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THE STUDY ON EFFECT OF ON THE JOB TRAINING OF TEACHERS IN IMPROVEMENT OF COGNITIVE SKILLS OF PRIMARY AND SECONDARY SCHOOL STUDENTS AT LAR TOWN

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ABSTRACT

On the job (OTJ) training of teachers includes improving the related educational and training activities to their professional field of working, which is mainly done in order to add their knowledge, acquire skill, and change in professional attitudes in them so that they are able to deal with teaching and training more efficiently and thus to provide the ground for creativity and educational performance of student. Therefore, this study was carried out by aiming at analysis of the effect of on the job training of teachers in improving cognitive skills among students of primary and secondary schools at Lar Town during academic year 2013-14.

In this descriptive- comparative study, which was conducted with design of finding the related field, 612 cohort students were elected and studied by means of multi-stage sampling among the primary and secondary schools at Larestan city. Proportional to its objective cognitive skills questionnaire (Pintrich et al, 1991) was employed in this investigation and finally the collected data via SPSS statistical software (v. 19) were analyzed and statistical parameters of frequency, mean, percentage, and independent t-test were utilized.

Data analysis shows that on the job training may effect on improving cognitive skills of students so that the cognitive skills have statistical significant difference in the studied groups ($t = 1.30$; $df = 610$; $p = 0.003$). Similarly, the findings show that the strategies of rehearsal, critical thinking, and self- regulatory scale of cognitive skills are increased under the influence by on the job training ($p = 0.05$). No significant difference was found in increase rate between elaboration and organization skills among the studied groups ($p = 0.05$).

With respect to the given results from this study based on which passing on the job training courses has affected the cognitive skills in students, it seems paying attention to this effective variable and formulation of efficient curricula for teachers is necessary for improving their professional and teaching skills and thus developing cognitive skills and educational achievement of students.

Keywords: Teacher, on the job (OTJ) training, Cognitive skill, Learning

INTRODUCTION

With respect to quick and accelerating developments in human knowledge and information, anything is extremely subjected to change and transformation. Organizations interact with the environment as an open system and they need to be accountable to environmental changes for their survival. Whereas human resources are assumed as the foremost factor and axis in organizations thus in equipping and preparation of the aforesaid sources to be exposed to changes is especially important and all of organizations should allocate the maximum capital, time, and plan to train the humans in various dimensions with respect to type of mission they are exposed to it (1). Inter alia, many organizations including education and training organization has identified execution of on the job empowerment plans to solve this problem and tried to prepare the needed ground to train the capable personnel. Similarly, developing all of educational and training of professional and well- trained human sources for working are considered as important factors for economic, social, and cultural development. The great developments, which occur in knowledge fields daily in any organization, create new educational requirements for various occupations so only academic studies and degrees do not meet such needs and it addresses other types of trainings like on the job training course. On the job training is one of the efficient techniques for improving productivity and optimal use of capacities and potentials of personnel regarding organizational goals.

In fact, on the job training puts new knowledge in portfolio of former trainings of the given person. More than any other time in the contemporary world, survival and duration of organizations is subjected to interaction between work implementation techniques with trans organizational changes, developments, and innovations. The main key for this interaction is latent in using efficient

mechanism of on the job training for personnel. Principally, on the job trainings can be deemed as a part of continuous trainings, which humans need in order to play efficient role in occupational relations and generally social relations with them (2).

Teachers are considered as start point and main elements in any type of development in education and training system. Thus in order to enable them to do better their occupational, professional, and educational tasks, it necessitates providing the possibility for them to enjoy new trainings and skills. This important goal will be possible by formulation and execution of on the job training system for teachers so that the ground is prepared for scientific and professional improvement, updating data, and acquisition of new skills. Due to importance of education and training system in advancement of communities, the subject of on the job training for workforce in education and training organization and particularly training of teachers is more important and sensitive than other areas (3).

