American Journal of Humanities and Social Sciences Research (AJHSSR)
e-ISSN :2378-703X
Volume-07, Issue-08, pp-128-138
www.ajhssr.com
Research Paper Open Access

Project Opera (Operation Rational): A Tool In Bridging The Learning GAPS In Fractions Among Grade 9- Non- Numerates

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ABSTRACT : The study was conducted to determine the Mathematical performance of the students. The study aimed to evaluate the effect of project opera in the mathematical performance of the students during pre-test and post-test performance in fractions. The study employed the quasi -experimental one group-pre-test-post-test research design. The paired t-test was employed to establish the existence of significant difference between pre-and post-test scores in fractions.

I. INTRODUCTION

Based on the summary of the investigations conducted, the researchers have arrived to conclude that: During pre-test identifying fractions obtained a descriptive rating of very satisfactory; while reducing and comparing fractions obtained a descriptive rating of satisfactory respectively; moreover, arranging fractions got a descriptive rating of satisfactory and adding, subtracting, multiplying, dividing and worded problem solving in fractions obtained a poor descriptive rating during pre – test. Pre-test results on identifying fractions obtained a descriptive rating of satisfactory respectively; on the other hand, arranging, reducing and subtracting got a descriptive rating of fairly satisfactory and comparing, adding, multiplying, dividing and worded problem solving in fractions using traditional way of teaching obtained a poor descriptive rating during pre – test. There is a significant difference in project opera way of teaching of the respondents in fraction numbers during pre – test and post – test in terms of identifying; arranging; reducing; comparing; adding; subtracting; multiplying; dividing and worded problem in solving affects the posttest using project opera as intervention. There is no significant difference using traditional way of teaching of the respondents in fraction numbers during pre – test and post – test. There is a significant difference between traditional and project opera way of teaching in terms of subtracting, dividing and worded problem solving in fractions during post – testwas affected. There is a significant relationship between pre – test and post – test performance of the respondents in terms of reducing fractions using traditional way of teaching.

Based on the summary of the investigations conducted and the conclusions arrived at, the researchers have offered the following recommendations: The teachers may consider to sustain the use of project opera. Teachers are encouraging to prepare more teaching strategies in to learners. The teachers may prepare instructional materials that encourage the teacher-student interaction to create an atmosphere of active learning. Teachers may enhance their teaching strategies on adding, multiplying, and worded problem solving of rational numbers in fractions. Seminars and training of Mathematics Teachers may be provided to improve teaching strategies in fractions. Use of project opera may be implemented in the classroom setting. Traditional way of teaching can still be used and enhance on identifying, reducing and comparing fractions. The institutions administrator may consider to provide administrative support for teachers' training to acquire better skills in the design and development of learning resources for the implementation of project opera. A similar study be conducted incorporating other variables not investigated in this study.

II. RATIONALE

Shin & Bryant (2015) stated that fractions are one of the critical topics that students must understand and master as a pre-requisite for algebra instruction.

Lee,2012; Lee & Hackenburg, 2013) conducted research with 18 middle school and high school students. Their research showed that fractional knowledge appeared to be closely related to establishing algebra knowledge in the domains of writing and solving linear equations and concluded: "Teaching fraction and equation writing together can create synergy in developing students' fractional knowledge and algebra ideas" (p.9). Their research used both a Fraction based interview and an Algebra based interview. The two interview protocols

were designed so that the reasoning involved in the fraction based interview provided a foundation for solving problems in the Algebra.

The study of Shin & Bryant (2016b) synthesized intervention studies focusing on instruction to improve fraction skills. From the Common Core State Standards for Mathematics, addition and subtraction of fractions were most frequently representing the Standard for Mathematical Content, and modeling for mathematics instruction was most frequently observed to represent the Standards for Mathematical Practice. Results indicated that interventions consisting of evidence-based instructional components (e.g., concrete and visual representations; explicit, systematic instructions; range and sequence of examples; heuristic strategies; and use of real-world problems) led to improved performance on measures with fraction concepts and skills.
Secondary students struggling to learn mathematics should learn various fraction concepts and skills (Powell, Fuchs & Fuchs, 2013). In addition, according to the recommendations in an Institute of Education Sciences practice guide(Siegler, et al.,2010), teachers should (a) help students understand that reducing fractions are also numbers in the number system, (b) promote students' understanding of fractions equivalence and negative numbers, and (c) allow students to mathematically translate among rational numbers of common fractions, decimals, and percentages.

