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LEARNING ACQUISITION AMONG SECONDARY STAGE STUDENTS THROUGH MODULAR AND MULTIMEDIA INSTRUCTIONAL STRATEGIES IN RELATION TO ACHIEVEMENT MOTIVATION

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Abstract:

The study was experimental in nature and conducted on the sample of 500 students, as per the requirements of 3*2 factorial design in which the independent variables of Instructional Strategies and Achievement Motivation were studied. Learning Acquisition on some concepts of English Grammar was taken as a dependent variable. There were three levels of Instructional Strategies - Modular Instructional Strategy (I1), Multimedia Instructional Strategy (I2) and Control Group (Io)- and two levels of the variable Achievement Motivation (A) – High Achievement Motivation (A1) & Low Achievement Motivation (A2) -. The results showed that F ratios were significant for the main effects of Instructional Strategies (I) and Achievement Motivation (A), and also for the double interaction effects of Instructional Strategies (I) * Achievement Motivation (A).

Key words: Instructional Strategies, Achievement Motivation and Learning Acquisition

INTRODUCTION

Instructional Strategies are the methods of teaching (in the classroom, online, or in some other medium) help to activate students' curiosity about a classroom topic, to engage the students in learning, to probe critical thinking skills, to keep them on task, to engender sustained and useful classroom interaction, and, in general, to enable and enhance their learning of course content. The goal is to enable learning, to motivate the learners, to engage them in learning, to help them focus.

For the present investigation variables of Modular and Multimedia Instructional Strategies and Achievement Motivation have been selected to study their effect on Learning Acquisition of Secondary School students studying through Central Board of Secondary Education (C.B.S.E.), on the basis of considerations Research studies of Kapoor, (1999), Pecoraro (2002), Freeland (2004), Haukoos (2007), Khalil, et al. (2010), Tyagi (2011), Alias and Sira (2012) and which showed significant effect of Modular Instructional Strategy on Learning Acquisition .

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However researches conducted by Dubey and Khuntia (2000), Culbertson et a1. (2004), could not find any significant relationship of Modular Instructional Strategy on Learning Acquisition of Students.

In addition, one study by Dhamija (1985) concluded that the involvement of students in classroom was maximum when they were taught through the radio-vision approach and self-confidence among the students increased the most when they were taught through the modular approach.

Researches earlier done in the field of Multimedia Instructional Strategy have shown Multimedia as a main factor having significant effect on Learning Acquisition of students. Studies by Koroghlanian (2000), Chittipun (2004), Jayaraman (2006), Gregorius et al., (2010), Rolfe and Gray (2011), Kim, (2012), Maree, (2013) et. al. and Rusanganwa, (2013) showed significant effect of Multimedia Instructional Strategy on Learning Acquisition .

However researches conducted by Lewis et a1. (2005) and Koeber (2005) could not find significant effect of Multimedia Instructional Strategy on Learning Acquisition.

Another variable considered significant for the present study pertains to Achievement Motivation (High and Low) of students. Research studies of Jayalekshmi (2000), Lan (2002), Nancy (2003), Tella (2007), Mahyuddin et. al. (2009), Awan et al. (2011), Rais Hasan et al . (2012), and Chow, and Yong, (2013) showed significant effect of Achievement Motivation on Learning Acquisition of Students.

However, researchers like Bhatt (2009), Reynolds and Weigand (2010) and Onete (2012) could not find significant effect of Achievement Motivation on Learning Acquisition.

In addition, there are studies by Kaul & Bhadwal (1989) which examined same level of achievement motivation at the end of instruction and Riley & Shannon (2002) studied mediated relationship between the Achievement Motivation and Learning Acquisition.

Survey of the related literature, on the studies conducted in this field, does not lead to a clear -cut trend. The results of these studies present various types of relationships of these variables with Learning Acquisition. These studies showed the effect of variables of Modular and Multimedia Instructional Strategies and Achievement Motivation taken up singly on Learning Acquisition, but the conjoint effect of all the variables on Learning Acquisition may present a different picture. The variable-wise rationale of the problem leaves wide scope for investigating the combined impact of independent variables on dependent variable in different combinations in a factorial frame of reference.

OBJECTIVES OF THE STUDY

The following are the objectives of the Study:

1. To find out the differences on Learning Acquisition of High And Low Achievement Motivation groups of students at the secondary stage.