UNESCO assumes development of skills, potentials for doing tasks, perceiving the needed knowledge and information by manpower for advancement in production as the goal of on the job training. According to Standard 10015, training includes four- phase process comprising of need analysis, educational planning, execution of training, and evaluation of the educational results. The simplest definition for training is to contribute the people for learning (4). In today world, training and education of teacher is supposed as the first level interests in terms of national interests (5). If teachers intend to fulfill well their educational tasks and responsibility, they should permanently devote their time to study and training. There are several systems to identify the rate of teachers' performance in most of countries and thereby teachers are required for passing new training courses and they are separated from the teacher, who should quit their job. Similarly, teachers are frequently subjected to exploration about teaching qualifications and request for receiving teaching (mentorship) certificate (6). All of the formal and informal activities and experiences, which contribute to teacher to be able to assume his/ her responsibility as a member of educational system efficiently and with high quality, are called on the job training (6).

Pierre and Gutter suppose on the job training as a type of systematic effort that is mainly at coordination and orientation of wishes, individuals' future interests and requirements

with organizational needs and goals within the framework of the expected tasks for the personnel (7). On the job training of teacher includes improvement of the relevant educational and training activities to their professional field, which are done mainly or exclusively in order to increase knowledge, acquire skill, and change professional attitudes in them so that to enable them to deal with teaching and training more efficiently (8). Accordingly, training of teachers is a continuous process (9) and according to viewpoint of Vashist, due to its quicker return, investment in training of teachers will be followed by more efficient outcome and it causes developing public education (10).

On the job training is the integrated part of training in any country and with respect to speed of advancement of knowledge, the organization should be able to make their manpower skillful more than ever. Thus, on the job training courses make teacher more capable in solving working problems and making educational decisions. Likewise, of important benefits of on the job trainings, one can refer to important effect that it has in improving teaching awareness and skills for teachers so this issue leads to improvement of teachers' educational performance and thus progress in various areas of educational system, especially the successful training and teaching of students. Learning of cognitive and metacognitive skills in students is some of the variables, which are affected by training capabilities of teachers.

Term '*cognition'* denotes internal mental process or strategies thereby the data are processed. Namely, we recognize and encode the methods thereby we notice the information and we store them in memory and call up them whenever we need to them and use them (11). Cognition means the thinking and learning flows and way of organizing, storing, and employing information (12). Derry and Murphy assume cognitive strategies as the methods thereby the individuals may manage their learning and recall and thinking on them (13).

Hendry considers cognitive strategies as designs or techniques for solving a problem. He argues that the cognitive strategies consist of explorations for data processing. Individuals need to regulate the external derives and scientific and creative activity in process of data acquisition and for this purpose using cognitive strategies may meet this requirement (14).

Flavell considers the cognitive process as one the important processes executed in memory.

He argues that this process starts from sensual impression phase and continues to retrieval of information from long- term memory and whereas these processes are related to knowing and cognition thus we call them cognitive processes. In other words, when we recognize something, remember a name, perceive a sentence, and or propose a comment and or solve a problem, we do cognition in practice (15).

Cognitive strategies have been noticed from various aspects. Park refers to two classes of cognitive strategies including strategies with strong effectiveness and strategies with weak effectiveness. Those strategies with high effectiveness cover the strategies for summarizing, note- taking, keyword technique, cues, method of advanced locations and organizers while strategies with low effectiveness consist of line marking strategies and conceptual maps (16). Presley et al refer to objective- specified cognitive skills. The users of this objective take this strategy in order to achieve a goal beyond execution of strategy (e.g. perceiving a text, learning the contents for next recall, creating relation, and finding the answer for problem). Most of goal- specific cognitive strategies are related to a certain field. For instance, memorization strategies include repetition of the learned contents, grouping the contents, which can be organized into the clusters, which are proportional to each other due to conceptual relations, creating relation among separated elements and thus improving potential for their learning (17). Cognitive and metacognitive skills are the measures, which will contribute to learning and recall. However, these skills can be learned, some of learners could not train them and they should be trained in this regard (18). To the extent the range of the skills, which the students employ them appropriately, is wide, their achievement will be further in problem solving, reading, comprehension, and memorizing the information (19). The conducted studies about cognitive and metacognitive strategies have shown that taking such measures may lead to improve learning for the learners (20). The studies show that training of cognitive and metacognitive strategies cause leading individual's thought in situations of learning and problem- solving and it is followed by better performance of memory. Likewise, metacognitive strategies cause the person to monitor his/ her practice more perfectly with respect to nature of tasks (19). Due to facilitation of successful experiences and creating the needed opportunities for practice,

