group go to private schools. In addition, in urban areas, more number of students studying in private institutions opts for additional tuition classes than the rural students. It is quite surprising that rural students outshined urban students and hence shown better performance in mathematics compare to urban students. In urban government schools almost all students enrollment come from lower economic levels and impoverished environment. Hence it is likely that they tend to be lower in their performance in mathematics competencies. Many studies quoted above reported lower mathematics achievement by urban students from government schools. In the present study the sample from urban and rural area was drawn only from government schools. As a result the rural sample becomes more heterogeneous having many higher ability students as well as lower ability students for the reason mentioned above. But the urban sample becomes more homogeneous consisting of students from first generation learners and poor family support. This difference of achievement between rural and urban students occurred due to the above mentioned reasons. The above study showed that the improvement of mastery level in the competencies "fundamental operations", "fractions, decimals and percentages", "decimal fundamental operations" and " decimals addition subtraction with mixed operation" is due to the use of adequate manipulatives, so in the present study also investigator used adequate manipulatives wherever necessary in his intervention programme. Hence it can be stated that the adequate use of manipulatives and appropriate strategies can improve the mastery level in attainment of the above competencies.

Keywords: competencies, fundamental operations, fractions, decimals and percentages, decimal fundamental operations and decimals addition subtraction.

Introduction

The system of elementary education in India has expanded a lot with the the support of national and international agencies during recent years. As said earlier, compulsory primary education was given

priority and efforts made from time to time by various prominent educationists and eminent philosophers like MahathmaGandhiji, in the constitution on elementary education is recognized as a fundamental right and given stronger emphasis to the earlier efforts and assertions as article 45 of Indian constitution has the following implications

- Provision of free schooling at the elementary stage (classes I to VII taking six plus as the entry point for a child in class 1).
- Enforcing compulsory schooling through legislation for all children.
- Enrolling all children in the age group 6-14 by adopting meaningful curricula.
- Retaining all children up to the end of elementary stage by making education relevant to the needs of various learners.

Importance of Mathematics Education

Mathematics plays an important role in school learning and assumes a prominent position in modern education and curriculum. In the past, aim of mathematics in the school curriculum was to prepare children for the life to enable them to use mathematics in the everyday world around them. But in this century, there are several factors of life that requires us to examine a new role that mathematics education is to play in the development students for the scientific technological and industrial society. Every citizen of this complex society must understand mathematics if he/she is to comprehend the operation of Governments and the material he or she reads in newspapers. In fact not just mathematics, but also a strong foundation in mathematics is needed by almost all the disciplines. Thus in these circumstances of increased importance and influence of mathematics, just a computational know- how of mathematics is not enough. The development of concepts and ideas of mathematics at the elementary school level is a must. Thus learning basic mathematics is a necessity in day today life and useful for continuing education in higher classes and courses.

Statement of the Problem

"Diagnosis Based Remediation on Attainment of MLL in Mathematics among V Standard Students from Shimoga District".

Need and Importance of the Present Study

The Education is intended to develop basic learning skills, reading, writing and arithmetic and life skills, necessary for the children to survive and improve the quality of life. During childhood, developments in the domains of literacy and numeracy take place through acquisition of basic learning competencies (BLC). These competencies represent levels of learning in a particular subject comprising basic knowledge, understanding, abilities, interests, attitudes and values. The competencies are essentially to be acquired by the end of a particular stage or standard of education. As far as the primary stage is concerned it is in fact the foundation stage for the development of basic competencies (BAS, 2002). Primary education in particular has remained a serious concern of the nation since independence. A large number of programmes and schemes have been initiated both by the Central and State Governments to realize the goal of the universalization of primary education. This has led to the opening of a large number of schools with emphasis on enrolment and retention coupled with focus on quality of education. The quantitative expansion seems to have diluted the quality of education. Research studies conducted both at national and state levels point out low level of learning in schools and the situation becomes worse as children move to higher classes. Poor level of achievement at primary stage is a big de-motivating factor resulting in repetition and drop out from the schools.Though there are a number of factors which determine the quality of education, the most vital one that attracts the attention of one and all is the level of achievement. These levels of achievement for any nation are so important that they need to be known periodically to keep a tab on the general health of the education system. Such a requirement warrants the conduct of periodical achievement surveys

at different stages of school education in order to initiate remedial measures for improving the quality of education. National Policy on Education (NPE) - 1986 recommended the conduct of periodical achievement surveys at all stages of school education. This has also been reiterated in the National Curriculum Framework for School Education-2005.