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2. To work out differences on Learning Acquisition of students taught through Modular and Multimedia Instructional Strategies and that of the students of the Control Group at the secondary stage.
3. To study the interaction effect of the variables of Achievement Motivation and Instructional Strategies on Learning Acquisition of students at the secondary stage.

HYPOTHESES OF THE STUDY

The following are the Hypotheses of the Study:

1. There will be no significant difference on the Learning Acquisition of High and Low Achievement Motivation groups of students at the secondary stage.
2. There will be no significant differences on the Learning Acquisition of students taught through Modular and Multimedia Instructional Strategies and that of the students of the Control Group at the secondary stage.
3. There will be no significant interaction effect of the variables of Achievement Motivation and Instructional Strategies on Learning Acquisition.

DESIGN OF THE STUDY:

The study was experimental in nature in which (3 * 2) factorial design was used to find out the effect of independent variables (Instructional Strategies and Achievement Motivation) on the dependent variable of Learning Acquisition. There were three levels of Instructional Strategies and two levels of each of the variables of Achievement Motivation. Instructional Strategies were studied as Modular Instructional Strategy (I1), Multimedia Instructional Strategy (I2) and the third group consisted of the Control Group (Io).The study was designed on the Pre Test – Post Test pattern. The same Achievement test was used at both the levels of testing. The teaching was done through Modular and Multimedia Instructional Strategies.

SAMPLE OF THE STUDY:

A sample pool of 500 students was drawn from the students of class IX of C.B.S.E. affiliated schools of Chandigarh. It consisted of both boys and girls. The sample was random in nature and was drawn from five Secondary/Senior Secondary Schools of Chandigarh. Technique of multistage sampling was used for collecting the data.

TOOLS USED:

The following tools were used to conduct the present study:

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1. Achievement Motivation (n- Ach) Scale by Deo, P. and Mohan, A. (1985) to test the Achievement Motivation.
2. Modular and Multimedia Instructional Strategies (Developed by the Investigator)
3. Learning Acquisition Test (Developed by the Investigator)

DATA ANALYSIS AND INTERPRETATION

This phase deals with the analysis of main and interaction effects of the variables. For analysis, the three-way analysis of variance was carried out to provide the information required by the objectives of the study. The results of data analysis are presented as follows:

Main Effect of Achievement Motivation

The main effect of Achievement Motivation was analysed at two levels, High Achievement Motivation and Low Achievement Motivation.

Table-1
F- Ratio showing Differences between High and Low Achievement Motivation Group of Students on Learning Acquisition

Achievement Motivation	No of Cases	Mean	Std. Deviation (SD)	Sum Squares (SS)	df	Mean Square	F- ratio
High Achievement Motivation	72	42.85	5.21	583.69	19.62	583.69	19.62
Low Achievement Motivation	72	34.96	4.78				

The F- ratio for Achievement Motivation is significant at .01 level. This implies that the differences between the High and Low groups of Achievement Motivation have significant effect on Learning Acquisition. The mean value of High Achievement Motivation group of students (42.85) is higher than that of the mean value of Low Achievement Motivation group of students (34.96). It clearly shows that High Achievement Motivation group of students has significantly higher Learning Acquisition than that of Low Achievement Motivation group of students. The comparison of the mean values of High Achievement Motivation and Low Achievement Motivation group is shown in Figure -1

