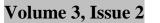# COMPARISON OF STUDENTS' ACADEMIC ACHIEVEMENT IN SCAFFOLDING BASED SELF-REGULATED LEARNING SYSTEM AND FORMAL SYSTEM OF LEARNING AT HIGHER EDUCATION LEVEL

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ABSTRACT

This study aimed at investigating the comparison of Scaffolding based self-regulated learning system and Formal learning system at higher education level. This research was experimental in nature; Equivalent comparison group design was adopted. BCS and MCS students studying the subject of Database in IT department at Kohat University of Science & Technology, Kohat and in Virtual University Campus, Kohat constituted the population of this study. Sample of the study comprised 50 BCS and MCS students i.e. 25 each from Kohat University of Science & Technology, Kohat and Virtual University campus, Kohat of Khyber Pakhtunkhwa, Pakistan. To make the groups equivalent, a pre-test was developed and conducted for the participants of both universities. On the basis of results, three sub-groups of low, average and high achievers from both learning systems were formed. A post-test was conducted to compare the academic achievement of students of different groups of both learning systems. The collected data was entered in SPSS-16 and paired sample t-test was applied to analyse the data. Significant differences were found in academic achievement of the high, average and low achievers groups after taking post-test in both learning systems. A significant improvement in

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scores of scaffolding based self-regulated learning system among all groups than formal learning systems was found. It is recommended that Scaffolding based self-regulated learning system is more convenient, affordable and useful in obtaining learning academic achievement objectives as compare to formal learning system at university level. Therefore, Scaffolding based self-regulated system may be promoted. Group activities and discussion with peers through video-conferencing as it is done in Scaffolding based self-regulated learning may be introduced in formal learning system. It will broaden the horizon of knowledge as well as expression power of the students. Further researches can be conducted in different situation to see whether there exist actual difference in the results of two different learning systems and to draw more authenticity for the   results of the present study.

KEYWORDS: Scaffolding-based Learning, Self-regulated Learning, Formal Learning, Information Technology, Higher Education.

INTRODUCTION

The word "Scaffolding" is a symbol given to a type of assistance by a teacher or a capable peer. The teacher helps the student to complete the given task or get mastery over the concept which he is unable to grasp at the beginning. The teacher gives him chance to complete most of the task unassisted but help in those parts in which he is primarily unable to take hold of independently.

It is an instructional approach which supports beginners by limiting the complexities gradually and learners gain the knowledge, skills, and confidence to handle complexities. (Young, 1993)

Bruner (1976), a Cognitive Psychologist presented scaffolding Theory at first in 1950s. He explained the word in the context of young children's oral language acquisition. The first tutors are their parents who help them to speak and provided with natural structures to learn a language in traditional way.

For example, stories read alouds from book or at sleeping time (Daniels, 1994). Wood, Bruner, and Ross (1976) also presented their work on the same idea of scaffolding. It is a useful interaction between adult and child that helps the child to learn independently. It is a sort of

conceptual structure put up for help to gain meaning and get success to accomplish a task. Cazden (1983) defined a scaffold as "a temporary framework for construction in progress". For example, parents intuitively help their children in accomplishing meaning through oral language. Scaffolding is required when child is unable to utter or explore learning independently. Teacher does not change the type and level of difficulty of task but provide help to complete the task successfully.

Discourse of scaffolding learning is that first instruction is provided in writing, then in verbal form. The teacher first engages the learner, refines their work, motivates them when needed, give clues to be on right track and control their anxiety (Rodgers, 2004). Through this type of instruction, the child's self development is maximized i.e. intrapsychological functioning, to identify ones own abilities and capabilities. In this process, all the things or activities which are beyond the child's capability are controlled by adult. He selects all the elements which increase the chances of child's success to complete the task. Speech is an important tool to think and respond, develop the higher psychological processes (Luria, 1979) like abstract, flexible, and independent thinking (Bodrova & Leong, 1996). According to Vygotsky, talk and action work together shapes awareness and performance of a child (Dorn, 1996). Scaffolding may be in form of dialogues range from casual talk to careful explanations amd demonstrating literature through actions enhance the child's levels of understanding. Clay (2005) demonstrates that cognitive development, language learning, story composition for writing, and reading comprehension enhances with casual conversational exchange. It facilitates creative, constructive, experimental, and developmental speech and writing in the development of new ideas and thoughts (Smagorinsky, 2007).