Operational Definition of Terms

1. **Diagnosis:** Diagnosis is defined as the identification of a trouble/ difficulty in learning concepts in mathematics
2. **Competencies:**In MLL approach the textual concepts are broken into detailed competencies, subcompetencies and subskills(NCF,2005). In this context concepts from V standard mathematics have been identified as competencies, subcompetencies and subskills.
3. **MLL:** The minimum expected competencies that a learner should possess after the completion of a particular task or grade of learning.
4. **Masters and Non-masters:** Those students who secure 80% and above of the competencies are called masters and other are called as non-masters.
5. **Remediation:** In this context remediation is to teach the basic competencies in which students found to be lagging behind based on pre-test.

Objectives of the Study

The main objectives of the study are

1) To find out the difference between male and female students in MLL attainment levels in Mathematics of selected schools of Shimoga District..

2) To study the effectiveness of the diagnosis based remedial programme in improving the proportions of students mastering each competency as well as in improving the overall competency (% of competencies mastered) by the group of V standard students in the selected (experimental) schools of Shimoga District.

Hypothesis

1. There is no significant difference between male and female students in MLL attainment levels in Mathematics from selected schools of Shimoga District.

2. There is no significant difference between rural and urban students in MLL attainment levels in Mathematics of schools of Shimoga District

Hypothesis 1: There is no significant difference between male and female students in MLL attainment levels in Mathematics from selected schools of Shimoga District.++-

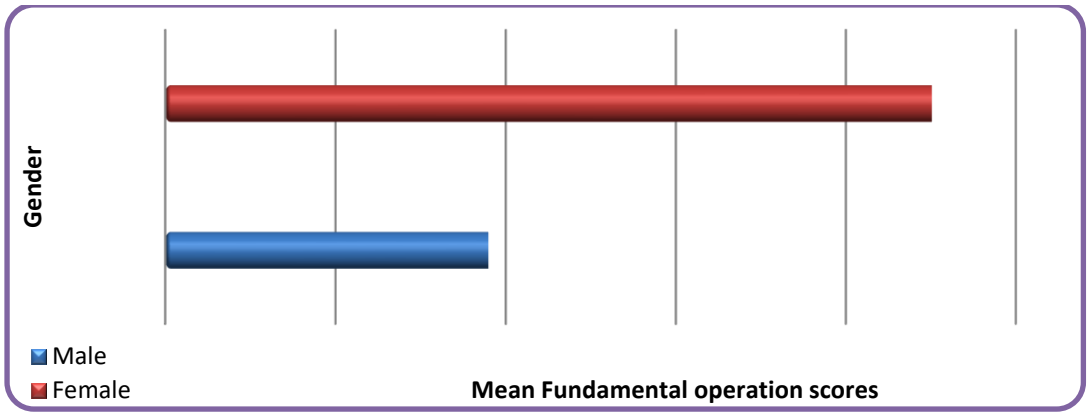
Table 1 (a): Comparison of means on various competencies between male and female students and results of Independent samples't' test

Competencies	Gender	Mean	S.D	't' value	P value
C1-Number	Male	3.87	1.13	0.397	0.692
	Female	3.84	1.13		
C2-Different numerals	Male	1.80	0.45	1.308	0.191
	Female	1.83	0.40		
C3-Fundamental operations	Male	1.89	1.04	2.318	0.021
	Female	2.03	1.11		

C4-Fractions, decimals, and percentages	Male	2.57	1.15	1.846	0.065
	Female	2.68	1.13		
C5-Decimal's fundamental operations	Male	1.84	0.99	1.290	0.197
	Female	1.91	0.98		
C6-Decimals addition and subtraction with mixed operations	Male	2.01	0.99	0.384	0.701
	Female	1.99	1.02		
C7-Angles	Male	2.15	0.96	1.763	0.078
	Female	2.06	0.97		
TOTAL	Male	16.12	4.16	0.991	0.322
	Female	16.35	4.47		

Only in Fundamental operationscompetency, significant difference was observed between male and female students as the obtained 't' value of 2.318 was found to be significant at 0.021 level where female students had high scores (means 2.03 and 1.89 respectively). In rest of the components as well as in total mathematics scores 't' value revealed non-significant differences between male and female students on the whole hypothesis 4 is accepted where in all the competencies except one competency and in total mathematics scores, the performance of male and female students had statistically equal scores (Fig. 4.6 (i)).