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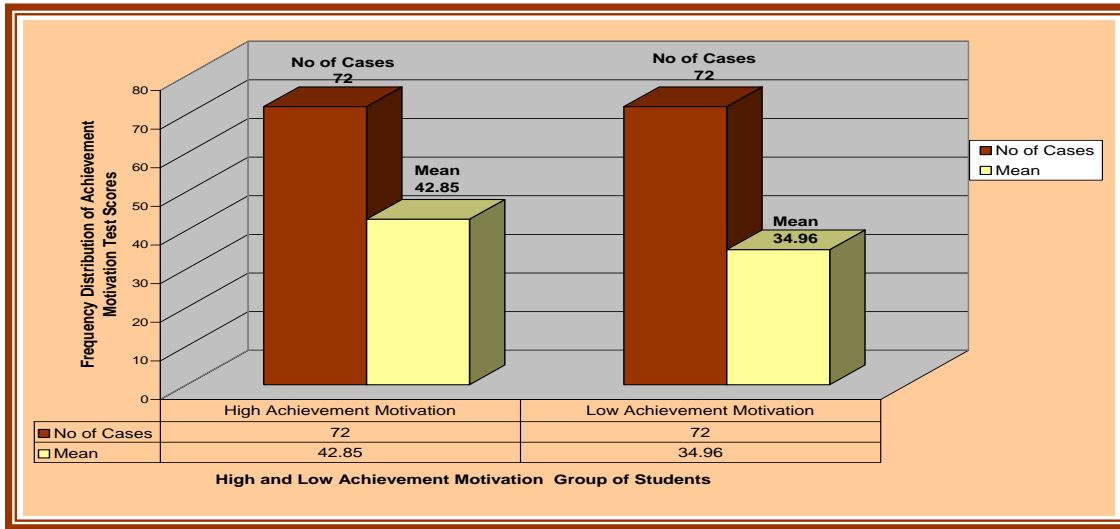
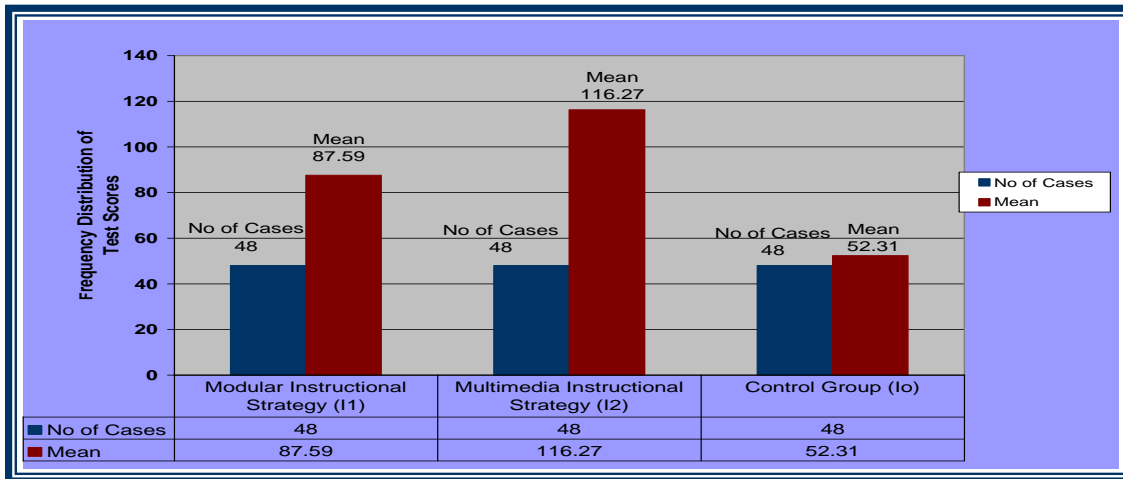## Main Effect of Instructional Strategies

The main effect of Instructional Strategies was analysed over three levels, Modular Instructional Strategy (I1), Multimedia Instructional Strategy (I2) and the Control Group (Io).

Table-2
F- Ratio showing differences among the groups of
Modular Instructional Strategy (I1), Multimedia Instructional Strategy (I2) and the
Control Group (Io) of students on Learning Acquisition

Instructional Strategies	No of Cases	Mean	Std. Deviation (SD)	Sum Squares (SS)	df	Mean Square	F-ratio
Modular - Instructional Strategy (I1)	48	87.59	18.45				
Multimedia - Instructional Strategy (I2)	48	116.27	27.59	2137.54	2	1068.77	35.94
Control Group (Io)	48	52.31	10.43				

The F- ratio for the groups of Modular Instructional Strategy (I1), Multimedia Instructional Strategy (I2) and the Control Group (Io) is significant at .01 level. This implies that the differences among the three groups have significant effect on Learning Acquisition of the

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students. To analyse these differences further t - ratios were computed which are presented in the Table -3. The comparison of the Mean values of the groups of Modular Instructional Strategy (I1), Multimedia Instructional Strategy (I2) and the Control Group (Io) is shown in the Figure- 2

Figure: - 2
Bar diagram showing differences among the Means of groups of
Modular Instructional Strategy (I1), Multimedia Instructional Strategy (I2)
and the Control Group (Io) on Learning Acquisition

Table:-3
t - ratios for the difference in means of two Experimental Groups of
Instructional Strategies (Modular, Multimedia) and Control Group of Students

