



A systematic review of teaching methodology effect and professional qualifications of teachers on critical thinking growth for primary school teaching in the country studies

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Abstract: The present study aimed to investigate teaching methodology effect and professional qualifications of teachers on critical thinking growth for primary school teaching in the country studies through a systematic review. For this purpose 12 studies done in the field of thinking growth in primary school teaching between 1998-2013 in the country level. They were recognized suitable at technical and conceptual level through the search of data centers and referring to universities, research centers and findings and finally after studying and reviewing these researches supra analysis for data analysis were used. The mentioned results were obtained through the use of 1470 data centers. According to accepting standards, 45 studies were investigated and 12 of them were considered to be suitable to be analyzed. The results showed that the calculation of the intended effect in the society among the teaching method on critical thinking growth was %306, the effect of discovery teaching method on critical thinking growth was %547, and problem solving method on critical thinking was % 252 and professional qualification of teacher on critical thinking growth was %135. They were evaluated as high, mid and low based on Cohen effectiveness level of interpretation table. Also the supra analysis showed each of these methods can be effective on the growth of critical thinking of primary level students and thinking teaching and discovery teaching methodology, in comparison to others, were more effective to increase thinking ability of primary school students.

Key words: Critical thinking . Systematic review . Teaching methodologies . Teachers' professional qualifications

INTRODUCTION

These days and more than before, the attitude toward education and training has been led to critical thinking (Mayerz, 1995). So thinking concept with thinking processing meaning starts with questioning step as the platform of critical thinking (Ghazi Moradi 2012). The way of thinking is a vital issue, because the basis of life philosophy for each person is formed by considering that (Shamloo, 2005). Thinking is the ultimate of reasoning by human. The quality of our future life is completely depends on the quality of our thinking. This is a true fact at individual, social and worldwide level (Dobono, 2005). Thinking is the intrinsic component of human growth which turned us to be creative animals (Fisher, 2006). Equipment, abilities and general scene for thinking can be intrinsic,

but different ways of understanding the world must be learned (Mayzer, 2007). Thinking would not take place in nothingness nor without motivation aspects, tendencies, desires and needs. It would not take place when thinking is just for thinking, because thinking is in fact more than intrinsic and usual activities (Kardan, 2001). Thinking includes a group of activities that concentration or non-concentration on each of them is generally effective on thinking process which is above them by itself (Shabani, 2007). Based on Older and Paul (1994), critical thinking is the best way to understand the rate of thinking ability of people in management and thinking ability (Hosseini, 2009). Stal defined critical thinking as the permanent and continuous patterns of reasoning (Stal, 1991). One of the problems and preventions for critical thinking growth is the lack of a common definition on this

subject. A group has defined critical thinking as the ability to discriminate and organize issues, using comparative and individual reasoning ability of logical extraction of obtained information through different sources, defense of reasonable conclusions by others, ability to differentiate facts and beliefs. Another group has limited it to high level thinking like "enforcement and performance of conceptual activities for solving a complicated problem" (Shabani & Meh Mohamadi, 2000). From Nelson view, critical thinking refers to a group of organized, purposeful and serious attempts to understand the surrounding world that take places by our exact evaluation of our thinking and of others to clarify and improve our understanding (Nelson, 2001). John Dewey defined critical thinking as ((floating judgment)) or ((healthy doubt)). He defined critical thinking as including active, stable and exact study of each idea and knowledge (Lotfi Ebadi, 2005). In the search of finding a complete definition of critical thinking, in 1990, a study conducted by the use of Delphi method and presence of 46 specialist in the field of critical thinking. The results of philosophical institution of America project was a well fed definition of critical thinking which said: critical thinking is a self-governing and purposeful judgment that needs interpretation, explanation, analysis, evaluation and inference (Neisani & Imam Verdi, 2013). Critical thinking skills through the Bire view included considering differentiation between proved facts and accountable claims, between related and non-related information, claims and reasons and determining the accuracy and carefulness, validity of sources, the ambiguities od claims or issues, the unspecified premises, discovering attitudes and biases, the logical fallacies, disagreements in inductions and determining the strength of discussions or claims (quoted by Shabani, 2007). Increasing and comprehensive changes of these days accompanying with unlimited and growing knowledge and information has introduced the need for critical thinking teaching as a vital need for all educational systems of different countries (Bakhtiar Nasr Abadi et al., 2005). If the educational systems are seeking the growth of intellectual and thoughtful people, they should design formal and informal plans for teaching thinking and philosophical thinking. The thinking ability helps children to be secured in daily life from social and mental dangers (Shabani, 2002). Unfortunately, in spite of emphasize and attention to the issues of thinking in education and training purposes, there is no enough intention and motivation toward critical thinking. While teachers state that they believe this idea that critical thinking pave the way for more and better teaching , they constantly uses fixed methodologies, deleting the facts and creating strict principal environment prepare the situation for keeping