these strategies leads to growth in creativity, educational performance, experience of successful learning so this in turn will be effective in developing educational self-concept in students. Similarly, training of these strategies and learning of them by the learners cause them to attend at exam sessions with higher readiness and self- reliance and to have better achievement in educational performance and consequently to experience positive growth in motivation of their progress. Given that there are many problems in training and way of employing various educational strategies in this sense so it seems necessary to conduct several researches about the effect of taking cognitive learning strategies in the field of education and the effective factors on taking these strategies especially the factor of teachers (on the job training of teachers) that have not been yet addressed in the previous researches in order to enhance the quality of teaching. Thus with respect to constraint of the conducted studies in this regard and role of variable of teachers' on the job training in growth of cognitive skills in students, this study was carried out by aiming at analysis of effect of on the job training of teachers in rising cognitive skills among primary and secondary school students at Larestan Town in academic year 2013-14.

METHODOLOGY

The current research is of descriptive-comparative type with contextual finding design and it was conducted by aiming at analysis of the effect of on the job training of teachers in improvement of cognitive skills among students from primary and secondary schools at Larestan City. The statistical population of the current study includes all students in primary and secondary schools at Larestan City during academic years 2013-14. With respect to goals and type of study and by virtue of the previous studies in this regard and by consideration of the following assumptions (significance level: 95%, and error level 5%) and by means of Krejcie-Morgan Table formula, the sample size was derived as 612 participants, who were elected among the aforesaid centers by means of multi-stage clustered sampling technique. Proportional to goals of research in this study, cognitive skills questionnaire (Pintrich et al, 1991) was utilized. This scale is a self-reporting tool including 31 questions and five dimensions (rehearsal, elaboration, organization, critical thinking, and self-regulation) that measures these variables and it is answered according to Likert 5- scale spectrum. Pintrich et al calculated internal consistency of this inventory by means of

computation of Cronbach alpha coefficient and the following values were acquired for subscales of self- efficacy beliefs, learning control beliefs, exam anxiety, critical thinking, and metacognitive self- regulation as 0.93, 0.68, 0.80, 0.080, and 0.79, respectively (21).

The value of Cronbach alpha coefficient was reported for cognitive skills questionnaire as 0.83 by Azizi so it indicated the high reliability of this tool (22). Likewise, in the present study, the rate of reliability of this tool was acquired 0.80 by means of Cronbach alpha coefficient. Finally, the collected data were analyzed via SPSS statistical software (v. 19) that provided the possibility for execution of descriptive and inferential statistics. Nonetheless, the main techniques have been employed to analyze hypotheses in this project including frequency, mean, and percentage and also independent t- test was used to analyze data.

Research questions

1. Does on the job training of teacher's effect on improvement of rehearsal practice in students?
2. Does on the job training of teacher's effect on improvement of elaboration practice in students?
3. Does on the job training of teacher's effect on improvement of organizing practice in students?
4. Does on the job training of teacher's effect on improvement of critical thinking practice in students?
5. Does on the job training of teachers effect on improvement of self- regulatory practice in students?
6. Does on the job training of teachers effect on improvement of cognitive skills in students?

FINDINGS

Descriptive and inferential data and statistics have been presented in this section. Table 4-1 shows the data about dispersion of demographic variables in the studied sample group. As it observed, the highest number of studied sample is devoted to boys (54.6%) and then girls (45.4%). As it shown in Table (1-4), 322 students were at primary schools and 290 students have been studying in secondary (guidance) schools. And also students have been divided into two homogeneous groups including students who have been trained by teacher [n = 306] and students, who have not been trained by teacher [n = 306] (Table 4-1).

To calculate effect of on the job training courses of teachers on growth of students'

cognitive skills, t-test for independent groups was employed. We analyze the effect of on the job training courses for teachers on cognitive skills and their elements in the studied groups in the following. Table (4-2) indicates results of independent t- test in comparison of effect of on the job training courses of teachers on improving rehearsal dimension of cognitive skills.