Groups			No of Students	Mean	S.D.	t- ratios	Level of Significance
I		I1	48	85.71	17.36	7.38	*** Significant at .01 level**
		I2	48	102.46	26.03		
II		I1	48	85.71	17.36	5.93	*** Significant at .01 level**
		Io	48	51.47	9.78		
III		I2	48	102.46	26.03	9.74	*** Significant at .01 level**
		Io	48	51.47	9.78		

* Significant at .01 level - 2.63 for 94 degree of freedom
** Significant at .05 level - 1.99 for 94 degree of freedom

Groups
1. Modular Instructional Strategy (I1)
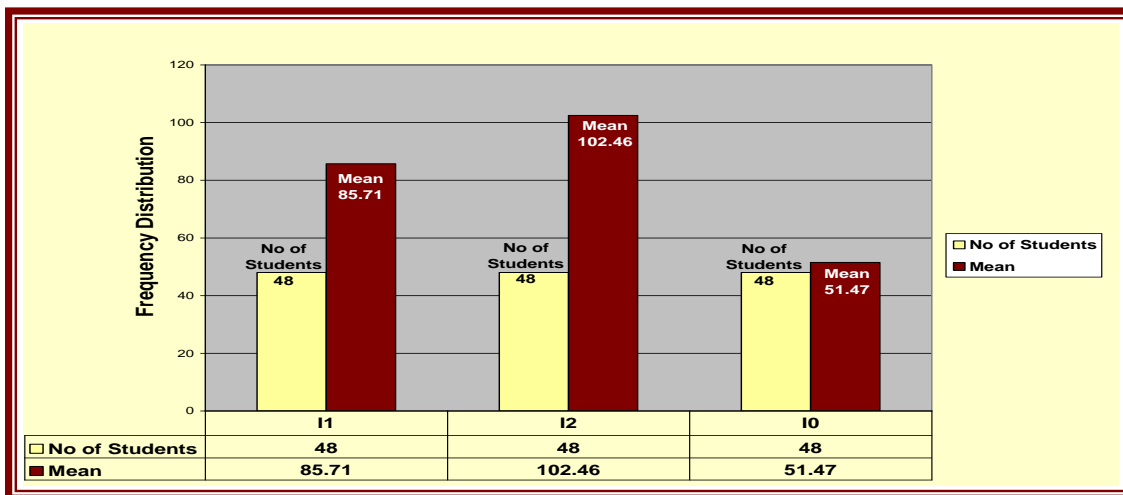2. Multimedia Instructional Strategy (I2)

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3. Control Group (No Teaching Io)
4.

The results of table -3 are interpreted as follows:

The t- ratio (7.38) between I1 and I2 is significant at .01 level. This implies that the differences between the two of groups of Modular Instructional Strategy (I1) and Multimedia Instructional Strategy (I2) are significant. The mean value of students taught through Multimedia Instructional Strategy (102.46) is higher than that of the students taught through Modular Instructional Strategy (85.71). It clearly shows that Multimedia Instructional Strategy Group (I2) of students has significantly higher Learning Acquisition than that of the group taught through Modular Instructional Strategy (I1).

The t- ratio (5.93) between Modular Instructional Strategy (I1) and Control Group (Io) is significant at .01 level in favour of the group taught through Modular Instructional Strategy (Mean 85.71)

The t- ratio of 9.74 between the group taught through Multimedia Instructional Strategy (I2) and Control Group (Io) is significant. This shows that Multimedia Instructional Strategy (I2) with the mean of 102.46 is higher than that of the Control Group (Io) with the mean value of 51.47 on Learning Acquisition. The comparison of the Mean values of two Experimental Groups and Control Group of Students is shown in Figure -3

	I1	I2	IO
No of Students	48	48	48
Mean	85.71	102.46	51.47

Figure: - 3
**Bar diagram showing Mean Values of Learning Acquisition on two Experimental
Groups of Instructional Strategies - Modular (I1), Multimedia (I2) - and
Control Group (Io) of Students**

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INTERACTION EFFECTS

The Interaction effects of Instructional Strategies and Achievement Motivation on Learning Acquisition presented in Table - 4 given below:

Table--4
Interaction Effect of Achievement Motivation X Instructional Strategies on Learning Acquisition

Achievement Motivation x Instructional Strategies N = 144				
VARIABLES	SS	df	MS	F-Ratio
Achievement Motivation x Instructional Strategies	674.837	2	337.418	11.347

