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A RESEARCH ON EFFICACY OF TEACHING VEDIC MATHEMATICS IN SCHOOL LEVEL

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Abstract

Mathematics teaching in school level has become a necessary as well as challenging task with updated curriculum to generate positive attitudes towards mathematics among students. Vedic mathematics is an extremely refined and efficient mathematical system based on 16 sutras and similar numbers of sub-sutras. The main purpose of this research article is to study and analyze the effectiveness of teaching Vedic Mathematics on Students. For this, the researchers have been chosen Judgement(purposive) sampling method under the non-random sampling to collect the data. The study was to compare the significant difference in achievements of students in knowledge, efficiency, accuracy and speed of students in two parallel groups as an experimental and control.

Key Words : School level mathematics, Vedic methods, Experimental groups, Control groups, Hypothesis testing.

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1. Introduction

Mathematics is a compulsory subject from very primary level to secondary level of schools everywhere. To teach this subject, different methods of teaching have been proposed or propounded by different educational thinkers or school of thoughts in education system. Even though, mathematics is considered by many students as a dry and difficult subject. It should be frankly admitted that the present-day teaching of mathematics is far from being satisfactory.

The remarkable system of Vedic mathematics was rediscovered by Sri Bharati Krishna Tirthaji from ancient Sanskrit texts Veda early last century between 1911 - 1918. It provides an innovative way of computations of almost all the mathematical problems, with which any mathematical problem be it arithmetic, algebra, geometry can be solved. This research article is concerned only the study and analysis of effectiveness of teaching some Vedic methods on students of grade V in school's level to solve the mathematical problems within the specified content and time frame.

In the research work, data collection, tabulation, analysis and interpretation are very important part. The purpose of data analysis is to extract useful information from data and taking the decision based upon the data analysis. The research is incomplete when its data has not been analyzed. In analysis, the collected data are tabulated and statistical techniques are employed as per research design of proposed research. The main purpose of this research is to study the effectiveness of teaching Vedic Mathematics on Students. For this, the study was to compare the significant difference in achievements of students in knowledge, efficiency, accuracy and speed of students in two groups. For this purpose, the researcher chooses Judgement(purposive) sampling method under the Non-random sampling. Under this method, the selection of items entirely depends on the choice of the researcher. The researchers were administered as pre-test and post-test before and after the intervention of Vedic and conventional methods in their respective groups respectively. From inferential statistics, paired t-test was taken as a tool for the hypothesis testing in their research.

The researcher was selected 300 students of grade V from different schools in Kathmandu valley. Being the capital of Nepal, Kathmandu valley comprises of people from different locality, ethnicity, and lingual community. The variation of student allows the data to be generalized among large number of students (Throughout the country) by taking

different types of four schools (2 private and 2 government). Whole 300 students were divided into two parallel groups. Each group contained 3 sections with 150 students which were taken as experimental group and control group. Both the groups were taught within the same content and same number of teaching hours by Vedic methods and conventional methods respectively by the researcher himself. Researcher's self-made achievement test was taken as a tool. The researcher administered two tests as pre-test and post-test for both the groups.

In this research, the researcher uses means, standard deviation, coefficient of variation as a tool from the descriptive statistics for his data to analyze them. t-test is chosen (moreover p-value) as a tool from the inferential statistics.

2. Hypotheses Test

The test of hypothesis is a process of testing of significance regarding the parameter of the population on the basis of the sample drawn from the population. Thus, the test of hypothesis is disclosed the fact whether the difference between the computed statistics and hypothetical parameter is significant. In this study, the hypotheses are:

- H_{01} : There is no significant difference between scores of pre-test and post-test in experimental group.
- H_{02} : There is no significant difference between scores of pre-test and post-test in control group.
- H_{03} : There is no significant difference between private and government school's students scores scored on pre-test in experimental group.
- H_{04} : There is no significant difference between private and government school's students scores scored on post-test in experimental group.
- H_{05} : There is no significant difference between private and government school's students scores scored on pre-test in control group.
- H_{06} : There is no significant difference between private and government school's students scores scored on post-test in control group.

• H_{07} : There is no significant difference between experimental group and control group to consume the time in examination of post-test.

In the procedure of testing a hypothesis, it should be managed to fix the level of significance. The commonly used levels of significance are 5% (0.05) or 1% (0.01). In this research, the researchers fix the general level of significance i.e. 5% (0.05) for their research. Out of the various types of hypothesis testing, the researcher chooses the *t*-test for their suitability of the data in the research to fulfill their objectives. Because, in t-test for difference between the means, the two samples have been assumed to be independent of each other.