It can be seen in findings of Table (4-2) that the mean values of rehearsal variable in group of students who were trained by teachers and the group of untrained students by the teachers indicate significant difference ($t = -2.81$; $df = 610$; $p = 0.011$). As a result, the research hypothesis is approved and statistical assumption is rejected ($p< 0.05$). Or in other words, teachers who have attended at on the job training courses have further effect in rehearsal dimension of cognitive skills in performance of students compared to teachers, who have not participated in these training courses. Table (4-3) indicates results of independent t-test for comparison of effect of on the job training course of teachers in improvement elaboration dimension of cognitive skills.

According to the given data, which are shown in Table (4-3), the mean value of variable of elaboration in students of trained teachers is not significant at level ($p = 0.05$). Thus, there is no significant difference among group of students of trained teachers with students group with untrained teachers in terms of this variable ($t = 1.21$, $df = 610$, and $p = 0.676$). Therefore, the research hypothesis is rejected. In other words, the results of this study signify that on the job training of teacher has no significant effect on improvement of performance of students in elaboration dimension of cognitive skills. Table (4-4) indicates results of independent t-test for comparison of effect of on the job training of teachers in improvement of organizing dimensions in cognitive skills.

As it shown in Table (4-4), there is no statistical significant difference in mean score of organizing variable between two groups of students by the trained teachers and students of untrained teachers ($t = 1.71$, $df = 610$, $p = 0.546$). As a result, the research hypothesis is rejected in this variable and statistical assumption is accepted ($p< 0.05$). Thus, it can be mentioned that on the job training of teachers has no significant effect on improvement of performance of students in organization dimension of cognitive skills. In Table (4-5), results of independent t-test are shown for comparison of effect of on the job

training of teachers in improvement of critical thinking of students.

The given results from Table (5-4) indicates that the mean score of variable of critical thinking has significant difference in two groups of students with trained teachers and students with untrained teachers ($t = 2.55$, $df = 610$, and $p = 0.048$). Therefore, the research hypothesis is confirmed and the statistical assumption is rejected ($p < 0.05$). Or in other words, it can be implied that teachers, who have attended in on the job training courses may have higher effect on critical thinking practice of students compared to teacher, who did not participate in these training courses. Table (4-6) shows the results of independent t-test for comparison of effect of on the job training of teachers in improvement of self-regulation dimension of cognitive skills in students.

With respect to significance level ($p = 0.05$) in analysis of results from Table (4-6), we notice a significant difference of variable of self- regulation between two groups of student with/ without trained teachers ($t = 2.75$, $df = 610$, and $p = 0.003$). As a result, research hypothesis for this variable is approved and statistical assumption is rejected. Based on this finding, it can be expressed that in this study those teachers who have enjoyed on the job training course had the higher effect on self- regulatory practice of students in comparison to teachers who have not participated in these training courses. Table (4-7) shows the results of independent t-test in comparison for effect of on the job training of teachers on improvement of total score of cognitive skills of students.

According to the results derived from Table (4-7), it may be found that the mean score for cognitive skills among two groups of students with/ without trained teachers has statistical significant difference ($t = 1.30$, $df = 610$, and $p = 0.003$). Hence, research hypothesis for this variable is approved and statistical assumption is rejected ($p < 0.05$). Under these conditions, it is expected that the cognitive skills of students to be increased at least in one of dimensions under the influence of on the job training courses of teachers. Accordingly it can be implied that the teachers who have passed on the job training course may act more successfully in training and improvement of cognitive skills in their students compared to the teachers who have not passed these courses.

Table (4-1): The related data for dispersion (distribution) of demographic variables in sample group

Variable	Groups	Frequency	Percent	Cumulative percentage
Gender	Girl	278	45.4	45.4
	Boy	334	54.6	100
Educational degree	Primary school	322	52.6	52.6
	Secondary school	290	47.4	100
Training group	Taught by trained teachers	306	50	50
	Taught by untrained teachers	306	50	50

Table (4-2): The results of independent t- test for comparison the effect of on the job training of teachers on improvement of rehearsal dimension

