

EFFECT OF TEACHING THROUGH GRAPHIC ORGANIZERS ON ACADEMIC ACHIEVEMENT IN SCIENCE OF VII GRADERS

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ABSTRACT

The study examined the effect of teaching through graphic organizers on academic achievement in Science subject. Sample of the study consisted of 120 VIIth class students (60 students in experimental group and 60 students in control group) from Government schools of Jalandhar city. Experimental group was exposed to use of graphic organizers strategy based lessons of science and the control group was exposed to conventional method of teaching. Achievement test in Science (developed by the investigator) was used as tool for data collection. The results of the study showed that achievement in Science of the group taught by use of graphic organizers was significantly more as compared to group taught by traditional method.

Key words: *Graphic organizers, experimental group, control group, achievement in Science*

INTRODUCTION

Education is the process by which an individual is encouraged and enabled to develop fully his or her potentialities. It may also serve the purpose of equipping the individual, with what is necessary to be a productive member of the society. An individual acquires and develop knowledge and skills through teaching and learning. Effective teaching is crucial to learning because the products of teaching such as knowledge, skills and attitude acquisition are much dependent on the teacher's effective teaching. Effectiveness of a teacher and students' learning can be enhanced through the appropriate strategy adopted in a learning situation. It is well known fact knowledge of science is essential in order to understand the surroundings, the earth or the universe as a whole. It is unfortunate to say that students find science as a difficult subject in schools and is having a science phobia. So, it's the responsibility of teacher to overcome their fear by making the subject interesting and understandable and this can be done by making science teaching effective. The lecture method is a passive method in which the teacher delivers a verbal discourse on a particular topic to the learners which is an uninspiring method lead to low achievement and incapable of developing basic skills, abilities and competencies

necessary to live and contribute to the development of the society.

Danmole (2011) noted that teachers need to employ different learning methods and strategies to ensure students understanding of scientific concepts. Adopting proper teaching strategies help teachers in solving learners' problems and bring remarkable improvement in their overall behavior.

Ausubel was a cognitive psychologist. His theory of learning is known as the theory of meaningful learning. He distinguishes between two dimensions of the leaning process. One dimension of learning deals with the ways by which knowledge is made available to the learner. The second one deals with the ways by which knowledge learners incorporate new information into their existing cognitive structure. Ausubel's theory gives primary importance to meaningful reception learning. This implies that the teacher should guide children to relate the material presented in the textbooks, reference books or through classroom instruction to their existing knowledge, derive meaning from what they learn and this will enable them to remember the learned facts for long. His theory of meaningful learning also implies that curriculum planners and teacher should take care to see that whatever is presented to the child is meaningful for him. Meaningful materials, models and

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pictures are learnt and remembered better than meaningless ones. This will facilitate efficiency in learning and permanence of retention (Ausubel & Robinson, 1969).

A graphic organiser is a graphical representation of text concepts. It is an instructional tool that can help students to organise information, structure the information and concept to relate with other concepts. They are visual representations or illustrations that depict relationship among the key concepts involved in a lesson, unit or lesson task (Braselton & Decker, 1994).

Graphic organizers provide signs that permit students to bring back information that has been stored in memory (Goddard, Pring & Felmingham, 2005). Stored information is connected to newly gained concepts, which creates relational knowledge that results in more robust comprehension (DiCecco & Gleason, 2002).

Graphic organizers help students in linking the newly gained knowledge with already known information (McMackin & Witherell, 2005).

Graphic organizers are visual and graphic displays that depict the relationships between facts, terms or ideas within a learning task (Hyerle, 2000). Graphic organizer is the visual or pictorial representation of the knowledge that displays relationship among facts, concepts and ideas. The visual display conveys complex information in easy- to understand manner. It is an important tool in the area of problem solving, decision making and brainstorming. It enhances learning and understanding of the subject matter. Webs, concept maps, mind maps and plots such as stack plots and Venn diagrams are some of the types of graphic organizers used in visual learning (Mehta, 2013).

Graphic organizers are communication devices that show the organization or structure of concepts as well as relationships between concepts. Spatial arrangements depicting the information's structure reduce the cognitive demands on the learner. The learner does not have to process as much semantic information to understand the information. This is one of the reasons why graphic organizers are such

powerful devices for students with language based learning disabilities. In short, they can be effective when used in conjunction with a wide array of teaching styles, when teaching a wide array of subjects, and when developing literacy and cognitive skills of students. Graphic organizers can be used to improve learning and performance of a wide array of students, ranging from those who may be intellectually gifted to those with mild learning problems (Ellis, 2004).

Graphic organizers are teaching and learning tools that show organization of concepts as well as relationships between them into a visual format. While Advance organizers are being used in the beginning of the lesson, graphic organizers can be used in any processes of lesson with different aims. They can be used a teaching tool throughout a lesson, or for review at a later time. Also, when such tools (graphic organizers) are used in a collaborative context, individual is less likely to ignore discrepancies between their own thoughts and the external representation. Therefore, such representations are assumed to have a greater effect on individual cognition when used in a social context, especially when badly structured domain allowing for multiple perspectives are involved (Suthers, 1999).

Gentz (2013) conducted an action research examining the impact of graphic organizers in the mathematics classrooms of higher- level secondary students. Ninety students in College Algebra and Calculus courses participated in the study. The researcher conducted five studies of experimental design and examined the results using independent samples t tests. Perceptions of students regarding the effectiveness of graphic organizers were gathered through a student survey to provide qualitative data. The results indicate graphic organizers positively impacted the performance of students on formative assessments. Surveys indicated positive student perceptions of graphic organizers used as instructional tools in the math classroom.

