

The Effectiveness of package Based on Constructivism on Critical Thinking

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Abstract

The aim of the present study is to investigate the effect of package based on constructivism on Critical Thinking skills of eight-grade students in Amman- Jordan. The sample consisted of 140 eighth-grade students, divided into two groups: one experimental and one control. The California Achievement Test was used to measure critical thinking skills of students. The experimental group was taught by Package based on Constructivism and the control group was taught by traditional method. The results of the study indicated significant differences between the control and experimental groups in Critical Thinking ability the mean score of Critical Thinking Ability experimental group was significantly higher than the control group. The study concluded that packaged based on constructivism is effective in enhancing Critical Thinking Ability of students.

KEYWORD:Effect Constructivism, Critical Thinking effectiveness, Jordan, Teaching.

INTRODUCTION:The main objective of constructivism strategies is to develop to enhance academic achievement and critical thinking Ability among the students. Then thinking may thus be defined as a pattern of behavior in which we make use of internal representations of things and events for the solutions of some specific purposeful problem. Thinking as a mental process, is usually classified into the different categories. Thinking as a mental process. Critical thinking involves constituent expertise in analyzing arguments, making inferences using inductive or deductive reasoning, judging or evaluating, and making decisions or solving problems. Prior past knowledge is fundamental in critical thinking ability but its not adequate enough to think critically in a given subject matter. Critical thinking involves the ability to engage in reflective and independent thinking with both cognitive skills and dispositions. These dispositions, which can be seen as attitudes or habits of mind, include open- and fair-mindedness, inquisitiveness, flexibility, a tendency to seek reason, a desire to be well-informed, and a respect for and willingness to entertain diverse viewpoints. The Definitions of critical thinking that have emerged from the cognitive psychological approach are (Sternberg, 1986)“the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts”; and (Halpern, 1998) “the use of those cognitive skills or strategies that increase the probability of a desirable outcome” ; and ((Willingham, 2007) “seeing both sides of an issue, being open to new evidence that disconfirms your ideas, reasoning dispassionately, demanding that claims be backed by evidence, deducing and inferring conclusions from available facts, solving problems, and so forth” .

NEED AND SIGNIFICANCE OF THE STUDY: most researchers working in the area of critical thinking agree on the important role of background knowledge. In particular, most researchers see background knowledge as essential if students are to demonstrate their critical thinking skills (Case, 2005; (Small, Kennedy, & Bender, 1991); Willingham, 2007). As McPeck (1990) has noted, to think critically, students need something to think critically about. Similarly, Bailin et al. (1999) argue that domain-specific knowledge is indispensable to critical thinking because the kinds of explanations, evaluations, and evidence that are most highly valued vary from one domain to another. (Facione, 1990)notes the following:

Although the identification and analysis of critical thinking skills transcend, in significant ways, specific subjects or disciplines, learning and applying these skills in many contexts requires domain-specific knowledge. This domain-specific knowledge includes understanding methodological principles and competence to engage in norm-regulated practices that are at the core of reasonable judgments in those specific contexts...Too much of value is lost if critical thinking is conceived of simply as a list of logical operations and domain-specific knowledge is conceived of simply as an aggregation of information. (p. 10)

critical thinking is more suitable in the present-day mathematics instruction to achieve higher order objectives at the secondary school level. Critical thinking may be distinguished from general or ordinary thinking in many ways. Its real value lies in its quality of being most skillful and Responsible thinking that facilitates good judgment. It definitely sets some criteria for its own procedural advancement and is self-correcting and sensitive to the contemporary issues and circumstances. It proves to be a backbone and a reliable support for carrying out the process of problem solving.

It does not reach or encourage the child to mug up things without proper understanding. Rather, it makes him a self-reliant, independent inquirer, a discoverer, a useful and progressive citizen, as needed by a rational and democratic society. Therefore, all our efforts should be to develop the required critical thinking potential among the youngsters. Effective lessons on critical thinking connect subject matter, cognitive strategies and skills. Because critical thinking cannot be done meaningfully unless the student knows certain concepts and facts related fundamentally to the question under consideration. A successful critical thinker is also aware of differences in criteria and evidence used to justify propositions in different subjects, such as mathematics, science, history, economics, and geography.