Rehearsal	Difference of groups			T	df	P
	Mean difference	Standard deviation	Standard deviation from mean			
Group of students with trained teachers- Group of students with untrained teachers	-3.91	3.37	1.39	-2.81	610	0.011

Table (4-3): The results of independent t- test for comparison the effect of on the job training of teachers on improvement of elaboration dimension

Elaboration	Difference of groups			T	df	P
	Mean difference	Standard deviation	Standard deviation from mean			
Group of students with trained teachers- Group of students with untrained teachers	0.023	0.056	0.019	1.21	610	0.676

Table (4-4): The results of independent t- test for comparison the effect of on the job training of teachers on improvement of organizing dimension

Organizing	Difference of groups			T	df	P
	Mean difference	Standard deviation	Standard deviation from mean			
Group of students with trained teachers- Group of students with untrained teachers	0.036	0.060	0.021	1.71	610	0.546

Table (4-5): The results of independent t- test for comparison the effect of on the job training of teachers on improvement of critical thinking dimension

Critical thinking	Difference of groups			T	df	P
	Mean	Standard	Standard			

	difference	deviation	deviation from mean			
Group of students with trained teachers- Group of students with untrained teachers	**0.148**	**0.075**	**0.058**	**2.55**	**610**	**0.048**

Table (4-6): The results of independent t- test for comparison the effect of on the job training of teachers on improvement of self- regulation dimension

Self- regulation	Difference of groups			T	df	P
	Mean difference	Standard deviation	Standard deviation from mean			
Group of students with trained teachers- Group of students with untrained teachers	**0.143**	**0.047**	**0.052**	**2.75**	**610**	**0.003**

Table (4-7): The results of independent t- test for comparison the effect of on the job training of teachers on improvement of cognitive skills

Cognitive skills	Difference of groups			T	df	P
	Mean difference	Standard deviation	Standard deviation from mean			
Group of students with trained teachers- Group of students with untrained teachers	**2.51**	**1.067**	**1.93**	**1.30**	**610**	**0.003**

DISCUSSION

This point is noteworthy before discussion about findings and results that the demographic data of testees were presented according to their gender, educational degree, and education degree of parents and testees have been compared identically based on these data. Nonetheless, the testees were composed of 54.6% boys and 45.5% girls. The majority of studied sample (52.6%) has studied in primary schools. Similarly, regarding educational degree of parents, more than 50.3% of fathers had high school diploma and over 47.6% of mothers reported their education under diploma. Likewise, majority of studied sample (67.4%) reported their own economic status at average level.

As it shown in findings about the research first question (**Does on the job training of teachers affect on improving rehearsal practice of students?**), the given results from calculation of t-test in independent groups suggest the existing statistical significant difference. With respect to the acquired

findings, it can be inferred that variable of rehearsal has statistical significant difference among students with trained teachers and students with untrained teachers. Or in other words, in this study the teachers, who have attended in on the job training courses may have higher effect on practice of students in terms of rehearsal dimension in cognitive skills compared to the teachers, who have not participated in these training courses. Regarding interpretation of these findings, it can be implied that iteration strategies or rehearsal include repetition of data (mentally, lexically, and or by written) that should be learned. The iteration and rehearsal strategies cover the simple assignments, reading a text aloud or quietly, rereading of a text and repetition of basic points of a certain subject aloud or quietly. The iterative and rehearsal strategies are employed in the complex subjects such as selection of parts by underlining them and taking abstract and notes (23). Recalling strategies and rehearsal comprise of reciting sentences for learning, speaking aloud upon reading a text, highlighting and underlining the important points by a relatively active and not passive technique. It is supposed that rehearsal strategies may contribute to students to concentrate their attention and to select important points from the lists or texts and to transfer these data actively to their working memory; nonetheless, the aforesaid strategies do not indicate a very deep processing level (21). Rehearsal is related to type of received training from the teacher so that as the presented trainings by teacher are stronger and more integrated, the rate post rehearsal effect will be also increased. Hence, passing on the job training courses causes teacher to improve and update their training skills about iteration and rehearsal fields for assignments, reading texts aloud and quietly, rereading and repetition of basic points according to developments in educational system, curriculum sources, and potential of students and this is led to improving rehearsal and iteration skills in students per se.