Table No. 2.1 : Number of students in two tests in two groups under thebasis of achievers of marks

Teaching Groups	Achievers	Pre-t	est	Post-test		
		Frequency	Percent	Frequency	Percent	
Experimental	Low	119	79.3	87	58.0	
	High	31	20.7	63	42.0	
Control	Low	91	60.7	101	67.3	
	High	59	39.3	49	32.7	

Note : High achievers means 35% and more scorer & low achievers means less than 35% scorer for both tests.

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Null	Teaching	Test Items		\overline{x}	$\mid N$	σ	p-values	Results of Null
Hypotheses	Groups							Hypotheses
H_{01}	EG	Pre-test		23.28	150	12.71	0.000	Rejected
		Post-test		35.19	150	30.97		
H_{02}	CG	Pre-test		32.37	150	16.14	0.000	Rejected
		Post-test		28.03	150	17.12		
H_{03}	EG	Pre-test	Pvt.	29.27	45	10.15	0.000	Rejected
			Gvt.	20.71	105	12.87		
H_{04}	EG	Post-test	Pvt.	42.13	45	32.11	0.072	Accepted
			Gvt.	32.21	105	30.14		
H_{05}	CG	Pre-test	Pvt.	37.77	105	14.36	0.000	Rejected
			Gvt.	19.76	45	12.76		
H_{06}	CG	Post-test	Pvt.	31.71	105	15.83	0.000	Rejected
			Gvt.	19.44	45	17.10		
H_{07}	EG			49.50	150	4.25	0.000	Rejected
	CG			88.57	150	2.92	1	

Table No. 2.2 : Analysis of results by using *t*-test on *p*-values

Note : In hypothesis testing of t-test, as p-value is less than 0.05, t-test revealed that null hypothesis is rejected, at that time alternative hypothesis is automatically accepted and vice-versa.

3. Results

From the above table No. 2.1, in experimental group, before intervention by Vedic method there were 20.67% high achievers, after intervention, the achievers doubled. But the low achiever's percentage decreased from 79.33% to 58% from pre-test to posttest. In control group, before intervention by conventional method there were 39.3% high achievers, after intervention, the achievers decreased down to 32.67%. But low achiever's percentage increased from 60.67% to 67.3% from pre-test to post-test.

From the above table No. 2.2, in both the null hypotheses H_{01} and H_{o2} , p value = 0.000, t-test revealed that there is significant difference in the score of pre-test and post-test for experimental group and control groups both. That is, null hypothesis H_{01} and H_{02} both are rejected. The difference in two rejections is that, the score scored in post-test is significantly more than pre-test in experimental group but in control group, the score scored in post-test is significantly less than those scores scored in pre-test. In H_{03} , *p*-value = 0.000 and in H_{04} , *p*-value = 0.072. *t*-test revealed that null hypothesis H_{03} is rejected but H_{04} is accepted. Therefore, there is significant difference between mean score of pre-tests but not difference on post-test of students of private and government school's students in experimental group. In H_{05} , *p*-value = 0.000 and in H_{06} , *p*-value = 0.000. *t*-test revealed that both the null hypotheses H_{05} and H_{06} are rejected. Therefore, there is significant difference between mean score of pre-tests and post-tests of students of private and government school's students in control group.

In H_{07} , *p*-value = 0.000, *t*-test revealed that null hypothesis H_{07} is rejected that is there is significant difference between experimental group and control group for consuming the time in examination of post-test. Moreover, the average (mean) time taken by control group is (88.57 - 49.50) = 39.07 minutes over than the time taken by experimental group out of 90 minutes of exam time. The standard deviation shows that, most of the students in experimental group consumed the time near to 90 minutes whereas the control group consumed 79% more time than experimental group.

4. Conclusion

From the above results, it can be concluded that, Vedic method is success to promote the result of experimental group by reducing the number of low achievers and increasing the number of high achievers but the conventional method is unsuccess to promote the result on control group from pre-test to post-test.

Under the basis of private and government school's students, the experimental verification showed that students of private and government schools students felt Vedic method is easier and effective to solve the mathematical problems than the conventional method for both types of students. Hence, Vedic method change the performance of the students of experimental but not of control group by conventional method.

Vedic methods help the students of experimental group to reduce the time consumption drastically in the examination than control group which were intervened by conventional methods to solve the same problems in the examinations. The standard deviation informed that, the variation of time consuming in experimental group is more than the variation of time consuming in control group, which supported that most of the students in control group consumed the time near to 88.57 minutes out of 90 minutes of exam time. Hence, the application of Vedic sutras is more effective than the existing system of mathematics instructional procedure by enhancing the skills and efficiencies for solving mathematical problems with computational speed and accuracy, which can be developed the positive attitudes towards mathematics.

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