Writing, speech, verbal and non-verbal demonstrations are its vital tools. As command and appreciation increases, the child requires less help to complete task. The teacher support may change from directive to suggestion, simple encouragement to observation. Child's tempo moves from other-regulation to self-regulation in Optimum scaffolds. Eventually self-scaffolding through internal thought is provided by the child (Wertsch, 1985). Scaffolding helps in developing understanding of printed material (Teale & Sulzby, 1986).

In Vygotsky's words, "what the child is able to do in collaboration today he will be able to do independently tomorrow" (Vygotsky, 1987).

Some components of scaffolding are predictability, playfulness; focus on sementics, role play, modeling, and naming.

Instructional scaffolding provides sufficient support to promote learning when concepts and skills are being first introduced to students.

The following supports may be included:

- Resources.

- A compelling task.

- Templates and guides.

- Guidance on the development of cognitive and social skills.

These supports promotes cognitive, affective and psychomotor learning skills and knowledge are gradually removed as students develop autonomous learning strategies,. Teachers guide the students through different types of supports, like Outlines, textbooks, stories, or clue questions.

Task is broken down into smaller manageable parts, loud thinking while accomplishing a task, peer support, which enhances team spirit, discussion, answering timely, guided questioning, etc. Students should be engaged in task completion but teacher will try to lower the level of frustration.

Currently two systems of learning are running parallel with each other in Pakistani Universities. One is scaffolding based self-regulated learning and the other is formal learning system. Both learning systems have their own advantages and limitations.

In scaffolding based self-regulated learning system, giftedness is identified earlier, individualized instruction is provided. Round about one hour video lecture can be watched on satellite TV channels on cable network or on computer using CDs. Videos can be repeated, if any point is missed. Moreover, handouts of university professors are also available on online bookshops and one hour internet session is available for students to participate in online discussion boards, doing online quizzes, receive and upload home assignments. It delivers efficiency, creates momentum, and motivates the learner to learn. There are some demerits of this system, it is a time consuming activity and requires trained personnel as well. As compare to scaffolding based self-regulated system, formal learning system is less time consuming activity. Teacher prepares his lecture and delivers it to the group of students. Students take notes and independent effort is required to grasp any problem. But in this system, no opportunity is given

to learn something practically, most often learner becomes passive, rote memory is encouraged, individualized instruction is not so common.

Keeping in view the above points, the researcher was attracted to compare the academic achievement of students in both systems.

OBJECTIVES OF THE STUDY

Following were the objectives of the study.

1. To compare Scaffolding based self-regulated learning with formal learning in the form of students' academic achievement at university level.

2. To give recommendations in order to improve the situation and for further research.

RESEARCH HYPOTHESES

This study was guided by the following Null Hypotheses.

Main Hypothesis

Ho1. There is no significant difference among the students' academic achievement in scaffolding based self-regulated learning and formal learning system at higher education level.

Sub-Hypotheses

Ho1(a). There is no significant difference among the high achievers' academic achievement in scaffolding based self-regulated learning and formal learning system at higher education level.

Ho1(b). There is no significant difference among the average achievers' academic achievement in scaffolding based self-regulated learning and formal learning system at higher education level.

Ho1(c). There is no significant difference among the low achievers' academic achievement in scaffolding based self-regulated learning and formal learning system at higher education level.

RESEARCH METHODOLOGY

This research was an experimental study that was conducted using equivalent comparison group design.

POPULATION AND SAMPLE

All BCS and MCS students studying the subject of Database in IT department at Kohat University of Science & Technology, Kohat and in Virtual University Campus, Kohat constituted the population of this study. Sample of the study comprised 50 BCS and MCS

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students i.e. 25 each from Kohat University of Science & Technology, Kohat and Virtual University campus, Kohat of Khyber Pakhtunkhwa, Pakistan.

Pre-test and Post-test of 17 students from Scaffolding based self-regulated learning system and 22 students from formal system of learning were returned back.