As the findings about research second question (**Does on the job training of teachers affect on improving elaboration practice of students?**) indicates, there is no significant difference among group of students with trained teachers and group of student with untrained teachers in variable of elaboration. In other words, the results of this exploration suggest that on the job training course of teachers has no significant effect on improving performance of elaboration dimension of cognitive skills in students.

Regarding interpretation of this finding, it can be mentioned that conceptual elaboration denotes creating subjective relation among the contents that should be taught by means of existing knowledge or through improving perception and conception by change in way of attitude toward the subjects in relationship with each other. According to Warr and Dowing, elaborative or interpretative strategies are some strategies, which give meaning with creation of links between memorizing subjects. Elaboration is often done automatically and when we encounter some points about a subject, our previous knowledge or schema of that subject is immediately activated on our mind (24). Similarly Woolfolk expresses those points which are elaborated, are more quickly trained in primary learning and they are forgotten much later and at the same time whereas the elaboration causes some links among new knowledge with the existing knowledge and it is subsumed and linked with many pieces of former data, it may put many clues for retrieval at learner's disposal upon trying for recall. Therefore conceptual elaboration may be also effective in facilitation of retrieval of points (25). The elaboration strategies include definition, interpretation, and summarizing the materials for training, deduction, creative note- taking, and giving response (26). Overall, the performance of conceptual elaboration is affected by already- trained knowledge and new knowledge both in teachers and students. Or in other words, as the conceptual skill of teachers and students is stronger, they will enjoy conceptual elaboration at higher level. Passing on the job training courses is led to creating subjective relation among the points, which should be taught, and the existing knowledge or improvement of perception and conception by change in way of attitude toward points in teachers. As a result, employing conceptual elaboration skills in classroom by teachers increases and improves these skills in students and this point is not consistent with findings in the present research.

As it shown in findings about research third question (**Does on the job training of teachers effect on improving organizing practice of students?**), the aforesaid results from t-test in independent groups signify that there is no statistical significant difference among mean score of variable of organizing between two groups of students with/ without trained teachers. Thus, with respect to these findings, it can be inferred that on the job training course of teachers has no significant

effect on improvement of students' practice in organizing dimension of cognitive skills.

The organizing is deemed as foremost and most perfect type of learning strategy and study. The organizing is a type of conceptual elaboration strategy. But it differs from it in that in taking organizing strategy for making meaningful learning, the learner may impose a type of organizational framework regarding points, which are intended to be taught while such a practice is not necessary in conceptual elaboration strategies. This organizational framework may be specified to new information (i.e. a type of internal organization) or it may link the existing points to the new subjects (elaborative framework). One of the requirements, which are effective in improvement of learning, is the organizing and integration of taught subjects. The organizing is a skill that provides this potential for the trained teachers by on time and useful utilization from it so that they can present the textbook subjects and materials to students by means of a regular and systematic method and thereby students can also remember the contents of lessons much more easily and deeply. The given strategies indicate the learning deeper level and they require the learner to exceed beyond the level of studied text and to infer from them. Organizing is other type of deep processing strategies, which includes several behaviors like selection of main theme of text, unlinking, highlighting of texts and or materials for learning, using various techniques to select and organize the existing ideas, design and preparation of a network or map of important ideas, identifying prose structures or text explanation and interpretation. Organizing strategies are led to deeper perception of materials and most of successful and professional learners are highly benefitted from these strategies (26). In general, on the job training prepares the ground for employing cognitive skills of organizing further in teaching and learning process for teachers and students. This assumption is not aligned with findings of the present research. In fact, findings of this study indicate that variable of organizing has no significant mean difference between the studied groups. Or in other words, it can be stated that on the job training courses have not affected on cognitive skills of organizing in learning process.

As the findings indicate about the research fourth question (**Does on the job training of teachers effect on improving critical thinking practice of students?**), the given results from calculation of t-test for

independent groups signify that there is statistical significant difference in variable of critical thinking. Or in other words, it can be said that teachers, who have attended in on the job training courses have higher effect on practice of critical thinking of students compared to teachers who have not participated in these training courses.