Figure 1 (i): Mean scores of male and female students on MLL Competency-Fundamental operations



Hypothesis 2: *There is no significant difference between rural and urban students in MLL attainment levels in Mathematics of schools of Shimoga District*

Table 4.7.(a): Comparison of means on various competencies of students hailing from urban and rural areas and results of Independent samples 't' test

Competencies	Area	Mean	S.D	't' value	P value
C1-Number	Urban	3.66	1.22	3.084	0.002
	Rural	3.90	1.10		
C2-Different numerals	Urban	1.85	0.40	1.183	0.237
	Rural	1.81	0.43		
C3-Fundamental operations	Urban	1.86	1.13	1.610	0.108

	Rural	1.98	1.06		
C4-Fractions, decimals, and percentages	Urban	2.54	1.19	1.384	0.166
	Rural	2.65	1.13		
C5-Decimal's fundamental operations	Urban	1.89	1.02	0.237	0.812
	Rural	1.87	0.98		
C6-Decimals addition and subtraction with mixed operations	Urban	1.77	1.05	4.013	0.000
	Rural	2.04	0.99		
C7-Angles	Urban	2.03	1.01	1.227	0.220
	Rural	2.12	0.96		
TOTAL	Urban	15.63	4.48	2.490	0.013
	Rural	16.37	4.27		

Only in number competency, different numeral competency and total competencies overall performance of students on all the competencies it was that significance differences between rural and urban areas were observed, where 't' values of 3.084, 4.013 and 2.490 were found to be significant at 0.002,0.000 and 0.013 levels respectively, where rural students had high scores (means=3.8981, 2.6442 and 16.3689 and 3.66, 1.77 and 15.3 respectively) than urban students. In rest of the competencies 't' value revealed non significant differences between rural and urban students on the whole hypothesis 5 is accepted where in all the conpetencies, except numbers competency, Decimals addition and subtraction with mixed operations and overall scores of all the competencies of rural and urban students was found to be statistically equal scores.figure4.7(i)

Figure 2 (i): Mean scores of urban and rural students in numbers competency, Decimals addition and subtraction with mixed operations and overall scores of all the competencies

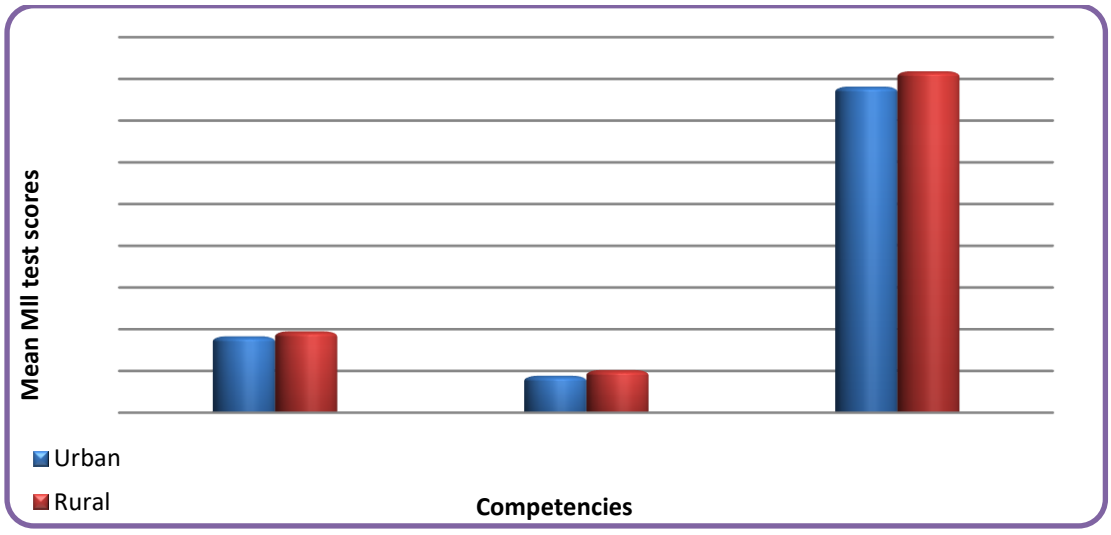


Table 2 : Comparison of means on various competencies of students studying in different taluks and results of One-way ANOVA for competencies numbers, Different numereals, Fundamental operations, Fractions, decimals and percentages.

