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RESEARCH ARTICLE

Effect of Scaffolding Teaching Method on Students' Academic Achievement in Mathematics

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Abstract
The current research focuses on the scaffolding instructional technique in improving students' understanding level in the subject of mathematics. The study was experimental in nature and thereby experiment was conducted at Government School Daraban Kalan, District Dera Ismail Khan, Khyber PakhtunKhwa. Two groups are formed of 10th grade students on the basis on pre-test score. Twenty-five (25) students were randomly assigned to control group whereas 25 students assigned randomly to experimental group. Control group were taught to conventional style of teaching while treatment group was taught by using scaffolding instructional approach. Pretest and Posttest was developed from 10th grade mathematics syllabus. The result of the study reveals that students secured high marks in experimental group as compared to control group. The study concluded that scaffolding instructional strategy enhances the students learning in academic achievement.

Keywords: Scaffolding; Academic achievement

Introduction

Education plays a crucial role in social life of an individual and essential part for personality grooming. In fact, education is s source of self-recognition and develops the one's attitude in proper direction. Generally, education plays a vital role in the social and economic development of the country. Without education, no country can make development in any field. More specifically, education is a main source of knowledge for the society because social values can be transmitted to generation through education (Ozturk, 2008).

Education plays an important role in individual personally and one's personally can be changes through learning. Moreover, individual's character, attitude and behavior can be modified though learning. But individual learning can be improved through appropriate method of teaching. (Harun & Salamuddin, 2010). Practitioner emphasis on student-centered teaching approach because it helps learners to develop meaning if they themselves experience it. In addition, it is important for students to associate their prior knowledge to new concepts and idea shared in the class. Conclusively, learning becomes real and tangible among students in the class (Dano-Hinosolango, & Vedua-Dinagsao, 2014).

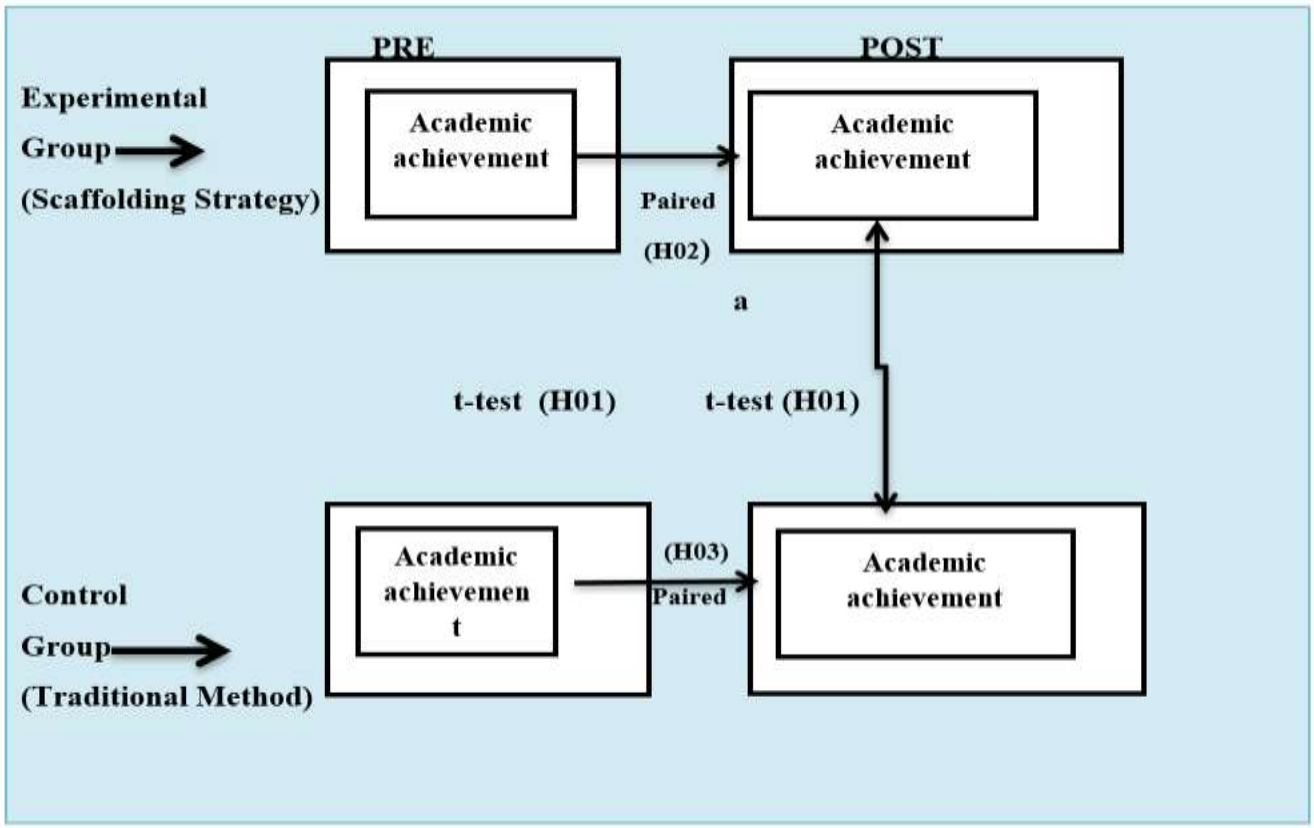
Scaffolding instructional strategy refers as a student-centered teaching approach that is used to accomplish maximum objectives in learning process. The key aim of scaffolding strategy is to accomplish desirable objective in a stipulated time period and engage students actively in teaching learning process (Alake & Ogunseemi, 2013). Scaffolding was closely link with the socio-cultural theory of Lev Semenovich Vygotsky, and specifically with his concept of Zone Proximal Development (ZPD). The key theme of the ZPD is the distance between what students can do by themselves and the next learning level that they can be helped to accomplish with skillful peer (Raymond, 2000). There are two development stages that is (i) the actual stage and the potential stage. The actual stage determined through independent problem while developmental or potential stage can be determined through problem solving under competent peer (Van de Pol, Volman, Oort & Beishuizen, 2015). In scaffolding strategy, teachers provide proper guidance to their students so they can able to solve the problem. it is a very effective strategy in which assist students solve problems and diverse tasks under the guidance of teachers' supervision and competent peer (Simons, & Klein, 2007).

