



Effects of Advance Organizer Teaching Model on Students Academic Performance in Mathematics in Secondary School

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The study investigated the effects of Advance Organizer teaching approach on student's academic performance in Mathematics in Secondary School. The study was a pre-test, post-test, control group quasi-experimental design. Purposive and stratified random sampling techniques was used to select a total sample of 30 Mathematics students. Six null hypotheses were formulated and tested at 0.05 level of significance. The data collected were analysed using t-test. The results of the analyses showed that no significant difference existed between the performance of students in experimental and control groups involved in the study at pre-test. However, student's achievement in the experimental group at post-test level was found to be significantly better than that of the control group. This showed that Advance Organizer teaching approach significantly influenced student's academic performance in Mathematics in secondary school.

Key Words: Mathematics Students, Advance Organizer, Teaching Model, Academic Performance.

1.Introduction: Teaching is the form of interpersonal influence aimed at changing the behavior of another person. In another words, teaching is a process in which learner, teacher, curriculum and other variables are organized in a systematic manner which is psychologically designed to attain few pre-determined instructional objectives. In the earlier days, teaching is an act of imparting instructions to the learners in the classroom situation in the traditional concept of the term. Now a days we are entered in the era of virtual learning in the forms of on-line education through virtual universities. To cope up with the existing situation a teacher is supposed to have effective teaching styles class wise, subject-wise and area-wise to meet the situation. For this we should be aware about innovative teaching learning strategies.

2.Models of Teaching: A model is a simplified and generalized version of real events. Models of teaching are designed to impart repositories while helping the students to learn information, ideas, academic skills, developing special skills, values and understand themselves and their environment. Various models of teaching are used in Mathematics.

3. Advance Organizer model: Advanced Organizer Model (Ausubel's Model) Ausubel's primary concern is to help teachers organize and convey large amounts of information as meaningfully and efficiently as possible. This model is designed to strengthen student's cognitive structures, a term Ausubel uses for a person's knowledge of particular subject matter at any given time and how well organized, clear and stable it is. This model is taken from verbal learning principle, in which the main aim is to give the most possible to students.

4. Research Objectives: 1. To find out the effect of advance organizer model on academic achievement of secondary school students in Mathematics.

2. To compare the effectiveness of advance organizer model and traditional method of teaching (lecture method) of Mathematics.

5. Research Hypotheses:

The following null hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant difference in the achievement mean scores of students in experimental and control groups before treatment.
2. There is no significant difference in the achievement mean scores of students in experimental and control groups after treatment.
3. There is no significant difference in the achievement mean scores of male and female students in each of the experimental and control group.
4. There is no significant difference in the achievement mean scores of male students in experimental group.
5. There is no significant difference in the achievement mean scores of female students in control group.
6. There is no significant difference in the achievement mean scores of female students in experimental group.

6. Methodology: The study was a pre-test, post-test, control group quasi-experimental design. The sample for the study was 30 Secondary mathematics students, selected through purposive and stratified random sampling techniques from two Secondary Schools. The experimental group was treated with Advance Organizers instructional package (i.e. the students were taught using Advance Organizers package) while, the control group were taught with the same concepts but through the conventional teaching approach. Six null hypotheses were tested at 0.05 level of significance. The data collected were analysed using inferential statistics of t-test.

7. Results:

Hypothesis 1. There is no significant difference in the achievement mean scores of students in experimental and control groups before treatment.

Table 1: t-test analysis of achievement mean scores of students in experimental and control group before treatment

Group	N	Mean	SD	df	tcal	t tab	Result
Experimental	30	21.03	3.79	58	0.42	2.00	Not significant
Control	30	21.76	8.54				

As shown in table 1, when the mean score of students in the experimental and control groups before the treatments (pre-test) were statistically compared, a t-value (tcal = 0.42) with $p > 0.05$ level was obtained, which was not significant at 0.05 level. This implies that there is no significant difference between experimental and control groups in pre-test achievement mean score. Consequently, the above null hypothesis was accepted.

Hypothesis 2. There is no significant difference in the achievement mean scores of students in experimental and control group after treatment.