Competencies	Taluks	Mean	S.D	F value	P value

C1-Number	Soraba	3.32	1.20	11.365	0.000
	Thirthahalli	3.70	1.00		
	Hosanagara	4.05	1.04		
	Bhadravathi	3.79	1.00		
	Shimoga	4.14	1.12		
	Sagar	4.03	1.13		
	Shikaripura	3.74	1.22		
	Total	3.86	1.13		
C2-Different numerals	Soraba	1.80	0.42	1.752	0.106
	Thirthahalli	1.81	0.48		
	Hosanagara	1.92	0.28		
	Bhadravathi	1.79	0.44		
	Shimoga	1.82	0.39		
	Sagar	1.81	0.47		
	Shikaripura	1.80	0.44		
	Total	1.82	0.42		
C3-Fundamental operations	Soraba	1.73	0.99	15.177	0.000
	Thirthahalli	1.80	1.10		
	Hosanagara	2.47	1.14		
	Bhadravathi	1.87	1.03		
	Shimoga	1.63	0.95		
	Sagar	2.11	1.05		
	Shikaripura	2.19	1.08		
	Total	1.96	1.07		
C4-Fractions, decimals, and percentages	Soraba	2.51	1.08	3.965	0.001
	Thirthahalli	2.57	1.10		
	Hosanagara	2.95	1.00		
	Bhadravathi	2.43	1.22		
	Shimoga	2.69	0.96		
	Sagar	2.62	1.25		
	Shikaripura	2.69	1.21		
	Total	2.63	1.14		

Numbers Competency

Table 3 : Results of Duncan's Multiple Range Test for Competency: Number

Taluks	N	Subset for alpha = .05		
		1	2	3
Soraba	140	3.3214		
Thirthahalli	162		3.6975	
Shikaripura	248		3.7379	
Bhadravathi	257		3.7899	
Sagar	233			4.0343
Hosanagara	155			4.0516
Shimoga	261			4.1418

In the case of numbers competency significant difference was observed between students studying in different taluks (F = 11.365; P = 0.000). The mean numbers competency scores of Soraba, Thirthahalli, Hosanagara, Bhadravathi, Shimoga, Sagar and Shikaripura were 3.32, 3.69, 4.05, 3.79, 4.14, 4.03 and 3.74 respectively. Further Duncan's multiple range test indicated that Soraba had least scores, Sagar, Hosanagar and Shimoga had Highest scores, Thirthahalli, Shikaripura and Bhadravathi students had the scores on competency numbers in between.

Different numerals competency

In the case of Different numerals competency no significant difference was observed between sectors as the observed 'F' value of 1.752 failed to reach significance level criterion. In other words the mean values for students studying in different taluks were statistically same.

Fundamental operations competency

Table 4: Results of Duncan's Multiple Range Test for Competency: Fundamental operations

SECTOR	N	Subset for alpha = .05			
		1	2	3	4
Shimoga	261	1.6322			
Soraba	139	1.7338	1.7338		
Thirthahalli	162	1.8025	1.8025		
Bhadravathi	257		1.8677		
Sagar	233			2.1073	
Shikaripura	248			2.1855	
Hosanagara	156				2.4679

In the case of Fundamental operations competency significant difference was observed between students studying in different taluks (F = 15.177; P = 0.000). The mean Fundamental operations competency scores of students studying in Soraba, Thirthahalli, Hosanagara, Bhadravathi, Shimoga, Sagar and Shikaripura were 1.73, 1.80, 2.47, 1.87, 1.63, 2.11 and 2.19 respectively. Further Duncan's multiple range test indicated that students studying in Shimoga , Soraba, Thirtahalli had least scores, Hosanagara had highest scores, students studying in Bhadravathi, Sagara, Shikaripura taluks had the scores in between.

Fractions, decimals, and percentages competency

Table 5: Results of Duncan's Multiple Range Test for Competency: Fractions, decimals, and percentages

SECTOR	N	Subset for alpha = .05		
		1	2	3
Bhadravathi	257	2.4319		
Soraba	140	2.5071	2.5071	
Thirthahalli	162	2.5679	2.5679	
Sagar	233	2.6180	2.6180	

Shikaripura	248		2.6895	
Shivmoga	261		2.6897	
Hosanagara	156			2.9487

In the case of Fractions, decimals, and percentages competency significant difference was observed between students studying in different taluks (F = 3.965; P = 0.001). The mean Fractions, decimals, and percentages competency scores of students studying in Soraba, Thirthahalli, Hosanagara, Bhadravathi, Shimoga, Sagar and Shikaripura were 1.08, 1.10, 1.0, 1.22, 0.96, 1.25 and 1.20 respectively. Further Duncan's multiple range tests indicated that students studying in Bhadravathi had least scores, Hosanagara had highest scores, and students studying in Sagar, Shikaripura and Shimoga had moderate scores.

