

Studies Related to Effect of Constructivist Approach on different Variable: An Analysis

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*Abstract

Knowledge is not attained but constructed (Von Glasersfeld, 1989). The statement came from a new challenge to the concept of traditional knowledge. In this regard different studies were conducted to see the effect of constructivism on different variable. The purpose of this study was to review the effect of Constructivist Approach on different variable. In this regard researcher reviewed six studies related to research. The dependent variables were Academic Achievement, Self-Concept, Learning Strategies, Science process skill, Science curiosity, scientific thinking and Academic Confidence. Five studies were conducted using Experimental design and one study was Quasi-experimental design. The study included two Elementary school students, four secondary school students and one pre-service teacher as a sample of the study. Five studies used test for the measurement of depended variable and two used scale, one used Inventory and one used Questionnaire, observation scheduled, interview, teacher`s daily diary, focus group discussion and rubrics. Almost all the studies concluded that Constructivist learning strategies is capable of improving students` mastery of content at higher order level of cognition. Students performed significantly higher than those who exposed to traditional approach.

***Keywords:** *Constructivist Approach, Traditional Approach, Studies, Effect, Variable*

Introduction

“In the progressive forward looking society science can play a truly liberating role, helping people escape from the vicious cycle of poverty, ignorance and superstition” – NCF-2005. The underlying assumption is that science education can initiate social change by bringing about change in the outlook and attitude of people, as it is a subject that is directly connected with the development of critical thinking, Logical reasoning, creativity and skills of rational problem-solving. School Education assumes significance in shaping the young mind for development of various cognitive skills. But it fails to develop such type of skill and competencies in children. The reason is that most of the education system in our country is still following the tradition method of teaching, in which the teacher dominates the whole classroom activities, also the communication between teachers and students are one sided (Gellies&Khan, 2008). There is little interaction between teachers and students (Sage &Brush, 2006).

Traditional education approach focuses on teaching goal such as remembering facts, and defining concept (Alamala, 2005 as cited in Kelly study). Therefore in such classrooms the social, emotional and psychological progress of students has been ignored, the teachers himself faces a number of challenges in teaching science effectively (Brookfield & Preskill, 1999). In this regard lots of studies have been conducted in the field of teaching and learning, science that leads to the demand of paradigm shift in education system. Cognitive method of teaching science has become a research focus around the world since the early 1980s (Georghiadis, 2004). Basically this research reveals that most people learned a kind of science that is useful in place other than the classrooms and laboratory, where students are merely expected to repeat what they are learn, follow direction and remember information and results on recall type examination (Bansole & Patankar, 2016). Another research field focuses on constructivist learning approach (Bybee et.al, 1989; Von Glaser, 1987, Yoger, 1991, Qurareh, 2016; Adak, 2017).

Constructivist Approach is a theory about knowing and learning that knowledge cannot be directly transmitted but must be actively constructed by the learners. It says that people

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construct their own understanding and knowledge of the world through experiencing things, which is unique to each individual. The constructivist view of learning can point towards a number of different teaching practices in the classroom. In the most general sense, it usually means encouraging students to use active techniques to create more knowledge and then, to reflect on them, and talk about what they are doing and how their understanding is changing (Khalid & Azim, 2012). Constructivist teaching-learning process help students to become independent in enhancing their learning, develop interactive skills and forms mutual terms and relationship with others, i.e teachers and fellow students (Kapur, 2019). Such type of research provides the baseline for future science teacher education program that the people learn best when they construct meaning for themselves. Without the research base provided by cognitive science and constructivist studies, improved models for science teacher education cannot be developed. Thus it is constructivist that initiated learner centered approach in education. National Curriculum Framework (NCF)-2005 strongly supports the constructivist and learner centered approach in school education. The historical roots constructivist also found in the work of Dewey (1929), Bruner (1961), Vygotsky (1962) and Piaget (1980).