Objectives

This study aimed to determine how the Project OPERA (Operation Rational through Jigsaw Collaborative Learning Strategy) Classroom Based Math Intervention Project will improve the Mathematics performance of the non- numerates in fractions among Grade 9 Junior High School students of Rofulo M. Landa Memorial Highschool – Annex Bulawen, Palauig, Zambales during the school year 2022- 2023.

Specifically, this study seeks to find answers to the following questions:

1. What is the performance level of the respondents in rational numbers during the pre- test and post-test using project opera in terms of:

   1.1 Identifying Fractions;
   1.2 Arranging Fractions;
   1.3 Reducing Fractions;
   1.4 Comparing Fractions;
   1.5 Adding Fractions;
   1.6 Subtracting Fractions;
   1.7 Multiplying Fractions;
   1.8 Dividing Fractions; and
   1.9 Worded Problems in Fractions?

2. What is the performance level of the respondents in rational numbers during the pre- test and post-test using traditional way of teaching in terms of:

   2.1 Identifying Fractions;
   2.2 Arranging Fractions;
   2.3 Reducing Fractions;
   2.4 Comparing Fractions;
   2.5 Adding Fractions;
   2.6 Subtracting Fractions;
   2.7 Multiplying Fractions;
   2.8 Dividing Fractions; and
   2.9 Worded Problems in Fractions?

3. Is there a significant difference on performance of the respondents in rational numbers in fractions during pre –t est and post-test using project opera?
4. Is there a significant difference on performance of the respondents in rational numbers in fractions during pre –t est and post-test using traditional way of teaching?
5. Is there significant difference on performance of the respondents on rational numbers in fractions between project opera and traditional way of teaching?
6. Is there a significant relationship between pre-test and post-test on performance of the respondents on rational numbers in fractions during pre-test and post-test using project opera?
7. Is there a significant relationship between pre-test and post-test on performance of the respondents on rational numbers in fractions during pre-test and post-test using traditional way of teaching?

III. METHODOLOGY

A true experimental method is an experiment conducted to prove or disprove a cause- and- effect relationship between two variables. A true experimental method must include a control group and at least one experimental group that are randomly assigned and a researcher manipulated variable. An example of a true experiment would be a study to judge the effectiveness of Project OPERA. Participants would be randomly assigned to either a control group, who will receive a traditional way of teaching, or an experimental group, who will receive the intervention (Project OPERA) that will be studied. This type of research will be used to determine the impact and effectiveness of Project OPERA to improve the performance of the Grade 9 students on fraction concepts, operations and procedures among the Grade 9 Junior High School Students in Rofulo M. Landa Memorial High School- Annex Bulawen Palauig, Zambales.

Respondents and Location

The participants of this study are the Grade 9 Junior High School students of Rofulo M. Landa Memorial High School- Annex. Students from Grade 9 with two (2) sections, a total of sixty- two (62) shall be subject for the pre-test and post-test. The effect of an intervention will be tested by comparing two groups. One group will be exposed to the intervention (experimental group) also known as the treatment group and the other is not exposed to the intervention (control group).

INSTRUMENT

The researcher used item test to be administered before and after the intervention project. The questionnaire deals with the administering of the 60 items pre-test and a post-test which is different from the pre-test to be given after the remediation project is done. The pre-test and post-test is made to measure students' understanding of the topics about fractions. It consists of nine (9) topics that test the numeracy level of Grade 9 Junior High School students on fractions.

Results and Discussions

Based on the respondents. Responses gathered through the questionnaire, the data were analyzed and the following are the summary of the interpretations in the findings.

1. **Performance Level of the Respondents in Rational Numbers During Pre-test and Post-test Using Project Opera**

Table 1 : Performance Level of the Respondents in Rational Numbers during Pre – test and Post – Test (Project Opera)

Fractions	Pre - Test		Post - Test	
	Mean	Descriptive Rating	Mean	Descriptive Rating
Identifying	4.07	Very Satisfactory	4.70	Very Satisfactory
Arranging	4.13	Fairly Satisfactory	5.72	Satisfactory
Reducing	2.60	Satisfactory	4.17	Very Satisfactory
Comparing	3.07	Satisfactory	4.37	Very Satisfactory
Adding	1.23	Poor	2.50	Fairly Satisfactory
Subtracting	1.07	Poor	3.30	Satisfactory
Multiplying	1.67	Poor	2.83	Fairly Satisfactory
Dividing	1.20	Poor	4.00	Very Satisfactory
Problem	2.50	Poor	4.30	Fairly Satisfactory

Table 1 shows the summary on performance level of the respondents in rational numbers during pre – test and post – test in fractions.