Table 6: Comparison of means on various competencies of students studying in different taluks and results of One-way ANOVA for competencies Decimal's fundamental operations, Decimals addition and subtraction with mixed operations, Angles and total scores

Competencies	Taluks	Mean	S.D	F value	P value
C5-Decimal's fundamental operations	Soraba	1.57	0.98	6.288	0.000
	Thirthahalli	1.75	0.92		
	Hosanagara	2.18	0.86		
	Bhadravathi	1.85	1.08		
	Shimoga	2.02	0.86		
	Sagar	1.87	1.02		
	Shikaripura	1.81	1.04		
	Total	1.87	0.99		
C6-Decimals addition and subtraction with mixed operations	Soraba	1.82	0.93	8.552	0.000
	Thirthahalli	1.80	0.98		
	Hosanagara	2.39	0.82		
	Bhadravathi	1.98	1.15		
	Shimoga	2.00	0.99		
	Sagar	1.81	1.06		
	Shikaripura	2.17	0.90		
	Total	2.00	1.01		
C7-Angles	Soraba	2.02	0.92	14.221	0.000
	Thirthahalli	1.99	0.94		
	Hosanagara	2.47	0.78		
	Bhadravathi	2.23	0.96		
	Shimoga	2.28	0.82		

	Sagar	1.70	1.13		
	Shikaripura	2.04	0.95		
	Total	2.10	0.97		
TOTAL	Soraba	14.79	4.24	11.574	0.000
	Thirthahalli	15.41	3.35		
	Hosanagara	18.42	4.20		
	Bhadravathi	15.94	4.29		
	Shimoga	16.59	3.75		
	Sagar	15.91	4.80		
	Shikaripura	16.47	4.58		
	Total	16.24	4.32		

Decimals Fundamental Operations Competency

Table 7: Results of Duncan's Multiple Range Test for Competency: Decimals fundamental operations

SECTOR	N	Subset for alpha = .05			
		1	2	3	4
Soraba	140	1.5714			
Thirthahalli	162	1.7531	1.7531		
Shikaripura	248		1.8145	1.8145	
Bhadravathi	257		1.8521	1.8521	
Sagar	230		1.8696	1.8696	
Shivmoga	261			2.0153	2.0153
Hosanagara	156				2.1795

A significant difference was found between the students studying in different taluks in the Decimals fundamental operations competency scores as the obtained F value of 6.288 was found to be significant at .000 level. The mean Decimals fundamental operations competency scores of students studying in Soraba, Thirthahalli, Hosanagara, Bhadravathi, Shimoga, Sagar and Shikaripura were 1.57, 1.75, 2.18, 1.85, 2.02, 1.87, 1.81 and 1.87 respectively. Further Duncan's multiple range tests indicated that students of Soraba and Thirthahalli had least scores, and students of Shimoga and Hosanagar had highest and others in between.

Decimals Addition and Subtraction with Mixed Operations Competency

Table 8 : Results of Duncan's Multiple Range Test for Competency: Decimals addition and subtraction with mixed operations

Taluks	N	Subset for alpha = .05		
		1	2	3
Thirthahalli	162	1.7963		
Sagar	233	1.8069		
Soraba	140	1.8214		
Bhadravathi	257	1.9767	1.9767	
Shivmoga	261	2.0000	2.0000	
Shikaripura	248		2.1653	
Hosanagara	156			2.3910

In the case of Decimals addition and subtraction with mixed operations competency, a significant difference was observed between students studying in different taluks (F=8.552; P=0.000). The mean Decimals addition and subtraction with mixed operations competency scores of students studying in Soraba, Thirthahalli, Hosanagara, Bhadravathi, Shimoga, Sagar and Shikaripura were 1.82, 1.80, 2.39, 1.98, 2.00, 1.80, 2.17 and 1.99 respectively. Further Duncan's multiple range test indicated that students of Thirthahalli, Sagar, Soraba had least scores, Hosanagar had highest scores, and students of Bhadravathi, Shimoga, Sagar and Shikaripura had moderate scores.