To interpret these findings, it can be implied that Sternberg called various different styles of individuals in data processing as thinking styles (27). From his view, thinking style is the preferred style of thinking not a capability, but it refers to way of using one's capabilities by the given person (28). The thinking styles proposed by Sternberg have formed according to theory of subjective automation. The faculty of thinking and power of imagination is one of the distinct characteristics of human and the basic axis of his/ her life that causes human's preference to other living organisms. Human has never been free of thinking and thought during his/ her lifetime and made decision by means of power of proper thinking and could solve the issues and problems and achieved growth and excellence. Therefore, all of humans' achievements and successes are subjected to fertile, dynamic, and efficient thought (29). Perceiving the thinking skills contributes to a person to understand why some of activities are suitable for him/ her while the others are inappropriate. Sternberg ad Grigorenko assume the study and identifying of thought not only necessary and useful for educational and occupational achievements, but also consider it as a key factor in improving creativity and cognition of creative persons (29). Critical thinking or problem- solving is to recognize and employ knowledge and skills, which are led to proper answer for learner and situation or reaching him/ her to the given goal. Therefore, it can be implied that application of knowledge from the already- taught skills is considered as the main element of critical thinking at new and real situations and as long as the individual could not employ his/ her already taught points in the status of problem solving, s/he will not succeed to solve the problem (30).

Critical thinking includes evaluation of decisions in the path of logical and regular analysis of issues, evidences, and solutions. Critical thinking comprises of thoughtful and fertile thinking as well as evaluation of evidences. Marzano classifies thinking into categories: critical thinking and creative thinking.

1) Critical thinking: This type of thinking includes some cases like accurate review on

subjects, paying attention to different viewpoints, and achieving the proper results. In other words, critical thinking is a rational and logical type of thinking that is focused on what is decided and it deals with critique, judgment, and finding faults and defects. The critical thinking is aimed at evaluation of appropriateness of doing the works.

2) Creative thinking: It is a type innovative and procedural thinking to find a unique solution. Both types of thinking play important role in most of activities like problem solving. Initially, we analyze the problems and then produce solutions for the problems. Afterwards, we select the appropriate solution and execute it and finally we evaluate the effectiveness of the executed solution. This process indicates despite of difference among creative thinking and creative critique, both of them are linked with each other (31).

Jacqueline and Martin Brooks have expressed their regret about this point that the critical thinking is taught in few numbers of schools. From their view, the schools spend a lot of time only to compel the students to give proper answer in imitatively for a problem instead of training their critical thinking. They argue that instead of this fact the teachers expect the students for analysis, inference, creating links, composition, criticism, creation, evaluation, and thinking, they mainly prefer to compel students to describe, define, and illustrate them. They highlight that many students do not their assignments well and they do not acquire good scores because they have not yet learned critical and deep thinking. Therefore, in order to develop critical thinking in students, it is recommended to teachers as follows:

- Don't ask them what it happened but also ask them about why and how it occurred.
- Analyze them to determine if there are some evidences to support the given assumption.
- Use deduction instead of emotions.
- Compare different answers with each other and select the best answer.
- In order to acquire new ideas and information, raise several questions beyond what you have already learned.
- Instead of absolute acceptance, evaluate what you heard from the people and improve and strengthen your teaching skills in these fields with passing educational courses (32, 33). These findings are consistent with the results of present researches.

Critical thinking is related to type of the learning received from the teacher in such a way that as the presented trainings by teachers lead the students further to analysis, inference, linking (subsumption), composition, criticism, creation, evaluation, and thinking, the rate of their effect will be also increased on critical thinking practice. Therefore, passing on the job training courses may cause teachers to improve and update their teaching skills in the fields of training critical thinking and problem- solving skills and this in turn leads to employing efficient teaching methods and consequently improving cognitive skills of critical thinking in students.

As it indicated in findings about research fifth question (**Does on the job training of teachers effect on improving self-regulation practice of students?**), the given results from t-test of independent groups suggest significant difference of variable of self- regulation in both groups of students with/ without trained teachers. According to this finding, it can be inferred that the teachers, who were benefitted from on the job training courses had the higher effect on self-regulatory practice of students in comparison to teachers, who have not passed these training courses. In other words, self-regulation is the other and important part of cognitive skills, which are affected by teaching methods of teachers. Zimmerman and Martinez- Pons also claimed that most of cognitive controlling patterns or self-regulatory strategies comprise of three types of general strategy: planning, control, and regulation (34). These three strategies are linked with each other both conceptually and empirically (35, 36).