REVIEW OF LITERATURE: Early teachings and findings of thinking skills began in the United States in 1980 with critical thinking skills and it was superseded with creative and critical thinking skills in 1985. In 1990, the teachings were developed to meta-cognitive reflection about learning(Fogarty & McTighe, 1993). Critical thinking is independent and generally recognized that it cannot be taught by traditional methods of teaching rather it is learned through experience but Fisher (2005) believed that thinking skills tradition argues thinking skills can be taught and should be taught. According to Rudd (2007), good thinking skills will not develop on their own, they must be taught. Teaching thinking skills is difficult to define, hard to transfer from one setting to another

and challenging to measure and assess. Definitions of critical thinking varies from school to school, or even department to department, and setting institutional benchmarks can be a tricky endeavor. Teaching to promote thinking takes a lot of time to construct, and it is difficult to arrange, and restricts the amount of content taught. Swartz and Parks, cited by (Innabi & El Sheikh, 2007) proposes that there are two approaches to teach critical thinking utilizing content disciplines; a) the embedded approach – where the critical thinking skills are taught in a roundabout ways without spelling it out to the students; and b) the infusion approach where critical thinking skills are educated noticeably using the discipline's content. Questioning is one of the approach used to amplify critical thinking and this has been used in Socratic teaching. It is quite right, according to Paul and Elder (2003), that this type of questioning strives to clarify information, to recognize a point of view, to uncover speculation, to alter factual claims from value judgements, and to identify flaws in reasoning by asking students questions and not by providing them answers. More precisely, Banning (2005) agree that by questioning metacognitive questions, this may encourage students to think critically. Flavell cited by (Noushad, 2008) sighted metacognition as "knowledge and cognition about cognitive phenomena". Metacognition is mostly referred to in the literature as "thinking about one's own thinking", or as "cognitions about cognitions". It is generally related to learners' knowledge, awareness and control of the processes by which they grasp and the metacognitive learner is believed to be distinguished by the capacity to recognize, evaluate and, where required, reconstruct surviving ideas. More significantly, when his/her metacognitive ability has been adequately developed, the student's inner disciplined voice would prevent the requirement for any Socratic questioner.

(Jawarneh, Iyadat, Al-Shudaifat, & Khasawneh, 2008) The study aimed to investigate the effect of Developing Critical Thinking Skills of Secondary Students in Jordan Utilizing Monro and Slater Strategy, and McFarland Strategy. The objective of the study was to answer whether there was any statistically significant differences in developing critical thinking skills for eighth-grade students related to strategy used and student gender and the interaction of the two factors. The results of the study indicated significant differences between the control and experimental groups for the favor of students in the experimental groups who studied via distinguishing between reality and opinion which is at the center of the Monro and Slater strategy.

(Al Hadid, 2012) Tried to investigate the "Critical Thinking and Disposition Skills among Nurse Educators in Jordanian Universities: An Exploration of the Perceived Practices and the Measured Achievement". The major objectives of the study were to Measure the level of CT skills among nurse, and to Explore the nurse educators' experience of CT skills. Also, to Measure CT disposition elements among nurse educators. The major finding first Nurse educators demonstrated positive dispositions towards critical thinking as well as high expectations of their practice of critical thinking, although their scores on the skill test could not reflect these findings. Second Indicated that they require further professional development to support their work in enhancing critical thinking. Furthermore, age, gender, degree and experience of educational concepts were found to affect the result. third the findings of this study demonstrated lower achievement levels of nurse educators. These findings do not have comparable

scores in the literature as this study is the first to apply to university educators. finally, the variables examined in this study generally demonstrated significant findings among their group. The only exception was 'years of experience', which did not show any statistical significance. Study suggests that nurse educators have positive inclination towards and high perceived practices of critical thinking. However, they did not reflect that in their achievement.

(Ahmad & Duskri, 2018) The study aimed to investigate the "Gender differences of mathematical critical thinking skills of secondary school students". The objectives were to find Critical thinking skills include reasoning skills and reflective thinking focusing on deciding what to believed and do. And Develop students' skills in understanding mathematical concepts, explaining interconnectedness between concepts, and using concepts or algorithms flexibly, accurately, efficiently and appropriately in problem-solving. The finding shows that the critical thinking skills of female students are slightly better than male students solving math problems.