Constructivists present several useful tenets to teacher educators and individual who are being educated to be teachers. First the learner is active in creating meaning; second the traditional role of passive learners and teachers as spoon-feeder must be reconsidered, with increasing responsibility recognized for and by the learner. Third, the learner goes through a series of broad stages of learning in which describable mental activities occur. A Constructivist classroom ideally become learner “a expert learner” this give them ever broadening a tool to keep learning with well planned classroom environment, the student learns how to learn (Bada & Olusegun,2015). In short, constructivism is the most important strategy in science teaching in which learning environment is provided to all students which is meaningful and which promotes the understanding and construction of scientific ideas through the interactions of teachers and peers.

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The present paper focus on review (overview) of researches based on the effect of constructivist approach only.

Kim (2005) The purpose of the study was to determine the Effectiveness of a Constructivist Teaching Approach in mathematics of elementary school education in term of academic Achievement, Self-Concept and Learning Strategies and student preference for a Constructivist Teaching Approach. The study was Non-Equivalent Pre-test Post -Test Control group Design in which 76 sixth grade students were chosen as a sample and all the selected students were divided into two group that is Experimental, 38 (male 21 female 17) and Control group, 38 (male 22 female 16). The Experimental group was taught using Constructivist Teaching Approach and the control group was taught using Traditional Teaching Approach. A total of 40 hours over nine week was used to implement the experiment. The data was collected by using Self-Concept Inventory, Learning Strategies Inventory, Class room environment survey and Mathematics test administered by teacher. The collected data were statistically analyzed by using Mean, SD and ANCOVA. It was concluded that Constructivist Teaching is more effective than Traditional Teaching in term of Academic Achievement where as Constructivist Teaching is not effective in relation to self Concept and Learning Strategies but had some effect upon motivation, anxiety towards learning and Self- monitoring. Constructivist environment was preferred to a Traditional classroom.

Vanisree (2009) study the Effectiveness of Constructivist Approach in teaching Biological Science for developing Science Process Skill, Science Curiosity and Academic Achievement among Secondary school students. The objective of the study is to compare the effectiveness of Constructivist Approach and Traditional Approach of teaching Biological science with respect to Science Process Skill, Science Curiosity and Academic Achievement among secondary school students. For this study Pre-test and Post- test parallel group design were adopted and a sample of 200 students of standard 8th from two secondary school in Raichur District were selected through simple random sampling technique. The effectiveness of

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Constructivism in teaching biological science was tested by experimental method. The control group was taught by traditional approach and experimental group was taught by using constructivist approach. An achievement test based on the topic was administered to both groups. Standardized test of science process skills and science curiosity were administered to the control group and experimental group. The Pre-test and Post-test score obtained were compare to determine the effectiveness of Constructivist approach in teaching biological science over traditional approach of teaching for developing science process skills, science curiosity and academic achievement among secondary school students. The finding of the present study provide a broad framework for understanding the Constructivist approach in teaching biological science and its rule in the development of science process skills and Science curiosity. From this study researcher found that the constructivist approach in teaching biological science is effective for developing science process skill and Science curiosity in students. The study also found that the constructivist approach make improvement in academic achievement of student and encourage students to interact in classroom and give an opportunity to construct their own knowledge.

Bharti (2014) studied on the title Development and implementation of ICT aided constructivist learning approach for professional development of pre-service teacher. The objectives of the study is to develop ICT aided Constructivist learning approach in science, the effectiveness of ICT aided Constructivist learning approach in science, the level of professional development of pre service teachers through ICT aided Constructivist learning approach. For this study two experimental design was adopted. For the Pre-service teachers experimental control group Pre-test and Post- test quasi experimental design has been employed on 65 sample, where as for school students single group pretest posttest experimental design has been employed on 437 students of class 9th. Data were collected through questionnaire, reaction scale, observation scheduled, semi structure interview schedule, achievement test, field note daily diary of teachers' focus group discussion, and rubrics. The collected data were analyzed both qualitatively and

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quantitatively. Responses on the questionnaire were analyzed through chi-square contingency; responses on the reaction scale were analyzed through chi-square. Observation were analyzed through frequency percentage count, chi-square and academic achievement analyzed through mean, SD t-test. Semi structured interview and focus group discussion, pre-service teacher's diary and the researcher field notes were content analyzed. Lesson design was analyzed by rubrics through frequency and percentage. The finding of the study provides the insights about the process of how ICT aided Constructivist learning approach facilitate meaningful learning and how it contribute for the professional development of the pre-service teachers. The present piece of study has proved that by integrating ICTACLA the pre-service teachers have transformed into teaching scientist. By adopting constructivist philosophy in the class and integrating ICT in activities. The pre-service teachers found the ICTACLA a very effective way for teaching learning of science.