The planning activities, which have been explored about learning of students in various studies, include selection of goal for the study, review (rehearsal) before reading, making questions before reading text, and doing analysis on assignment (task) or analysis of problem. It seems that these activities contribute to learner to plan for his/ her cognition activity and stimulate various dimensions of previous knowledge, and to simplify further perception and organizing materials and tasks (36). Control and monitoring on personal educational thinking and behavior is the other basic aspect of learning self- regulation. A few criteria, scales, or certain goals should be characterized for self- regulation so that to make comparisons possible and thereby to

lead control process. Winston and Mayer also maintain that students can revise their perception versus their selected goals by means of these processes. The controlling activities include dividing attention at time of reading a text or listening to lecture, self-exercise by giving answers to the related questions in text to review rate of their perception, monitoring of perception of materials expressed by lecturer, and taking strategies to prepare for exam (like speed of control and adaptation to the existing time). Controlling strategy is one of the basic strategies in self- regulation (26). When students control over their learning and practice by several criteria or goals, they need to regulation processes. For instance, when learners ask some questions from their own upon controlling on perception and then go back and read some part of text again, this repeated reading is a strategy for regulation (26). According to what it mentioned, it can be concluded that the self- regulatory strategies (e.g. planning, control, and regulation) include important part of cognitive and metacognitive skills in learners. Teachers play important role in educational performance and the governing cognitive process over learning of students by employing the aforesaid strategies.

As it indicated in findings about research sixth question (**Does on the job training of teachers effect on improving cognitive skills of students?**), the results suggest that the mean score of cognitive skills has statistical significant difference in both groups of students with/ without trained teachers. Under such circumstance, it is expected that the cognitive skills of students to be increased at least in one of these dimensions under the influence of on the job training courses of teachers. Accordingly, it may be expressed that teachers, who have passed on the job training courses act more successful than the untrained teachers in terms of training and improving cognitive skills of their students.

To interpret these findings, it can be implied that as the range of cognitive skills, which are appropriately employed by students, is wide their achievement will be further in problem-solving, reading, comprehension, and memorizing the data (19). The conducted studies about cognitive and metacognitive strategies have shown that taking these measures may lead to improvement of learning in learners (20).

According to Connell procedural model about educational achievement, at first place the textural variables (e.g. relation with cohorts), classroom target structures (e.g. participatory

and competitive classroom structures), and teaching structure of teacher over his/ her system affect on students and then systems determine how much student should be involved in their assignments and textbook subjects. In fact, the rate of their educational involvement is led to various educational consequences (37, 38). Therefore, training of teachers about employing cognitive and metacognitive skills in classroom includes some important individual variables, which can remarkably effect on developing cognitive skills and educational achievement of students.

CONCLUSION

Education and training organization is considered as an open-ended system interacts with the environment and it needs to become responsive to the environmental changes for survival and it necessitates for human resources to update their available educational methods and tools according to human modern developments and progress in scientific and technological fields. Whereas teachers are assumed as the paramount factor and growth and development axis in organization thus equipping and preparation of them to encounter changes is crucially important. Similarly, with respect to the results derived from this study based on which passing on the job training courses may be effective in developing cognitive skills in students so it seems necessary to pay attention to this effective variable and formulation of efficient training curricula for teachers in order to improve their specialized and teaching skills and as a result developing cognitive skills and educational achievement in students.

Research suggestions:

1- Holding on the job training courses for teachers;

2- Holding teaching workshop of cognitive and metacognitive skills for teachers and students;

3- Revision of passive teaching methods and encouraging teachers for application of creative teaching techniques

Research constraints

The present research has been conducted on students of primary and secondary schools at Lar city and the results of this study should be carefully generalized to other students' community from other cities or towns, especially the cities or town with very different cultural, ethnic, and educational features. Likewise, with respect to constraint of the above-said community, it requires being cautious in generalization of results of this investigation.

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