In the above table the value of SS for Interaction between Achievement Motivation and Instructional Strategies in respect of Achievement is 674.837 and degrees of freedom for interaction are 2. The F - ratio for interaction is 11.347, which is significant at .01 level of confidence. It shows that levels of Achievement Motivation interact with levels Instructional Strategies to produce significant effect on Learning Acquisition.
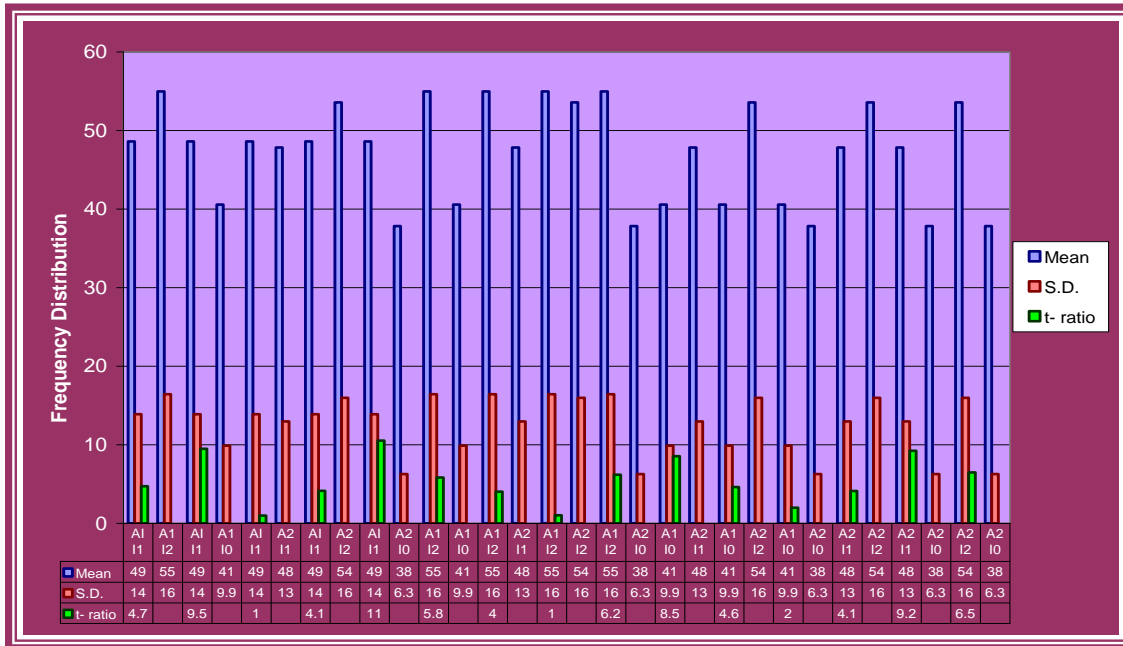
To find out the exact nature of differences due to the double interaction effects of Instructional Strategies and Cognitive Styles on Learning Acquisition, further analysis was done in terms of the computation of t-ratios shown in Table – 5

Table: - 5
t- ratios for the effect of Achievement Motivation x Instructional Strategies (A* I) on Learning Acquisition

Sr. No	Levels of variables Interaction	Mean	S.D.	t- ratio	Level of Significance
1.	AI I1	48.61	13.89	4.72	* Significant at .01 level
	A1 I2	54.97	16.42		
2.	AI I1	48.61	13.89	9.47	* Significant at .01 level
	A1 I0	40.56	9.87		
3	AI I1	48.61	13.89	0.987	Not Significant
	A2 I1	47.83	12.97		

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4.	AI I1	48.61	13.89	4.13	*** Significant at .01 level**
	A2 I2	53.56	15.98		
5.	AI I1	48.61	13.89	10.53	*** Significant at .01 level**
	A2 I0	37.82	6.27		
6.	A1 I2	54.97	16.42	5.82	*** Significant at .01 level**
	A1 I0	40.56	9.87		
7.	A1 I2	54.97	16.42	4.03	*** Significant at .01 level**
	A2 I1	47.83	12.97		
8.	A1 I2	54.97	16.42	1.03	**Not Significant**
	A2 I2	53.56	15.98		
9.	A1 I2	54.97	16.42	6.18	*** Significant at .01 level**
	A2 I0	37.82	6.27		
10.	A1 I0	40.56	9.87	8.53	*** Significant at .01 level**
	A2 I1	47.83	12.97		
11.	A1 I0	40.56	9.87	4.62	*** Significant at .01 level**
	A2 I2	53.56	15.98		
12.	A1 I0	40.56	9.87	1.98	**Not Significant**
	A2 I0	37.82	6.27		
13.	A2 I1	47.83	12.97	4.12	*** Significant at .01 level**
	A2 I2	53.56	15.98		
14.	A2 I1	47.83	12.97	9.23	*** Significant at .01 level**
	A2 I0	37.82	6.27		
15.	A2 I2	53.56	15.98	6.47	*** Significant at .01 level**
	A2 I0	37.82	6.27		