the lesson information (Maleki & Habibi Pour, 2007). To teach critical thinking to students, in addition to an organized frame for thinking processes and use of skills and situations in which these processes are used, an interactive practice is needed between students and teachers (Sultan Al Gharae & Soleimani Nejad, 2008). Teaching methodology is an organization and system of interaction between teacher and student to achieve training purposes of the teaching method through the used teaching activities (Shaare Nejad, 2008). The way of teaching in ordered, organized, defined and safe processes is called methodology (Dooj, 2005). Teaching skill is the special way to teach and control the educational activities based on what teacher believe to be done in the class (Shaare Nejad, 2008).the frame work of teaching thinking, based on Cotsa, has three parts: teaching for thinking, thinking teaching and teaching about thinking (Haji Eshagh, 2011). Considering the comprehensive concepts, skills and anticipators of critical thinking, there is always this question that which factors and activities pave the way for critical thinking. Fysyven and et al. (2001) in their vast study on 110 university student proved that critical thinking skills are learnable. In fact learning the critical thinking is difficult and not out of reach (Hosseini, 2009). An increasing number of studies have been done about the factors that raise thinking and learning. The main factors like child understanding of himself as a student, educational style of teacher and the place where both processes of learning and teaching take place. These three activities are related (Fisher, 2006). Teacher is one of the key factors in critical thinking of students. Therefore, in order to teach critical thinking to students, their teachers are needed to have learned this kind of thinking to teach it to their students (Razavian Shad&Sultan Al Gharai, 2010). Teacher through activities like empowering the conceptual aspects of students, motivation, reinforcement of emotional aspects, making imbalance, making an interactive environment, making balance between challenge and support can select a suitable framework for critical thinking activities (Shabani, 2007). Usually one of the teacher's responsibilities is to help his students to learn how to think about real problems independently. Critical thinking in primary school includes the ability to collect, interpret and extract the results and the application and generalization of those obtained results in the new situation. In addition he helps them to have the ability of evaluating discussions, ideas and inferences that stated by others (Taghi Pour, 2010). Taba, one of the famous theorists in education and training believes that it is possible to increase thinking skill in students through teaching methodologies (FazliKhani, 2003). Teaching is constantly a collection of systematic, ordered, purposeful and predesigned

activity that tries to prepare suitable situations for learning. Teaching is an activity that flows between teacher and student interaction. Shabani has stated the following steps for performing critical thinking teaching (in his regard, these activities do not have any order but intertwined and unified): empowering the conceptual aspects of students' knowledge, stimulation, empowering the emotional aspect, making imbalance, making a situation for mutual relationship, making balance between challenge and protection (Shabani, 2007). The managers of schools have a key role in the growth of critical thinking, so in their selection thinking ability, innovation and creation features should be considered as a norm which can be empowered in them through performing instructional courses with their presence in the classes or through their non-presence instructions of skills and attitudes related to critical thinking (Hashemi Nejad, 2001). The achievement of education and training organizations purposes in its final analysis depends on teachers' dominance on concepts and meanings of purposes. And they should be reviewed and clarified by faculty members, teachers and collaboration of lesson planners, so that lesson planning in schools should be based on teachers collaborative studies and values that those purposes have from training and society ideals planned by considering the principle of education and training philosophy guidance and finding of psychology. Razavian Shad and sultan al Gharai (2010) studied the understanding of teachers toward critical thinking. Their study led to extracting the aspects of defining critical thinking, requirements of teaching critical thinking, critical thinking methodology and the obtained results through critical thinking. The results of their study could make a clear picture of teachers' understanding related to this concept. Rahimi Nejad (2010) in his study showed that there is a meaningful relationship between teaching methodologies of teachers in primary schools and scientific understanding of students. Yang (2007) showed that teaching methodology can influence critical thinking. Also studies by Shabani and MehrMohammadi (2000) showed that practicing problem solving method in group activity form has a vital role in the growth of thinking abilities. Some findings reported by Gasemian (2009) show that in lesson planning, critical thinking has devoted an average of 34.86 to itself. Among the components of lesson plan to guide teachers, critical thinking has been adequately paid attention to. The findings of Rezai (2010) showed that the rate of philosophical thinking of students taught through discovery method is higher than those who were taught by traditional teaching methods. Maskey (2008) in his study about the effect of teaching methodology on critical thinking showed that teaching methodology can