(Zetriuslita, Ariawan, & Nufus, 2016): has conducted a study on "Students Critical Thinking Ability: Description Based on Academic Level and Gender" the study aims to describe students' critical thinking ability based on the level academic and gender. The populations of this study were 132 students participating in five classes of Calculus course. The results show that There is high level of capability, both male students or female students already have the ability to generalize the ability to complete the data provided. And they don't have yet have the ability to identify and justify the concept and analyze algorithms. As well as medium and low levels of capability, male students or female students show similar.

OBJECTIVES OF THE STUDY:

1. To find the effectiveness of Package Based on Constructivism (PBOC) on Critical Thinking Ability (CTA) of 8th standard students.
2. To find out differential effect of Package Based on Constructivism (PBOC) on Critical Thinking Ability (CTA) with respect to gender of students of 8th standard students.

POPULATION AND SAMPLE OF THE STUDY

Multistage sampling was used to select the sample. In the first stage since there were 5 areas in Amman city random sampling technique (lottery method) was used to select the area for the experiment. In the second stage schools were chosen according to Random sampling technique (lottery method). Also, in the third stage since there were more than two sections of eight standard in both schools random sampling technique (lottery method) was used to select the sections. The students of two sections were randomly assigned as experimental group and control group in both the schools.

HYPOTHESES OF STUDY:

1. There is no significant difference between post –test mean scores of Critical Thinking Ability(CTA) of experimental group and control group.

- There is no significant difference between Post Test Mean Scores Critical Thinking Ability(CTA) score of boys and girls of experimental group.

VARIABLES OF THE STUDY:

The details of the variables of the study are categorized into three variables. Firstly, Independent variable; Method of Teaching with Package Based on Constructivism (PBOC) and Traditional method of Teaching. Second, Dependent Variables: Critical Thinking Ability (CTA), Moderate variables: Gender.

TOOLS OF THE STUDY

The adapted version of ‘C.A.T (adapted by Al rabady in 2004 to Arabic environment) was used to assess the C.T.A of students.

DESIGN OF THE STUDY

The present study is an experimental study. First the researchers administered pre-test in CTA to students of both the experimental group and control group, Then the investigator taught the experimental group by PBOC and the control group by traditional method. Then the researcher administered post-test in CTA to both the experimental group and control group.

PROCEDURE OF THE STUDY

The researcher taught the experimental group by package based on constructivism and the control group by the traditional method. Therefore, the researcher administered the California Achievement Test to the experimental and the control group students.

HYPOTHESES TESTING

Objective 1: To find the effectiveness of Package Based on Constructivism (PBOC) on Critical Thinking Ability (CTA) of 8th standard students.

Hypotheses 1: There is no significant difference between post –test mean score of Critical Thinking Ability (CTA) of experimental group and control group.

Table 1. The comparative post test mean scores of critical thinking ability and its components between experimental group and control group

Dimension	Group	Mean	Std. Error Mean	SD	T-Value	DF	Sig.
Critical Thinking	Control.	10.937	.41420	3.31363	17.902	126	.001
	Experimental.	19.296	.21556	1.72452			
Evaluation	Control.	1.6563	.1302	1.04226	9.020	126	.002
	Experimental.	3.1875	0.1088	.87060			
Inducing	Control.	2.0156	0.1550	1.2407	7.494	126	.004

	Experimental.	3.5312	0.1298	1.0384			
Analyzing	Control.	2.3125	0.1370	1.0965	4.544	126	.012
	Experimental.	3.1093	0.1093	0.8750			
Concluding	Control.	1.2812	0.1078	0.8631	2.140	126	.034
	Experimental.	1.6406	0.1286	1.0292			
Deducing	Control.	3.6719	.19166	1.53328	18.698	126	.003
	Experimental.	7.8281	.11259	.90070			

According to the table (1) The results proved that the experimental group has significantly higher scores in the critical thinking ability compared to the control group. Thus, the Hypothesis no.1 is rejected, and the alternative hypothesis is accepted which stated that there is a significant difference between post –test mean score of critical thinking ability of experimental group and control group.