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	AI I1	A1 I2	AI I1	A1 I0	AI I1	A2 I1	AI I1	A2 I2	AI I1	A2 I0	A1 I2	A1 I0	A1 I2	A2 I1	A1 I2	A2 I2	A1 I2	A2 I0	A1 I0	A2 I1	A1 I0	A2 I2	A1 I0	A2 I0	A2 I1	A2 I2	A2 I1	A2 I0
Mean	49	55	49	41	49	48	49	54	49	38	55	41	55	48	55	54	55	38	41	48	41	54	41	38	48	38	54	38
S.D.	14	16	14	9.9	14	13	14	16	14	6.3	16	9.9	16	13	16	16	16	6.3	9.9	13	9.9	16	9.9	6.3	13	16	13	6.3
t- ratio	4.7		9.5		1		4.1		11		5.8		4		1		6.2		8.5		4.6		2		4.1		9.2	6.5

Figure - 4
Bar Graph Showing Mean, S.D. and t- ratios of
Achievement Motivation X Instructional Strategies on Learning Acquisition

The results of table - 4 are interpreted as follows:

1.   High Achievement Motivation Group of students with Multimedia Instructional Strategy (A1 I2) exhibits higher Learning Acquisition than that of High Achievement Motivation Group of students with Modular Instructional Strategy Group (A1 I1), since the t-ratio (4.72) is significant at .01 level of confidence.
2.   High Achievement Motivation Group of students with Modular Instructional Strategy (A1 I1) reveals higher Learning Acquisition than that of High Achievement Motivation Group of students with Control Group (A1 I0), since the t-ratio (9.47) is significant at .01 level of confidence.
3.   High Achievement Motivation Group of students with Modular Instructional Strategy (A1 I1) and Low Achievement Motivation Group of students with Modular Instructional Strategy (A2 I1) show no significant differences on Learning Acquisition, since the t-ratio (0.987) is not significant even at .05 level of confidence.
4.   Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) exhibits higher Learning Acquisition than that of High Achievement Motivation Group of students with Modular Instructional Strategy (A1 I1), since the t-ratio (4.13) is significant at .01 level of confidence.

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5.   High Achievement Motivation Group of students with Modular Instructional Strategy (A1 I1) reveals higher Learning Acquisition than that of Low Achievement Motivation Group of students with Control Group (A2 I0), since the t-ratio (10.53) is significant at .01 level of confidence.

6.   High Achievement Motivation Group of students with Multimedia Instructional Strategy (A1 I2) exhibits higher Learning Acquisition than that of High Achievement Motivation Group of students with Control Group (A1 I0), since the t-ratio (5.82) is significant at .01 level of confidence.

7.   High Achievement Motivation Group of students with Multimedia Instructional Strategy (A1 I2) shows higher Learning Acquisition than that of Low Achievement Motivation of students with Modular Instructional Strategy (A2 I1), since the t-ratio (4.03) is significant at .01 level of confidence.

8.   High Achievement Motivation Group of students with Multimedia Instructional Strategy (A1 I2) and Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) reveal no significant differences on Learning Acquisition, since the t-ratio (1.03) is not significant even at .05 level of confidence.

9.   High Achievement Motivation Group of students with Multimedia Instructional Strategy (A1 I2) shows higher Learning Acquisition than that of Low Achievement Motivation Group of students with Control Group (A2 I0), since the t-ratio (6.18) is significant at .01 level of confidence.

10.   Low Achievement Motivation Group of students with Modular Instructional Strategy (A2 I1) exhibits higher Learning Acquisition than that of High Achievement Motivation Group of students with Control Group (A1 I0), since the t-ratio (8.53) is significant at .01 level of confidence.