Table 2: t-test analysis of achievement mean scores of students in experimental and control group after treatment

Group	N	Mean	SD	df	tcal	t tab	Result
Experimental	30	37.13	3.09	58	4.68	1.96	Significant
Control	30	28.63	9.22				

As shown in table 2, when the mean score of students in the control and experimental groups after the treatments (post-test) were statistically compared, a t-value (tcal = 4.68) with $P < 0.05$ alpha level was obtained, which was significant at 0.05 level. This implies that there exists significant difference between the control and experimental groups achievement mean scores after the treatment in favour of experimental group. Consequently, the above null hypothesis was rejected.

Hypothesis 3. There is no significant difference in the achievement mean scores of male students in control group after treatment.

Table 3: t-test analysis of achievement mean scores of male students in control group after treatment

Test	N	Mean	SD	df	tcal	t tab	Result
Pre-test	10	18.8	2.48	18	4.37	1.96	Significant
Post-test	10	23.0	1.79				

As shown in table 3, when the mean score of male students in the control group after the treatments (post-test) were statistically compared, a t-value (tcal = 4.37) with $P < 0.05$ level was obtained, which was significant at 0.05 level. This implies that there exists significant difference between the pre and post-test in control group achievement mean scores after the treatment. Consequently, the above null hypothesis was rejected.

Hypothesis 4. There is no significant difference in the achievement mean scores of male students in experimental group after treatment.

Table 4: t-test analysis of achievement mean scores of male students in experimental group after treatment

Test	N	Mean	SD	df	tcal	t tab	Result
Pre-test	07	22.0	2.00	12	19.62	1.96	Significant
Post-test	07	38.29	0.97				

As shown in table 4, when the mean score of male students in the experimental group after the treatments (post-test) were statistically compared, a t-value (tcal = 19.62) with $P < 0.05$ level was obtained, which was significant at 0.05 level. This implies that there exists significant difference between the pre and post-test in experimental group achievement mean scores after the treatment. Consequently, the above null hypothesis was rejected.

Hypothesis 5. There is no significant difference in the achievement mean scores of female students in control group after treatment.

Table 5: t-test analysis of achievement mean scores of female students in control group after treatment

Test	N	Mean	SD	df	tcal	t tab	Result
Pre-test	20	23.25	9.98	38	2.58	1.96	Significant
Post-test	20	31.45	10.10				

As shown in table 5, when the mean score of female students in the control group after the treatments (post-test) were statistically compared, a t-value ($t_{cal} = 2.58$) with $P < 0.05$ level was obtained, which was significant at 0.05 level. This implies that there exists significant difference between the pre and post-test in control group achievement mean scores after the treatment. Consequently, the above null hypothesis was rejected.

Hypothesis 6. There is no significant difference in the achievement mean scores of female students in experimental group after treatment.

Table 6: t-test analysis of achievement mean scores of female students in experimental group after treatment

Test	N	Mean	SD	df	tcal	t tab	Result
Pre-test	23	20.74	3.84	44	14.86	1.96	Significant
Post-test	23	36.65	3.22				

As shown in table 6, when the mean score of female students in the experimental group after the treatments (post-test) were statistically compared, a t-value ($t_{cal} = 14.86$) with $P < 0.05$ level was obtained, which was significant at 0.05 level. This implies that there exists significant difference between the pre and post-test in experimental group achievement mean scores after the treatment. Consequently, the above null was rejected. As such, the conventional method of instruction used for control group can be said to be less effective compared with Advance Organizers instructional approach to teach the experimental group.

8. Discussion: Major finding of this study was that the achievement means scores of students in experimental and control groups were statistically different after the treatment. By implication, therefore, the advance organizers teaching approach was more effective in improving student's performance in Mathematics than the conventional mode of teaching. The findings of this study also revealed that there was no significant difference in the academic achievement of male and female students in Mathematics in each of the experimental and control groups before and after the treatment. In other words, academic performance of male and female students exposed to advance organizer teaching approach did not differ significantly as female students were found to have similar academic performance in Mathematics as their male counterparts in the two groups involved in the study. The implication of this result is that gender was not a significant predictor of student's academic performance in Mathematics.

9. Conclusion: Based on the findings of this study, it can be concluded that Advance Organizers teaching approach is more potent in improving student's academic achievement in Mathematics in secondary schools than the conventional method. It can also be concluded that the effect of teaching approach on secondary school Mathematics was also found not to vary with gender of students.

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