Qarareh (2016) conducted a study to investigate the Effect of Constructivist Learning Model (CLM) in teaching Science on the Achievement and Scientific Thinking of 8th grade

students. The purpose of the study is to investigate the effect of using Constructivist Learning Model in teaching science, especially in the subject of light: its nature, mirror, lens and properties on the achievement of eight grade students. The study was an Experimental Design in which 136 male and female 8th- grade students were chosen as sample from two basic school in the academic year 2015 -2016. Sample of all the four classes were divided into experimental and control group. For collecting the data researcher prepared lesson plan using constructivist learning model, Achievement Test, and scientific thinking test. The collected data were statistically analyzed by Mean, SD, ANOVA, ANCOVA. The results shows that there is an effectiveness for using Constructivist Learning model in the achievement of learners in science along with teaching by using Constructivist Learning Model give better opportunities for the learner to participate actively in teaching learning process; it has also been showed through

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classroom observation of the researcher, that the experimental group students have shown enthuse-iasm towards works to learn and made a effort to acquire knowledge from various source. The results of the study also confirm that the Effectiveness of Constructivist Learning Model in development of scientific thinking, because the learner is given the opportunity to practice thinking skill, such as observation, description, classification and developing hypothesis.

Kaur & Kaur (2016) conducted a study to compare the effect of Constructivist Teaching and Traditional Teaching on Academic Confidence of student. The objective was to study the Effect of Constructivist Teaching Approach in Science teaching on Secondary school students in term of Academic Confidence for Sustainable Development. Various Constructive Teaching Techniques were enlisted and some Constructive strategies were developed. The sample of 200 students was raised randomly from school of Jalandhar district. After administering the Pre-test on whole sample the experiment group was taught with these Constructive techniques and the control group was taught with traditional technique. After experiment the Post- test was conducted on the whole sample. Data collected was tabulated and statistically analyzed. It was concluded that Constructive Teaching was better than Conventional Teaching. The paper explain how various Constructive in Achieving Sustainable Development.

Adak (2017) studied the Effect of Constructivist Approach on Academic Achievement in Science at Secondary level, using Pre-Test Post-Test Experimental and Control group design with the total sample of 87 in which 58 samples grouped as Experimental group and 29 samples as Control group, on the basis of matching intelligence test. He conducted this experiment over three weeks by using both Traditional and Constructivist 7E- model. The self-developed achievement test covering class 9th textbook of West Bengal board of Secondary Education, India was used as tool. The study revels that the students exposed to the Constructivist 7E- model significantly achieved better than Traditional method. In addition students exposed to 7E- model performed significantly higher than those exposed to the Traditional teaching methods in respect of their gained score at every level of intelligence. The Constructivist approach strategy

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is capable of improving student's mastery of content at the higher order level of cognitions. Therefore It is recommended that constructivist 7E- model strategy be used in Science teaching for the development of student higher achievement in Science at Secondary level.

Overview of Researches Based on Effect of Constructivist Approach

(Name & Year, Independent Variable (IV) and Dependent Variable (DV), Method, Sample, Tools and Analysis of researches based on effect of Constructivist approach.

Sl. No	Name & Year	Title of the Research	IV/DV	Method & Sampling	Tools	Analysis
1.	Kim (2005)	Effect of Constructivist Teaching Approach on student Academic Achievement , Self - concept and Learning Strategy	Constructivist Teaching Approach / Academic Achievement , Self-Concept and Learning Strategies	Experimental (Non-equivalent Pre-test Post-test Control group Design) / 76 six grade students	Academic Achievement ,t-test, Self-Concept Inventory & Learning Strategies Inventory	Mean. SD ANCOVA
2.	Vanisree (2009)	Effectiveness of Constructivist Approach in Teaching Biological Science for Developing Science Process	Constructivist Approach / Science process skill , Science curiosity & Academic Achievement	Experimental / 9 th grade students	Achievement Test	t-test