INSTRUMENTATION

Pre-test and Post-test were used as the data collection instrument. Pre-test was developed from the whole course of the subject Database Management System which was consisted of 70 objective type test items of 80 marks while two items were related to practical skills of 20 marks.

For the validation of pre-test, suggestions and expert opinions were also sought from experts working in different universities of Khyber Pakhtunkhawa, and were incorporated.

Moreover, for reliability and validity, Pre-test was personally administered to 10 subjects as a pilot run. The subjects were part of the population but were not included in the selected sample of the study. The data was analyzed through SPSS-16. The reliability of seventy two items of the test was found through Cronbach's alpha the value obtained was .78, which was quite reasonable.

To compare the academic achievement of the students in both systems, the pre-test was conducted after mid-term exam. On the basis of result, three sub-groups of low, average and high achievers on same criteria from both learning systems were formed to make both group equivalents.

Table 1: Comparison of students' Pre-test Academic achievement (N= 39)

Students Group	System	Mean	S.D.	t	p- value
High achievers	Scaffolding	48.5	1.91	0.715	0.47
	Formal	49.4	2.29		
Average achievers	Scaffolding	35.4	5.59	0.27	0.79
	Formal	36.3	5.65		
Low achievers	Scaffolding	25.1	2.94	1.98	0.07
	Formal	28	1.58		
Overall	Scaffolding	33.6	10.2	1.92	0.06
	Formal	39.7	9.5		

*Significance = 0.05

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In Table 1, p- value indicates that there is no significant difference among the High, average and low achiever groups as well as overall achievement of the students in pre-test in both learning systems.

Post-test was conducted to compare the academic achievement of students of both groups having different learning systems.

ANALYSIS AND INTERPRETATION OF DATA

To analyse the data paired sample t-test was used to compare the students' academic achievement of Scaffolding based self-regulated learning and formal learning system at higher education level after taking post-test, at 0.05 level of significance.

Table 2: Comparison of students' Post-test Academic achievement (N= 39)

Students Group	System	Mean	S.D.	t	p- value
High achievers	Scaffolding	62.5	0.57	8.39	0.00*
	Formal	47.6	3.43		
Average achievers	Scaffolding	52	6.52	4.94	0.00*
	Formal	40.25	1.75		
Low achievers	Scaffolding	39	4.41	2.86	0.02*
	Formal	32.4	3.29		
Overall	Scaffolding	48.4	10.8	2.43	0.02*
	Formal	41.5	6.65		

*Significance = 0.05

Table 2 shows that there is significant difference among the high, average, low achievers and overall student's academic achievement in both learning systems at higher education level.

Therefore, the null hypothesis "There is no significant difference among the students' academic achievement in scaffolding based self-regulated learning and formal learning system at higher education level" is rejected at 0.05 level of significance.

CONCLUSIONS

From the analysis and interpretation, it can be concluded that:

1.   There was a significant difference between the students' academic achievement in scaffolding based self-regulated learning and formal learning system at higher education level.

Scaffolding based self-regulated learning system showed a significant improvement in form of students' academic scores than formal learning system.

2.   There was a significant difference among the high achievers' academic achievement in scaffolding based self-regulated learning and formal learning system at higher education level. Scaffolding based self-regulated learning system showed much improvement as compare to formal learning system.

3.   There was a significant difference among the average achievers' academic achievement in scaffolding based self-regulated learning and formal learning system at higher education level. Scaffolding based self-regulated learning system proved a better learning system than formal learning system.

4.   There was a significant difference among the low achievers' academic achievement in scaffolding based self-regulated learning and formal learning system at higher education level. A significant improvement was shown by Scaffolding based self-regulated learning system.

RECOMMENDATIONS

On the basis of the conclusions, the following recommendations can be made:

1.   Scaffolding based self-regulated learning system is more convenient, affordable and useful in obtaining desirable learning and academic achievement as compare to formal learning system at university level. Therefore, Scaffolding based self-regulated system may be promoted.

2.   Group activities and discussion with peers through video-conferencing as it is done in Scaffolding based self-regulated learning may be introduced in formal learning system. It will broaden the horizon of knowledge as well as expression power of the students.

3.   Further researches can be conducted in different situation to see whether there exist actual difference in the results of two different learning systems and to draw more authenticity for the results of the present study.

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