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## Studying the Effect of Guided Discovery Learning on Reinforcing the Creative Thinking of Sixth Grade Girl Students in Qom during 2012-2013 Academic Year

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## ABSTRACT

The excellent and educational role of creativity urges world pedagogical systems into planning for reinforcement of creative thinking in learners. Thus, the effective teaching methods are critically important. The main aim of this research is studying the influence of the guided discovery learning as one of the active methods of teaching students having creative thinking. Based on a pseudo-experimental research of pre and post-test kind in control group, primary stages and collecting data were followed by choosing two groups consisting of 50 students of sixth grade, 25 of which compose the experimental group and 25 students are in control group. The process of choosing was done by the method of convenience sampling. First, two groups were put to the test of "Abedi Creativity Test" (ACT). Experimental practice was then carried out after acquainting with the method of teaching with the help of resources and the proficient professors. In this regard, the subjects of experimental sciences, thinking and researching, technology and art were taught by the method of guided discovery learning in about 4 months. At the same time, the traditional method of teaching was implemented in control group. Finally, a post-test was hold for two groups. The data were analyzed by independent sample T-test and paired sample T-test. The results show that the guided discovery learning is an efficient way of reinforcing the creative thinking of students. The influence is also significant in growing the creativity, fluidity, flexibility and the development of experimental group.

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### INTRODUCTION

Human is a social creature that is influenced by his fellowmen and has influence on them to grow and to reach perfection. This mutual influence is achieved through family, small groups and social systems. In such respect, the role of educational and pedagogical system, as one of the most important columns of social systems is an excellent and distinct role and has an extreme influence over human's growth and perfection. It opens up the window of wisdom and perfection to children, teenagers and youths.

In formal educational and pedagogical system, although all countries agree on most sciences, scientific principles and teaching methods, education instructions are oriented by the general purposes and the insight of governors and planners. An educational system may be planned in a way to yield a perfect or a one-dimensional and prejudiced human to the society.

Today over and above the type of insight into the educational and pedagogical system, what is more important is enabling the learners to attain the new sciences, technologies and guidelines of facing new problems and challenges and to achieve an exhaustive growth and development. One of the main factors to facilitate a jump into scientific, technical, cultural and social development is taking advantage of creative thinking and innovativeness having a good place in the level of education and pedagogy.

In his researches, Jerome Bruner (1961), best known and influential psychologist of the twentieth century, introduced and emphasized the discovery learning as a factor of creativity growth and creative thinking of learners. Bruner thinks that education and pedagogy is not apt to be controlled and monitored. He prefers solutions bringing forth human creativity and freedom. His viewpoint is that discovery learning is the only way of providing these values. According to this, in the environment some interesting and stimulating opportunities should be provided for learners to choose activities which are particularly valuable for them. Experiences, errors and ups and downs of learners are of utmost importance and are highly effective in recognition process. To this reason, in discovery method making mistake is permitted and it is not isolated from learning process (Billier,

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1974; Kadivar, 2007, 153). Eggen & Kauchak (2001) believe that guided discovery learning is more effective than unstructured discovery method. According to them, this method would result in learning development and reaching a high level thinking. Santroch (2004) thinks that discovery learning is useful for teaching sciences in the level of elementary and high school and for developing creativity. Among available methods of learning, Hsu-chan Kua (2006) emphasizes techniques and schemes of developing creativity to engage and urge students into thinking to taste the joy of learning and improve their mental capabilities of creativity and problems solving. In a research, Bryant (2011) considers the impact of teaching creative methods on intermediate students working with a computer animation program. In this method, to make an animation video, experimental group used creative strategies of problem solving, various ways of problem solving and choice of the optimum solution. This strategy included open educational methods, brain storming, using metaphors and criticism. However, this strategy was prevalent for evidence group and the result indicated that when the creative strategies were combined, the students were involved in the process and the animation video had higher quality. Dau-Gaspar (2011) has carried out a research in Romania under the title of "Teachers' Creative Approach is an Influential Factor for the Students' Creativity". The research results stress on the importance of teachers' creative approaches in formation of students' creativity which is the same as the purpose of education which is shaping a creative personality.

This research is extremely important because in addition to the method of guided discovery learning, the rate of influence over the students' creative thinking and the role of creative thinking in social and pedagogical life are analyzed and explained. The effective methods recognized in this direction can be useful for educational and pedagogical planners, pedagogical authorities, teachers and all researches and students of educational sciences. Thus, the research is aimed at studying the impact of guided discovery learning as an active method of teaching on students' creative thinking. In fact, the researcher studies this fact that if the method of guided discovery learning has influence on strengthening the learners' creative thinking. Or does this method have influence on creativity, fluidity, flexibility and meaning extension?

## 2. Discovery Learning:

In the process of education and pedagogy, teaching methods are considered as working tools. The more we are familiar with different methods, the more tools are available. With these tools we can provide learners with desired contents and materials regarding the factors of time and place. In a type of classification, teaching methods are divided into two general classes: methods applied in a remote past and called "historical methods" (e.g. Socratic and Maktabkhaneh Methods) and methods relied on psychology and pedagogical sciences based methods and called "new methods" (e.g. explanative method, lecture, question and answer, labor unit, problem solving, discovery methods, small groups, et.) (Safavi, 2007, 192-244). Discovery approach is a method of teaching by which learners are encouraged to have interaction with environment, to explore, to manipulate objects, to deal with questions, and to do experiment to understand a subject (Ormrod, 1995, 443).

The discovery method urges students into exploration and it is placed against other methods. Bruner, who is the owner of this theory and the author of "Toward a Theory of Instruction", strongly criticizes the planned learning. He believes that arranged programs lead learners to be the decisive followers of the programs and prevent them from being creative. Instead of planned learning, Bruner encourages teachers to help learners encounter the problems individually or in form of group. Teachers rush into their help just in the moment of finding solutions (Kadivar, 2007, 148).