In Pakistani scenario, teachers are mostly used old methods while teaching mathematics. Teachers use talk and chalk while teaching mathematics. Mathematically, teachers consume 80% time in delivering lecture and only 20% time consume in practical activities (Sultana & Zaki, 2015). Scaffolding teaching strategy could be very useful to

improve the cognitive level of students in mathematic. Cognitive problems of learners can be solved through this teaching approach (Bayuningsih, Usodo & Subanti, 2018). Therefore this research paper was examined the Effect of scaffolding Teaching method on students' academic achievement in mathematics.

Conceptual Framework

According to Grant & Osanloo (2014) Conceptual framework demonstrated the association between the key variables of the study and logical presentation that how idea of research study relate to another. There is numerous research studies has been conducted to investigate the impact of scaffolding teaching approach on the students learning. A study conducted by Omiko (2015) that scaffolding teaching strategy has positively influence on the students' academic score. Joda (2019) found that students performed well who taught through scaffolding instructional strategy. Following conceptual model was developed on the basis of above empirical studies.



Hypotheses

H_{01}: Students performed better in experimental group as compared to control group.
H_{02}: Students achieved high marks in posttest as compared to pretest in experimental group.
H_{03}: Students achieved high marks in posttest as compared to pretest in control group

Research Methodology

The current research was experimental in nature and thereby two groups were formed on the basis of pretest results. The experiment was carried out in GHSS School Daraban Kalan, D.I.khan. A sample of 50 students was randomly selected for the experiment. A fisher Bowl method was used to assign 25 students in control and 25 students were randomly assigned in experimental group. Pretest and Posttest was design from 10th grade mathematics syllabus and therefore both tests were based on 30 Multiple Choice Questions (MSCQs). Content Validity Ration was applied to measure the content validity of instruments. In CVR, both tests were validated by content experts. Students were split into two groups on the basis of pretest score which obtained before experimentation. Control group was taught through conventional method of teaching whereas scaffolding instructional method was used in treatment group. All conditions remained same for both groups except method of teaching. Low achievers students, average and higher achievers were equally participated in both groups. The treatment continues for two months periods. After completion of experiment, posttest was administered. Researcher used independent sample t-test and parried sample test was applied to test the hypotheses.

Data Analysis

Table-2 indicates the Mean difference in academic achievement of students between two groups. The result reported that Mena score of EG group ($\bar{x}$=26.90) found highest than Mean score of CG ($\bar{x}$=17.29). The result also reported that significant difference found in score taught through two different teaching strategies (p=.000<.05). Thus, H_{01} is hereby rejected.

Table 2. $H_{01:}$ Students performed better in experimental group as compared to control group.

Research Variable Scaffolding Teaching Strategy	C-G			E-G				
	n	$\bar{x}$	SD	n	$\bar{x}$	SD	tcal	Sig.
	25	17.29	7.871	25	26.90	13.79	7.33	.000

p<.05

Table 3. $H_{02:}$ Students achieved high marks in posttest as compared to pretest in experimental group

Research Variable Scaffolding Teaching Strategy	Pre-test			Post-test				
	n	$\bar{x}$	SD	n	$\bar{x}$	SD	tcal	Sig.
	25	11.89	6.88	25	24.29	8.11	-8.27	.000

p<.05

Table-3 reported that Mean score of Post-test group ($\bar{x}$ =24.29) found highest than Mean score of Pre-test ($\bar{x}$ =11.89) in experimental group. The result also reported that significant difference found in in students' academic achievement of pretest and posttest of experimental group (p=.000<.05). Thus, H_{02} is hereby rejected.

Table 4. $H_{03:}$ Students achieved high marks in posttest as compared to pretest in control group.

Research Variable Scaffolding Teaching Strategy	Pre-test			Post-test				
	n	$\bar{x}$	SD	n	$\bar{x}$	SD	tcal	Sig.
	25	12.66	6.89	25	13.24	7.22	-1.36	.189

p<.05

Table- 4 reported that Mena score of Post-test group ($\bar{x}$ =12.66) found highest than Mean score of Pre-test ($\bar{x}$ =13.24) in experimental group. The result also reported that significant difference found in in students' academic achievement of pretest and posttest of experimental group (p=.189>.05). Thus, we failed to reject the null hypothesis (H_{03}).

Discussion

The current study main focused on the scaffolding teaching method in improving understanding level of learners in mathematics subject. The findings revealed that students achieved high marks in experimental group as compared to control group.. Similar result was reported by Muhammad (2019). They found that students got highest score after implemented scaffolding teaching strategy. The result of the study revealed that students got high score in mathematics subject in post-test in experimental group as compared to pretest. Same result was given by Omiko (2015). The found that students performed well and their academic score was increased in experimental group whereas no change was found in students' score in control group.

Conclusion and Recommendations

The key objectives of the study was examined the Effect of scaffolding teaching method on students' academic achievement in mathematics]. Based on the research findings, scaffolding teaching strategy has positive impact on the students' academic score in mathematics at secondary level. This teaching strategy can help students to understand the mathematical concept and improve students' results. Precisely, the study concluded that scaffolding teaching strategy gives better results in perspective of students understanding in mathematics subject as compared to the traditional way teaching.

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