Pre – test. As can be seen on the table identifying fractions obtained a descriptive rating of very satisfactory; while reducing and comparing fractions obtained a descriptive rating of satisfactory respectively; moreover, arranging fractions got a descriptive rating of satisfactory and adding, subtracting, multiplying, dividing and worded problem solving in fractions obtained a poor descriptive rating during pre – test.

Pre – test. Table above results indicates that identifying, reducing, comparing, and dividing fractions obtained a descriptive rating of very satisfactory; while arranging and subtracting fractions gained a descriptive rating of satisfactory; moreover, adding, multiplying and worded problem solving in fractions obtained a descriptive rating of fairly satisfactory during post – test.

2. Performance Level of the Respondents in Rational Numbers During Pre-test and Post-test Using Traditional Way of Teaching

Table 2 : Performance Level of the Respondents in Rational Numbers during Pre – test and Post – Test (Traditional)

Fractions	Pre - Test		Post - Test	
	Mean	Descriptive Rating	Mean	Descriptive Rating
Identifying	3.28	Satisfactory	4.69	Very Satisfactory
Arranging	4.61	Fairly Satisfactory	6.17	Satisfactory
Reducing	2.31	Fairly Satisfactory	3.84	Satisfactory
Comparing	1.66	Poor	4.00	Very Satisfactory
Adding	1.50	Poor	2.44	Fairly Satisfactory
Subtracting	2.16	Fairly Satisfactory	1.81	Poor
Multiplying	1.22	Poor	2.34	Fairly Satisfactory
Dividing	1.47	Poor	3.13	Satisfactory
Problem	2.94	Poor	2.94	Poor

Table 2 shows the summary on performance level of the respondents in rational numbers during pre – test and post – test in fractions using traditional way of teaching.

Pre – test. As can be seen on the table identifying fractions obtained a descriptive rating of satisfactory respectively; on the other hand, arranging, reducing and subtracting got a descriptive rating of fairly satisfactory and comparing, adding, multiplying, dividing and worded problem solving in fractions using traditional way of teaching obtained a poor descriptive rating during pre – test.

Pre – test. Table above results indicates that identifying and comparing fractions obtained a descriptive rating of very satisfactory; while arranging, reducing, and dividing fractions gained a descriptive rating of satisfactory; moreover, comparing and diving obtained a descriptive rating of fairly satisfactory; while subtracting and worded problem solving in fractions using traditional way of teaching obtained a descriptive rating of poor during post – test.

3. Test of Significant Difference on Performance of the Respondents in Rational Numbers in Fractions During Pre-test and Post-test Using Project Opera.

Table 3 : Test of Significant Difference in Project Opera Way of Teaching of the Respondents in Fraction Numbers during Pre – test and Post – Test

Fractions	t	df	Sig. (2-tailed)	Decision/ Interpretation
Identifying	-2.919	29	0.007	Reject Ho Significant
Arranging	-3.218	29	0.003	Reject Ho Significant
Reducing	-4.265	29	0.000	Reject Ho Significant
Comparing	-7.477	29	0.000	Reject Ho Significant
Adding	-5.774	29	0.000	Reject Ho Significant

Subtracting	-8.697	29	0.000	Reject Ho Significant
Multiplying	-7.663	29	0.000	Reject Ho Significant
Dividing	-10.770	29	0.000	Reject Ho Significant
Problem	-3.525	29	0.001	Reject Ho Significant

Table 21 reflects the test of significant difference in project opera way of teaching of the respondents in fraction numbers during pre – test and post – test.
The computed significant value for identifying (0.007); arranging (0.003); reducing; comparing; adding; subtracting; multiplying; dividing and worded problem in solving (0.000) respectively are all less than 0.05 alpha level of significance values; results indicates that there is a significant difference in project opera way of teaching of the respondents in fraction numbers during pre – test and post – test. The result implies that identifying; arranging; reducing; comparing; adding; subtracting; multiplying; dividing and worded problem in solving affects the posttest using project opera as intervention. Therefore, hypothesis is rejected.