The table (1) reveals that there are statistically significant differences on critical thinking scale due to group, t. value was (17.902) by significant (0.001), the differences are favor to experimental group by means (19.30) but control group means was (10.94). while There are statistically significant differences on evolutions dimension in critical thinking measure due to group, t. value was (9.020) by significant (0.02), the differences are favor to experimental group by means (3.19) but control group means was (1.66). And there are statistically significant differences on inducing dimension in critical thinking measure due to group, t. value was (7.494) by significant (0.004), the differences are favor to experimental group by means (3.53) but control group means was (2.02). In addition there are statistically significant differences on analyzing dimension in critical thinking measure due to group, t. value was (4.544) by significant (0.012), the differences are favor to experimental group by means (3.11) but control group means was (2,31). Also, there are statistically significant differences on concluding dimension in critical thinking measure due to group, t. value was (2.140) by significant (0.034), the differences are favor to experimental group by means (1.64) but control group means was (1.28). As well as there are statistically significant differences on deducing dimension in critical thinking measure due to group, t. value was (18.698) by significant (0.003), the differences are favor to experimental group by means (7.83) but control group means was (3.67).

In the present study there is no significant difference between post-test mean of Critical Thinking Ability (CTA) of experimental group and control group. The findings suggest that if teachers purposely and persistently practice higher order thinking strategies for example, dealing in class with real-world problems, encouraging open-ended class discussions, and fostering inquiry-oriented experiments, there is a good chance for a consequent development of critical thinking capabilities.

Objective 2: To find out differentiate effect of Package Based on Constructivism (PBOC) on Critical Thinking Ability (CTA) with respect to gender of student of 8th standard students

Hypothesis 2: There is no significant difference between critical thinking ability score of boys and girls of experimental group of 9th standard student.

Table 2 The comparative post test mean scores of critical thinking ability and its components score of boys and girls of experimental group of 9th standard student

Dimension	Gender	Mean	Std. Error Mean	SD	F-Value	DF	Sig.
Critical Thinking	Boy	19.470	.31093	1.81301	0.856	62	.395
	Girl	19.100	.29692	1.62629			
Evaluation	Boy	3.2941	.13700	0.79884	1.044	62	.301
	Girl	3.0667	.17243	0.94443			
Inducing	Boy	3.5294	.20351	1.18668	.015	62	.988
	Girl	3.5333	.15708	.86037			
Analyzing	Boy	2.9412	.15188	.88561	1.660	62	.102
	Girl	3.3000	.15275	.83666			
Concluding	Boy	1.7647	.15257	.88963	1.027	62	.308
	Girl	1.5000	.21308	1.16708			
Deducing	Boy	7.9412	.14590	.85071	1.070	62	.289
	Girl	7.7000	.17387	.95231			

The table (2) reveals that there are no statistically significant differences in critical thinking between boys and girls, t. value was (0.856) by significant (0.395). In addition, the results showed that there was no statistically significant difference in the mean scores of the participants in critical thinking dimensions between boys and girls for the experimental group. Therefore, there is no differences between critical thinking ability between girls and boys in the experimental group. Thus, the Hypothesis no. 2 is accepted.

The table (2) reveals that boys and girls of experimental group showed no significant difference in their posttest critical thinking ability (CTA) score. There is no significant difference, no matter which teaching method is used as boys and girls each have their own advantages in terms of critical thinking skills. Many researchers used boys and girls of experimental group as a variable when exploring differences in critical thinking.

FINDINGS OF THE STUDY:

1. Package Based on Constructivism was effective and its enhanced Critical Thinking Ability of students of Jordan.
2. Gender of students has no influence on the Effect of Package Based on Constructivism with respect to Critical Thinking Ability.

EDUCATIONAL IMPLICATION:

1. *The results of the present study showed that Package Based on Constructivism was effective in improving their Critical Thinking Ability. Therefore, critical thinking strategies should be integrated into secondary curriculums associated to history courses, also social studies teachers should be coached and directed on the best way of using effective teaching strategies into their classroom. In addition, there is a requirement for planning the curriculum to upgrade the standard of learning Mathematics, as well as acceptable environments should be imparted to students to permit them advance their critical thinking skills, and also design strategies for teaching critical thinking skills for school students at the Ministry of Education in Jordan.*
2. *The present study revealed that there is no influence of gender on students Critical Thinking Ability respect to Package Based on Constructivism, so both boys and girls should be provided equal opportunities while studying Mathematics and there should be no gender discrimination in teaching Mathematics.*

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