11.   Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) reveals higher Learning Acquisition than that of High Achievement Motivation Group of students with Control Group (A1 I0), since the t-ratio (4.62) is significant at .01 level of confidence.

12.   High Achievement Motivation Group of students with Control Group (A1 I0) and Low Achievement Motivation Group of students with Control Group (A2 I0) show no significant differences on Learning Acquisition, since the t-ratio (1.98) is not significant even at .05 level of confidence.

13.   Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) exhibits higher Learning Acquisition than that of Low Achievement Motivation Group of students with Modular Instructional Strategy (A2 I1), since the t-ratio (4.12) is significant at .01 level of confidence.

14.   Low Achievement Motivation Group of students with Modular Instructional Strategy (A2 I1) exhibits higher Learning Acquisition than that of Low Achievement Motivation Group of students with Control Group (A2 I0), since the t-ratio (9.23) is significant at .01 level of confidence.

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15.   Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) reveals higher Learning Acquisition than that of Low Achievement Motivation Group of students with Control Group (A2 I0), since the t-ratio (6.47) is significant at .01 level of confidence.

DISCUSSION OF RESULTS

The results obtained from the analysis of tables from 1to 5 are discussed in the context of hypotheses formulated earlier. The results already arrived at by various related studies have also been compared with the results of present study. This has been done to make the study more meaningful.

The first hypothesis of the study states, "There will be no significant difference on the Learning Acquisition of High and Low Achievement Motivation groups of students at the secondary stage."

The F- ratio for Achievement Motivation vide table no-1 is significant at .01 level. This implies that the differences between the high and low groups of Achievement Motivation are significant on Learning Acquisition. The mean value of high Achievement Motivation group of students (42.85) is higher than that of the mean value of low Achievement Motivation of students (34.96).

The results of the present study reveal higher Achievement of the High Achievement Motivation group of students than that of the Low Achievement Motivation group. So, the first hypothesis of the study is rejected.

Research studies of Jayalekshmi (2000), Lan (2002), Nancy (2003), Tella (2007), Mahyuddin et. al.(2009), Awan et al.   (2011), Rais Hasan et al . (2012), and Chow, and Yong, (2013) supported the significant effect of Achievement Motivation on Learning Acquisition.

The second hypothesis of the study states, "There will be no significant differences on the Learning Acquisition of students taught through Modular and Multimedia Instructional Strategies and that of the students of the Control Group at the secondary stage."

The F- ratio for Instructional Strategies - Modular (I1), Multimedia (I2) and the Control Group (Io) - vide table no -2 is significant at .01 level. This implies that the differences among the three groups based on Modular Instructional Strategy (I1), Multimedia Instructional Strategy (I2) and Control Group (Io) have significant effect on the Learning Acquisition of the students. To analyse these differences further t - ratios were also computed and the result indicate the following:

  -The Learning Acquisition of the group taught through Multimedia Instructional Strategy (I2) is better than that of the group taught through Modular Instructional Strategy (I1) and also that of the students' of the Control Group (I0).

  - The Learning Acquisition of the group taught through Modular Instructional Strategy (I1) is higher than that of that of the students' of the Control Group (Io).

So, the second hypothesis of the study is rejected. Studies by Kapoor, (1999), Pecoraro (2002), Freeland (2004), Haukoos (2007), Khalil, et al. (2010), Tyagi (2011) and Alias and Sira

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(2012) have shown that modular instructional strategy is quite effective in ensuring Learning Acquisition.

On the other hand the researches by Koroghlanian (2000), Chittipun (2004), Jayaraman (2006), Gregorius et al., (2010), Rolfe and Gray (2011), Kim, (2012), Maree, (2013) et. al. and Rusanganwa, (2013) have shown the effectiveness of multimedia instructional strategy on Learning Acquisition. These studies have shown the effectiveness either modular strategy or multimedia taken up singly to observe their effect on Learning Acquisition. The researcher could not find any research evidence to exhibit the superiority of multimedia or modular Instructional Strategies in comparison with each other.

The third hypothesis of the study states, "There will be no significant interaction effect of the variables of Achievement Motivation and Instructional Strategies on Learning Acquisition."

The F - ratio for interaction between Achievement Motivation and Instructional Strategies (A * I) is 11.347, which is significant at .01 level of confidence. This shows that levels of Achievement Motivation interact with the levels of Instructional Strategies to produce significant effect on Learning Acquisition. Thus, the third hypothesis of the study is also rejected.

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