Angles competency

Table 9: Results of Duncan's Multiple Range Test for Competency: Angles

SECTOR	N	Subset for alpha = .05			
		1	2	3	4
Sagar	233	1.6996			
Thirthahalli	162		1.9877		
Soraba	140		2.0214		
Shikaripura	248		2.0403		
Bhadravathi	257			2.2335	
Shimoga	261			2.2835	2.2835
Hosanagara	156				2.4679

In the case of Angles competency, a significant difference was observed between students studying in different taluks (F=14.221; P=0.000). The mean Angles competency scores of students studying in Soraba, Thirthahalli, Hosanagara, Bhadravathi, Shimoga, Sagar and Shikaripura were 2.02, 1.98, 2.46, 2.23, 2.28, 1.69 and 2.04 respectively. Further Duncan's multiple range test indicated that students of Sagar had least scores, students of Shimoga and Hosanagara had highest scores and other students in between.

Total competency scores

Table 9 : Results of Duncan's Multiple Range Test for total competency scores

SECTOR	N	Subset for alpha = .05			
		1	2	3	4
Soraba	140	14.7857			
Thirthahalli	162	15.4136	15.4136		
Sagar	233		15.9142	15.9142	
Bhadravathi	257		15.9416	15.9416	
Shikaripura	248			16.4677	
Shivmoga	261			16.5862	
Hosanagara	156				18.4231

When total scores on all the competencies were verified, it was found that students studying in different taluks differ significantly, as the obtained F value of 11.574 was found to be significant at .000 level. The mean C7 scores for Soraba, Thirthahalli, Hosanagara, Bhadravathi, Shimoga, Sagar and Shikaripura were 14.79, 15.41, 18.42, 15.94, 16.59, 15.91 and 16.46 respectively. Further Duncan's multiple range tests indicated that Sagar had least scores, Shimoga and Hosanagar had highest scores, Thirthahalli, Soraba, Shikaripura and Bhadravathi were in between.

Several studies have been conducted to compare achievement of mastery level in mathematics by students studying in urban and rural schools. Singh (2003) found significant difference in mathematic achievement between rural and urban students. Santhosh Sharma (1999) also found the same results. A study by Sharma (2000) found that teagarden school children (rural area) lagged behind urban students. Dutta (2003) found that urban girls were better in achievement in mathematics than rural girls. A study by Ramakalyani (1993) showed that urban government school students were better than rural government schools but they were inferior in mathematics achievements to the private school children.

It can therefore be concluded that achievement pattern in mathematics competencies among urban students is in a better position than compared to rural students. The findings of the present study show the reverse pattern of achievement as the rural students showed better performance .These results can be explained in the following manner. The students in the rural sample were selected from government schools. Usually students of all levels of mathematical ability have no option, but to enroll themselves in government schools. Thus, the students from rural areas present a more heterogeneous nature in mathematical ability than urban students. Usually in urban areas, children of well to do families are enrolled in private schools, which are perceived to be, and to an extent in actual sense qualitatively better than government schools. Naturally in urban areas, majority of students belonging to the higher ability group go to private schools. In addition, in urban areas, more number of students studying in private institutions opts for additional tuition classes than the rural students. It is quite surprising that rural students outshined urban students and hence shown better performance in mathematics compare to urban students. In urban government schools almost all students enrollment come from lower economic levels and impoverished environment. Hence it is likely that they tend to be lower in their performance in mathematics competencies. Many studies quoted above reported lower mathematics achievement by urban students from government schools. In the present study the sample from urban and rural area was drawn only from government schools. As a result the rural sample becomes more heterogeneous having many higher ability students as well as lower ability students for the reason mentioned above. But the urban sample becomes more homogeneous consisting of students from first

generation learners and poor family support. This difference of achievement between rural and urban students occurred due to the above mentioned reasons.

Conclusion

The above study showed that the improvement of mastery level in the competencies "fundamental operations", "fractions, decimals and percentages", "decimal fundamental operations" and " decimals addition subtraction with mixed operation" is due to the use of adequate manipulatives, so in the present study also investigator used adequate manipulatives wherever necessary in his intervention programme. Hence it can be stated that the adequate use of manipulatives and appropriate strategies can improve the mastery level in attainment of the above competencies.

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