influence critical thinking. Data analysis of the study by Mahdi Zadeh, Lotfi and Islam Panah (2012) showed that performing rational planning method in the class for science field has been effective on the increase of scores average of critical thinking of male and female students. The findings of Zargar Kalai (2012) showed that from primary teachers' view in Nekah city, problem solving method practiced in group form influence the critical thinking of students. Momenee, Mahmoe, Karimi and Kakhaki (2012) showed that the use of discovery pattern causes an increase in critical thinking of students in experimental group. Mola Aghaei and Behnamiri (2012) reported that discovery teaching pattern has meaningfully influenced the critical thinking and educational performance of students. In spite of several studies about critical thinking, no systematic and organized study has been done on this subject in primary schools in the country. So researcher of the study tried to seek all published studies and researches in valid journals to find common issues reported among them. Then through their presentation some applicable suggestions are advised to open a small window to vast field of scientific research.

METHODOLOGY

In the present study the systematic review method is used. In the systematic studies researches on a specific subject will be presented in the summarized and useful form which is in contrary of traditional way of journal reviewing or like primitive studies that follow strict rules and principles. Their attitude is completely systematic and their way of application is pre designed and identified in systematic review protocol (Rajab Nejad, 2006). In this method, researchers' research the existed articles and thesis from all valid data bases by the use of key words, when they found them, they read their abstracts. The selected standards for accepting an article or thesis were methods of growing critical thinking in primary school teaching. The words "critical thinking" is used as the subject and key words. Totally 1470 articles and thesis were found by narrowing the studies to educative science, scientific- investigative ones and among them 45 thesis and articles were selected after reviewing and revision. Finally through the careful study of each thesis and article 12 of them were selected for supra analysis.

SOCIETY AND SAMPLING

In these methods, all articles and thesis confirmed scientifically and methodologically compose the society of the study. In another word, the statistical society of the study are all scientific researches and articles done between 1985-2013 on methodologies of growing

critical thinking in primary school education. So in this comprehensive study it is tried to gather all the related studies to the subject of methodology of growing critical thinking in primary school education which can be used in this regard. Considering the used methods in this study that are just relayed on those articles and thesis confirmed for their methodological and subjective content, there should be a systematic review on them and not sampling.

DATA ANALYSIS

In supra analysis, the major principle is the rate of effectiveness for separated studies and turning them into a common matrix and combining them to achieve an average effectiveness. In this study, to evaluate the rate of effectiveness Hunter and Schmitt method is

used. Hunter and Schmitt support a common method which is random rates of method. They believed that fixed rate models are not suitable for real data and relatively relates to the fictional interpretation of researchers (Abedi & Arizi, 2004). In its complete form, Hunter and Schmitt method emphasized on the need for isolation and correction of sources from problems like sampling from error and reliance on variables. The major difference in this method is from unchanged rates of effectiveness estimated in the calculation of rates of effectiveness.

FINDINGS

The results of studying the effect of type of teaching on critical thinking growth of students are reported in Table 1.

Table 1: The average and standard deviation of independent studies level related to the effect of type of teaching on critical thinking

Statistical index Of Independent study	Number of studies N	Level of calculated effectiveness r	Effectiveness level Standard deviation SD	Standard level error SE	Z
Discovery teaching methodology	6	%306	%207	%084	3.643

The presented data in Table 1 show the average and standard deviation of effectiveness rate of teaching method on critical thinking. According to the above mentioned information, the best calculation of intended effect in the society between teaching methodologies on

the critical growth is %306 and based on Cohen effectiveness level interpretation table is evaluated to be average. The results of studying the effect of discovery teaching methodology on critical thinking of students are presented in Table 2.

Table 2: The average and standard deviation of independent studies level related to the effect of discovery teaching methodology on the growth of critical thinking

Statistical index Of Independent study	Number of studies N	Level of calculated effectiveness r	Effectiveness level Standard deviation SD	Standard level error SE	Z
Discovery teaching methodology	3	%547	%077	%045	12.156

The presented data in table show the average and standard deviation of effectiveness level of discovery teaching on critical thinking growth. According to above mentioned information in the table, the best calculation of intended effect in the society between discovery methodology on the critical growth is %547

and based on Cohen effectiveness level interpretation table is evaluated to be high.