Shihusa and Keraro (2009) investigated the effect of teaching through advanced graphic organizers on students' motivation to learn biology and concluded that group taught through

the use of advanced graphic organizers had a higher level of motivation as compare to the group taught through traditional method.

Ives (2007) observed that graphic organizers can act as a roadmap that guides learners over the new content to be learned facilitating considerable improvement in academic performance and motivational levels.

Hawk (2006) confirmed the view that graphic organizers require minimal training time with teachers, little investment in materials, no investment in equipment, and no change in the existing physical plan. Further, he suggested that such teaching procedures will produce greater cognitive learning while making it more appealing.

Griffin and Malone (1995) examined that the performance of students who used graphic organizers was statistically superior to that of students in traditional instructional conditions.

Moore and Readence (1984) reported motivating and improving results when both pre-lesson and post-lesson organizers were used.

EMERGENCE OF THE PROBLEM

Review of literature shows that the use of various teaching strategies gave quite positive in comparison to traditional teaching strategy. Most of the research work opined that effective learning can be assisted through the use of graphic organizers (Ives, 2007). DeWispelaere and Kossack (1996) found that graphic organiser enhanced the critical thinking and higher order thinking skills of the students. Also Ives, (2007); Garderen (2007); Baxendell, (2003); Gagnon and Manccini, (2000) used graphic organiser among students with learning disabilities showed that graphic organisers helped the students to comprehend the content, organise the information, retain and recall in mathematics as measured by post-tests. Only few studies have been found by investigator done on population of Punjab Government school students in science subject. The proposed study thus seems fully justified as it will check the effect of teaching through graphic organizers on achievement in science of grade VIIth on Punjab Government school students.

OPERATIONAL DEFINITIONS

Graphic Organizers: The researcher constructed various graphic organizers on the Science topics of class VIIth. The graphic organizers included various types e.g. hierarchy diagrams, cycle maps, spider maps, sequence diagrams, time lines, cause and effect chart, venn diagram.

Academic Achievement in Science: Academic achievement refers to the academic performance in a particular subject. In the present study, it refers to the mean gained scores by the students obtained in the achievement test in Science. This test was an investigator made test covering the lessons chosen for this particular study.

DELIMITATIONS OF THE STUDY

The study was concerned with:

- a) The study was delimited to Government schools of Jalandhar affiliated to Punjab School Education Board only.
- b) The study was delimited to VIIth class students only.
- c) Following topics of science as prescribed in the syllabus of VIIth class by Punjab School Education Board were taken as subject matter (a) Nutrition in Plants (b) Nutrition in Animals (c) Acids, Bases and Salts (d) Electric Current and its Effects (e) Our Forests

OBJECTIVE

To investigate the significance of difference in achievement in Science of the groups taught through using graphic organizers strategy and conventional teaching strategy.

HYPOTHESIS

There will be no significant difference in achievement in Science of the groups taught through graphic organizers strategy and traditional teaching.

DESIGN

The design of the study was experimental in nature. Randomized groups pre test-post test design was used.

SAMPLE

Random sampling technique was followed to select the sample of the study. The study was conducted over a total of 120 (60 experimental group and 60 control group) students of VIIth class of Government Schools of Jalandhar, affiliated to P.S.E.B, Mohali.

TOOLS

Following tools were used in the present study:

- a) Achievement test in Science for 7th class students (developed by the investigator).
- b) Graphic organizers strategy based lesson plans (developed by the investigator).

PROCEDURE

The present study was conducted to determine the effect of teaching through use of graphic organizers on achievement in science of VII class school students. For the study, government schools of Jalandhar district were chosen randomly, each with two sections of VII class. In the first step, two groups one as experimental group and the other as control group were assigned by matching them on the basis of their age group (10-14 years), who is not taking any external tuition, coming regularly to school and having approximately equal marks background. Sixty students were included in each group. In the second step, achievement test in science of VII class (developed by the investigator) was administered as pre-test. In the third step, the experimental group was taught through using graphic organizers (with different graphic organizers concerned with the syllabus of VII class prepared by investigator) for a period of 20 days and for the same period control group was taught with the help of traditional method. Both the groups were taught by the investigator herself to control other extraneous variables. In fourth step achievement test in science was administered to both the groups as post test. The gain score (Post test scores – Pre test scores) were used as achievement in science for both the groups.

RESULT

t-ratio was used to check the significance of difference in the achievement in science of the

experimental and control groups.

Table: t – ratio of gain mean scores in Science between experimental and control groups

Group	N	Mean of gain score	S.D.	t-value
Experimental group	60	5.37	1.85	4.61*
Control group	60	3.85	1.74	

*Significant at 0.01 level of significance.

The above table value shows that the mean of gain score in achievement of science for the experimental and control group were 5.37 and 3.85 respectively. The t-value between these two groups was found to be 4.61 which in comparison to the table value was found to be significant at 0.01 level of significance. The result indicates that the performance of experimental group which was taught by using graphic organizers method was more effective than that of control group which was taught by traditional method.

This leads to the rejection of hypothesis which states that 'There will be no significant difference in achievement in science of the groups taught through using graphic organizers and traditional teaching.' This finding is well supported by the studies conducted by Griffin & Malone (1995), Shihusa & Keraro (2009), Gentz (2013) and Kraph (2016).

EDUCATIONAL IMPLICATIONS

The result of the study shows that achievement of students in science subject can be improved by using graphic organizers. Based on the result obtained, it is therefore suggested that teachers should be encouraged to use graphic organizers strategy for teaching science in schools. It is the responsibility of educational institutions to acquaint their science teachers through seminars and participation in research workshops about different teaching strategies. It is also recommended that the explanations about how graphic organizers can be prepared are presented in teacher books.

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