4. Test of Significant Difference on Performance of the Respondents in Rational Numbers in Fractions During Pre-test and Post-test Using Traditional Way of Teaching.

Table 4 : Test of Significant Difference in the Traditional Way of Teaching of the Respondents in Fraction During Pre – Test and Post – Test

Fractions	t	df	Sig. (2-tailed)	Decision/ Interpretation
Identifying	-5.090	31	0.000	Reject Ho Significant
Arranging	-3.138	31	0.004	Reject Ho Significant
Reducing	-5.685	31	0.000	Reject Ho Significant
Comparing	-9.004	31	0.000	Reject Ho Significant
Adding	-3.186	31	0.003	Reject Ho Significant
Subtracting	.918	31	0.366	Accept Ho Not Significant
Multiplying	-3.450	31	0.002	Reject Ho Significant
Dividing	-5.718	31	0.000	Reject Ho Significant
Problem	0.000	31	1.000	Accept Ho Not Significant

Table 4 reflects the test of significant difference in traditional way of teaching of the respondents in fraction numbers during pre – test and post – test.

The computed significant value for subtracting (0.366) and worded problem solving (1.000) in fraction are greater than 0.05 alpha level of significance values; results indicates that there is no significant difference using traditional way of teaching of the respondents in fraction numbers during pre – test and post – test. The result implies that subtracting and worded problem solving in fractions during pre – test and post – test was not affected. Therefore, hypothesis is accepted.

Moreover, the computed significant value for identifying (0.000); arranging (0.004); reducing (0.000); comparing (0.000); adding (0.003); multiplying (0.
002) and dividing (0.000) fractions are all less than 0.05 alpha level of significance values; results indicates that there is a significant difference in project opera way of teaching of the respondents in fraction numbers during pre – test and post – test. The result implies that identifying; arranging; reducing; comparing; adding; multiplying; and dividing affects the posttest using traditional way of teaching. Therefore, hypothesis is rejected.

5. Test of Significant Difference on Performance of the Respondents on Rational Numbers in Fractions Between Project Opera and Traditional Way of Teaching.

Table 5 : Test of Significant Difference between Project Opera way of Teaching and Traditional During Pre – Test and Post – Test

Fractions	df	Pre - Test			Post - Test		
		t	Sig. (2-tailed)	Decision/ Interpretation	t	Sig. (2-tailed)	Decision/ Interpretation
Identifying	60	2.49	0.02	Reject Ho Significant	0.07	0.95	Accept Ho Not Significant
Arranging	60	-1.01	0.32	Accept Ho Not Significant	-0.67	0.51	Accept Ho Not Significant
Reducing	60	0.76	0.45	Accept Ho Not Significant	0.90	0.37	Accept Ho Not Significant
Comparing	60	5.41	0.00	Reject Ho Significant	1.29	0.20	Accept Ho Not Significant
Adding	60	-1.76	0.08	Accept Ho Not Significant	0.18	0.86	Accept Ho Not Significant
Subtracting	60	-3.67	0.00	Reject Ho Significant	4.60	0.00	Reject Ho Significant
Multiplying	60	2.78	0.01	Reject Ho Significant	1.35	0.18	Accept Ho Not Significant
Dividing	60	-1.48	0.14	Accept Ho Not Significant	2.38	0.02	Reject Ho Significant
Problem	60	-0.97	0.34	Accept Ho Not Significant	2.08	0.04	Reject Ho Significant

Table 5 reflects the test of significant difference between project opera way of teaching and traditional during pre – test and post – test.

Pre – test. The computed significant value for arranging (0.32); reducing (0.45); adding (0.08); dividing (0.14) and worded problem solving (0.34) in fraction are greater than 0.05 alpha level of significance values; results indicates that there is no significant difference between traditional and project opera way of teaching in terms of arranging, adding, dividing and worded problem solving in fraction during pre – testwas not affected. Therefore, hypothesis is accepted.

However, the computed significant value for identifying (0.02); comparing (0.00); subtracting (0.00) and multiplying (0.01) in fraction are less than 0.05 alpha level of significance values; results indicates that there is a significant difference between traditional and project opera way of teaching in terms of identifying, comparing, subtracting and multiplying in fractions during pre – testwas affected. Therefore, hypothesis is rejected

Post – test. The computed significant value for identifying (0.95), arranging (0.51), reducing (0.37), comparing (0.20), adding (0.86), and multiplying (0.18) in fraction are greater than 0.05 alpha level of significance values; results indicates that there is no significant difference between traditional and project opera way of teaching in terms of identifying, arranging, reducing, comparing, adding, and multiplying in fractions during post – testwas not affected. Therefore, hypothesis is accepted.