		Skills Science Curiosity and Academic Achievement among Secondary School Students.	nt				
3.	Bharti (2014)	Development and Implementati on of ICT Aided Constructivis t Learning Approach for the Professional Development of Pre- service Teachers	Constructiv ist Learning Approach / Pre-service teachers	Pre-test Post -test Quasi- experimental design for the pre- service teachers and single group Pre-test Post- test experimental design for school students / 9th std students.	Questionnaire Reaction scale Observation schedule semi - structured interview Achievement test Researcher's field note Daily diary of teachers Focus group discussion and rubrics.	Chai square t-test Content Analysis	
4.	Qarareh (2016)	The Effect of using Constructivis t Learning Model in teaching Science on the Achievement and Scientific thinking of 8 th grade students	Teaching Methods (Constructi vist Learning Model, Traditional Method) gender(Mal e, Female)/ Achieveme nt in Science and Scientific Thinking	Experimental Design/ 8 th standard students	Achievement Test Scientific Thinking test	Mean ANOVA ANCOVA	

5.	Kaur & Kaur (2016)	Role of Constructivist Teaching	Constructivist Teaching /	Experimental / 200 secondary	Academic Confidence Scale	Mean, SD, t-test
		Approach in Science Teaching for Sustainable Development	Academic Confidence	school students		
6.	Adak (2017)	Effectiveness of Constructivist approach on achievement in science at secondary level	Constructivist approach / Academic Achievement	Experimental / 9 th grade students	Achievement Test	t-test

Conclusion

Knowledge is not attained but constructed (Von Glasersfeld, 1989). The statement came from a new challenge to the concept of traditional knowledge. In this regard different studies were conducted to see the effect of constructivism on different variable. The purpose of this study was to review the effect of Constructivist Approach on different variable. In this regard researcher reviewed six studies related researches to see the effect of constructivist approach on different variable. The dependent variables were Academic Achievement, Self-Concept, Learning Strategies, Science process skill, Science curiosity, scientific thinking and Academic Confidence. Five studies were conducted using Experimental design and one study was Quasi-experimental design. The study included two Elementary school students, four secondary school students and one pre-service teacher as a sample of the study. Five studies used test for the measurement of depended variable and two used scale, one used Inventory and one used Questionnaire, observation scheduled, interview, teacher's daily diary, focus group discussion and rubrics.

Kim (2005), Vanisree (2009) and Kaur & Kaur (2016) found that Constructivist teaching is more effective than traditional teaching in term of Academic Achievement and Academic confidence. Constructivist approach encourages students to interact in classroom and give an opportunity to construct their own knowledge. It was also observed that students shows keen interest in the subject of science when taught with Constructivist Approach. Kim also concluded that constructivist approach is not effective in relation to self-concept and learning strategies.

Bharti (2014) found that ICT Aided constructivist learning approach is very effective for teaching and learning science. She proved from her study that integrating ICT Aided constructivist learning approach the pre- service teachers himself transformed into teaching scientist. Constructivist learning approach not only facilitates meaningful learning but also contribute for the professional development of pre-service teacher. Qarareh (2016) shows from his study that Constructivist Learning Model give better opportunities for the learner to participate actively in teaching learning process. He also observed from classroom observation

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that the experimental group students have shown enthusiasm toward works to learn and make an effort to acquire knowledge from various sources. Adak (2017) reveals from the study that the students exposed to the Constructivist 7E- model significantly achieved better than Traditional method. In addition students exposed to 7E- model performed significantly higher than those exposed to the Traditional teaching methods in respect of their gained score at every level of intelligence. The Constructivist learning strategy is capable of improving student's mastery of content at the higher order level of cognitions. Therefore It is recommended that constructivist 7E- model strategy be used in Science teaching for the development of student's higher achievement in Science at different level. Besides this Several other studies, Barman & Bhattacharyya (2015), Beura, Baik & Nayak (2021), Naureen, Arshad & Bashir (2020) evident that constructivist approach is more effective and appropriate method of teaching and learning.

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