The results of studying the effect of teaching problem solving methodology on critical thinking growth of students are presented in Table 3.

Table 3: The average and standard deviation of the effectiveness level of independent studies about the effect of teaching problem solving on critical thinking growth

Statistical index Of Independent study	Number of studies N	Level of calculated effectiveness r	Effectiveness level Standard deviation SD	Standard level error SE	Z
Problem solving teaching methodology	4	%252	%418	%209	1.206

The presented information in table 3 show the average and standard deviation of effectiveness level for the effect of teaching problem solving methodology on critical thinking growth. According to the information presented in the above table, the best calculation of the

intended effect in the society through the problem solving teaching methodology on critical thinking growth is %252, and based on Cohen effectiveness level interpretation table is evaluated to be average.

The results of studying the effect of teacher's professional qualifications on the growth of students'

critical thinking are reported in Table 4.

Table 4: The average and standard deviation of independent studies level of effectiveness about the effect of teacher's professional qualifications on the growth of critical thinking

Statistical index Of Independent study	Number of studies N	Level of calculated effectiveness r	Effectiveness level Standard deviation SD	Standard level error SE	Z
teacher's professional qualifications	5	%135	%219	%098	1.378

The presented information in table 4 show the average and standard deviation level of teacher's professional qualifications on critical thinking growth. According to the table, the best calculation of the intended effect in the society through teacher's professional qualifications on critical thinking growth is %125 and based on Cohen effectiveness level interpretation table is evaluated to be low.

DISCUSSION AND CONCLUSION

The results of study showed that the best calculation on intended effect in the society and through teaching and training methodologies of critical thinking growth is %306 and based on Cohen effectiveness level interpretation table is evaluated in average level. Considering the obtained results, different teaching methodologies can cause critical thinking growth or reduction in primary level students. The reported study by Keyvan Hafshejani (2012) showed that teaching methodology of teachers can influence the thinking growth of students; in fact the methodology of teacher in the studied class caused an increase in the growth of their thinking. In their study Fatehi and Hafshejani (2010), studying the teachers' teaching methodology in relation to scientific attitude formation which was correlated with primary school students, role play, work or project unit, protection and repetition with curiosity, work or project with critical thinking, collaborative style, work unit, question and answer, experiment and group discussion and invention. Karimi (2012) showed that the philosophical thinking ability of students taught through story telling method has been increased. Moreover, results showed the best calculation form the intended effect in society through teaching methodologies on critical thinking growth is for discovery method and about %547 and based on Cohen effectiveness level interpretation table is evaluated to be high. The results showed that discovery method can cause critical thinking enhancement for primary school students. Mola Aghaei and Behnamiri (2001) showed the pattern of discovery method has a meaningful effect on critical thinking and educational performance of students. The reported results by Rezaei (2010) also showed that philosophical thinking ability in students taught through discovery method is higher than those

taught through traditional methods. Momeni and Mahmoei (2012) reported that the use of discovery pattern can increase critical thinking of experimental group of students.

The best calculation of intended effect in society through problem solving method on critical thinking is %252 and based on Cohen effectiveness level interpretation table is evaluated to be average. The results showed that problem solving teaching methodology can increase the critical thinking ability of students in primary school. Shabani (1999) reported that in comparison with control group, students taught in group working through problem solving methodology has obtained more scores for their critical thinking abilities. Gashtasbi (2013) in a study as the effect of problem solving method on creative and critical thinking showed that the use of teaching methodology meaningfully caused the enhancement of students' critical thinking. The results of Zargari and Kolaei study showed that problem solving method in groups can influence students' critical thinking. The results also revealed that the best calculation of the intended effect in society through professional qualifications of teacher on critical thinking growth is %135, and based on Cohen effectiveness level interpretation table is evaluated to be low. Rahimi Nejad (2010) showed that there is a meaningful relationship between primary school teacher methodology of teaching and scientific comprehension of students. Gholampour and Bariki (2013) reported that there is a meaningful relationship between critical thing and teaching skill of teachers. Also, the meaningful relationship between critical thinking with teaching skill factors like methodology and lesson plan were proved. The results of these reported studies show that professional qualification of teacher is effective on the growth of primary students' critical thinking although, in comparison to other methods to grow critical thinking, it had lower effect. Considering studies in this regard systematic reviews and supra analysis of data it profited from lower effect.

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