Moreover, the computed significant value for subtracting (0.00); dividing (0.02); and worded problem solving (0.04) in fractions are less than 0.05 alpha level of significance values; results indicates that there is a significant difference between traditional and project opera way of teaching in terms of subtracting, dividing and worded problem solving in fractions during post – testwas affected. Therefore, hypothesis is rejected

6. Test of Significant Relationship between Pre-test and Post-test on Performance of the Respondents on Rational Numbers in Fractions During Pre-test and Post-test Using Project Opera.

Table 6 : Test of Significant Relationship Between Pre – Test and Post – Test of Fractions Performance of the Respondents Using Project Opera

Source of Correlations			Decision/ Interpretation
Identifying	Pearson Correlation	0.04	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.83	
	N	30	
Arranging	Pearson Correlation	0.33	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.08	
	N	30	
Reducing	Pearson Correlation	0.03	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.86	
	N	30	
Comparing	Pearson Correlation	0.577**	Moderate Relationship Reject Ho Significant
	Sig. (2-tailed)	0.00	
	N	30	
Adding	Pearson Correlation	0.09	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.64	
	N	30	
Subtracting	Pearson Correlation	-0.04	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.82	
	N	30	
Multiplying	Pearson Correlation	0.619**	Moderate Relationship Reject Ho Significant
	Sig. (2-tailed)	0.00	
	N	30	
Dividing	Pearson Correlation	0.29	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.13	
	N	30	
Problem Solving	Pearson Correlation	0.35	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.06	
	N	30	
*. Correlation is significant at the 0.05 level (2-tailed).			
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 6 reflects the test of significant relationship between pre – test and post – test of fractions performance of respondents using project opera.

The computed Pearson r for identifying (0.04); arranging (0.33); reducing (0.03); adding (0.09); subtracting (0.04); dividing (0.29); and worded problem solving (0.35); results indicates that there is no significant relationship between pre – test and post – test performance of the respondents in terms of identifying; arranging; reducing; adding; subtracting; dividing and worded problem solving in fractions using project opera. Hence, hypothesis is accepted.

However; the computed Pearson r in terms of comparing (0.577) and multiplying (0.619) in fractions indicates that there is a moderate relationship between pre – test and post – test performance of the respondents in fractions in terms of comparing and multiplying fractions. Hence, hypothesis is rejected.

7. Test of Significant Relationship between Pre-test and Post-test on Performance of the Respondents on Rational Numbers in Fractions During Pre-test and Post-test Using Traditional Way of Teaching.

Table 7 : Test of Significant Relationship Between Tradition of the Respondents in Fractions During Pre – Test and Post – Test (Traditional)

Source of Correlations			Decision/ Interpretation
Identifying	Pearson Correlation	0.08	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.68	
	N	32	
Arranging	Pearson Correlation	-0.09	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.63	
	N	32	
Reducing	Pearson Correlation	.452**	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.01	
	N	32	
Comparing	Pearson Correlation	0.14	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.46	
	N	32	
Adding	Pearson Correlation	0.09	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.62	
	N	32	
Subtracting	Pearson Correlation	-0.14	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.46	
	N	32	
Multiplying	Pearson Correlation	-0.17	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.35	
	N	32	
Dividing	Pearson Correlation	0.05	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.77	
	N	32	
Problem Solving	Pearson Correlation	0.06	No Relationship Accept Ho Not Significant
	Sig. (2-tailed)	0.75	
	N	32	
*. Correlation is significant at the 0.05 level (2-tailed).			
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 7 reflects the test of significant relationship between pre – test and post – test of fractions performance of respondents using traditional way of teaching.

The computed Pearson r for identifying (0.08); arranging (0.09); comparing (0.14); adding (0.09); subtracting (0.14); multiplying (0.17); dividing (0.05); and worded problem solving (0.06); results indicates that there is no significant relationship between pre – test and post – test performance of the respondents in terms of identifying; arranging; comparing; adding; subtracting; multiplying; dividing and worded problem solving in fractions using traditional way of teaching. Hence, hypothesis is accepted.

While the computed Pearson r for reducing (0.452) indicates that there is a significant relationship between pre – test and post – test performance of the respondents in terms of reducing fractions using traditional way of teaching. Hence, hypothesis is rejected

IV. CONCLUSIONS

Based on the summary of the investigations conducted, the researchers have arrived to conclude that:

1. During pre-test identifying fractions obtained a descriptive rating of very satisfactory; while reducing and comparing fractions obtained a descriptive rating of satisfactory respectively; moreover, arranging fractions got a descriptive rating of satisfactory and adding, subtracting, multiplying, dividing and worded problem solving in fractions obtained a poor descriptive rating during pre – test. However, results indicates that identifying, reducing, comparing, and dividing fractions obtained a descriptive rating of very satisfactory; while arranging and subtracting fractions gained a descriptive rating of satisfactory; moreover, adding, multiplying and worded problem solving in fractions obtained a descriptive rating of fairly satisfactory during post – test.
2. Pre-test results on identifying fractions obtained a descriptive rating of satisfactory respectively; on the other hand, arranging, reducing and subtracting got a descriptive rating of fairly satisfactory and comparing, adding, multiplying, dividing and worded problem solving in fractions using traditional way of teaching obtained a poor descriptive rating during pre – test. Moreover, results indicates that identifying and comparing fractions obtained a descriptive rating of very satisfactory; while arranging, reducing, and dividing fractions gained a descriptive rating of satisfactory; moreover, comparing and diving obtained a descriptive rating of fairly satisfactory; while subtracting and worded problem solving in fractions using traditional way of teaching obtained a descriptive rating of poor during post – test.
3. There is a significant difference in project opera way of teaching of the respondents in fraction numbers during pre – test and post – test in terms of identifying; arranging; reducing; comparing; adding; subtracting; multiplying; dividing and worded problem in solving affects the posttest using project opera as intervention.
4. There is no significant difference using traditional way of teaching of the respondents in fraction numbers during pre – test and post – test. The result implies that subtracting and worded problem solving in fractions during pre – test and post – test was not affected. However; there is a significant difference in project opera way of teaching of the respondents in fraction numbers during pre – test and post – test in terms ofidentifying; arranging; reducing; comparing; adding; multiplying; and dividing affects the posttest using traditional way of teaching.
5. There is no significant difference between traditional and project opera way of teaching in terms of arranging, adding, dividing and worded problem solving in fraction during pre – test was not affected. There is a significant difference between traditional and project opera way of teaching in terms of identifying, comparing, subtracting and multiplying in fractions during pre – test was affected. There is no significant difference between traditional and project opera way of teaching in terms of identifying, arranging, reducing, comparing, adding, and multiplying in fractions during post – testwas not affected. There is a significant difference between traditional and project opera way of teaching in terms of subtracting, dividing and worded problem solving in fractions during post – testwas affected.
6. There is no significant relationship between pre – test and post – test performance of the respondents in terms of identifying; arranging; reducing; adding; subtracting; dividing and worded problem solving in fractions using project opera. There is a moderate relationship between pre – test and post – test performance of the respondents in fractions in terms of comparing and multiplying fractions. Hence, hypothesis is rejected.
7. There is no significant relationship between pre – test and post – test performance of the respondents in terms of identifying; arranging; comparing; adding; subtracting; multiplying; dividing and worded problem solving in fractions using traditional way of teaching. There is a significant relationship between pre – test and post – test performance of the respondents in terms of reducing fractions using traditional way of teaching.

Recommendations

Based on the summary of the investigations conducted and the conclusions arrived at, the researchers have offered the following recommendations:

1. The teachers may consider to sustain the use of project opera.
2. Teachers are encouraging to prepare more teaching strategies in to learners.
3. The teachers may prepare instructional materials that encourage the teacher-student interaction to create an atmosphere of active learning.
4. Teachers may enhance their teaching strategies on adding, multiplying, and worded problem solving of rational numbers in fractions.
5. Seminars and training of Mathematics Teachers may be provided to improve teaching strategies in fractions.

6. Use of project opera may be implemented in the classroom setting
7. Traditional way of teaching can still be used and enhance on identifying, reducing and comparing fractions.
8. The institutions administrator may consider to provide administrative support for teachers' training to acquire better skills in the design and development of learning resources for the implementation of project opera.
9. A similar study be conducted incorporating other variables not investigated in this study.

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