Bruner says: "the program should be so organized and arranged to incite the student to be active because answering the questions directly would depend students on teachers and books. Thus, they would not try and would not enjoy learning. This would weaken the learning motivation." By doing further studies and researches, he has considered pedagogical activities in four major areas. To explain this, Bruner stresses on four factors:

### 1. Emphasis on Process of Learning:

Bruner believes that it is important to acquire knowledge and wisdom not reciting the facts. His viewpoint is that acquiring wisdom is not a process but a product. Therefore, students should not be taught the principles but they have to discover these principles themselves and engage in an inductive process. In fact, in discovery learning, the way of learning is more important than what is learnt. In this process, it is not important what is learnt but it is important how it is learnt. Students' insight is more important than their level of knowledge, indeed.

### 2. Emphasis on Learning Structure:

To emphasize the learning structure, Bruner offers four points:

A. knowing the main structure makes the understudied subject more understandable. In other words, if the pedagogical contents are rationally organized, students will learn them better. This is similar to the classification of creatures (scientific taxonomy): creatures are classified into two groups of "solid existences and living

creatures”, living creatures into two groups of “plants and animals”, animals into two groups of vertebrate and invertebrates and so on.

B. learning structure helps teacher make a relationship between elementary and high education and fill the existing gaps.

C. although the details of learning structure may be forgotten, rationally organized subjects are kept in mind better, longer and more.

D. understanding the political beliefs of a learning structure and recognizing the components’ correlation with the whole facilitate the transferring process and lessen the pedagogical complexities of concepts.

### 3. *Emphasis on Intuition:*

In addition to the flow and structure of learning, Bruner emphasizes the important of intuition and the secrets of acquaintance. He believes that memorizing mathematical and verbal sciences is not a worthy goal. But the purpose should be set on raising the level of insight and intuitive perception. Education condition should be in a way that students understand the subject by a quick and deep glance.

### 4. *Emphasis on Intrinsic Motivation:*

Intrinsic motivation is a proper and successful activity bringing about satisfaction and behavioral reinforcement not material benefits. According to Bruner, intrinsic benefits are more effective than material ones. He offers four types of intrinsic motivation:

A. tendency to learn

B. inherent drive to cooperate with others

C. motivation for gaining capability and empowerment

Bruner’s idea is that by these four motivations, teachers can inspire students to effectively learn (Shabani, 1907, 30-32).

In the method of discovery learning, teachers do not directly teach the subjects. They encourage students to find and discover themselves. As an example, to teach the stage of problem-solving, teachers set students a problem to do. They then provide a situation in which students can find the relation between the components and the solution.

Discovery learning is a process during which students specify the desired problem, consider the possible solutions, try the solutions according to the available evidence, achieve some results based on experiments, apply the results in new situations and finally reach general rules (Safavi, 2007, 203).

Bruner believes that teachers are better no to deal directly with learners’ needs but to provide a condition to recognize needs and to choose them. In addition to trust the growth and capabilities of learners, teachers do not act as a source of information. Thus, predetermined contexts in pedagogy are rejected and the emphasis is not merely on transferring past culture and civilization to learners. In other words, by individually searching and following, anyone should creatively make his/her values. In fact, these values belong to the person when engage in acquiring them (Kadivar, 2007, 159).

It should be noted that Bruner mostly defends from guided discovery than completely dependent. Guided discovery means a process of discovery which has been guided by more knowledgeable people (Fetsko MacKlor, 2005, 141, Sey 2011, 113).

Guided discovery helps students be autonomous, self-directed and take the responsibility of self-learning. When students are able to have the ability of self-learning, they would be more self-excited instead of hearing about something – by discovery learning. They learn to do their activities with the power of self-admiration. To state more precisely, in this regard, the award is self-discovered (Maleki, 2011, 300, cited by Arture Karin, Robert B. Sand, 1993).

One of the superior and distinguishing qualities of human being is the power of creativity. Creativity in science, art, literature and other aspects of culture and civilization have always been respected by human. Due to this fact, one of the main aims of education and pedagogy is developing the creative geniuses like developing the ability to solve the problems (Seyf, 2011, 397).

### 3. *Creativity:*

There are many ways and methods to define creativity and there are a lot of definitions for it. There is no simple single definition to be generally accepted. In the whole, most of scientists and scholars of psychology and educational and pedagogical sciences define exquisitely the ability of acquiring something as “creativity”.

In fact, a creative person is one who has a curious and inventive mind. Santrock (2004) defines creativity as “the power of thinking about new and uncommon ways and reaching distinct solutions for problems” (p. 294). Gardner (1993) thinks that creative people are dexterous in solving problems, have artworks, and pose new questions and their thoughts are considered fresh and uncommon but are finally accepted in their own cultures (ibid. 397).

Lotanz (1992), a master of institutional behavior, has defined creativity as making a combination of individuals' thoughts and approaches of a new method. Barzman regards creativity as a recognition process of producing an idea, conception, product or a novel discovery (Shahrara, Madani Pour 2006, 39). Like justice, democracy and freedom, creativity has various meanings as well but a common factor in all creativities is that it is to deal with new factors in which the factor of creativity exists and acts as a cultural heritage. However, what is new is a combination of these factors in a new pattern (Jack Haluran, Doglas Nebton, 1992). Creative attempts are regarded as tools of innovation. Creativity is a mental activity and innovation has practical aspects and is the end product of creativity (Farnudian, 1991, 6).

In recent years, creativity has been one of the main issues in all educational and scientific organizations and centers and its important role has constantly been stressed. Deep and extensive upheavals of twenty first century are accompanied by delivering intellectual models, scientific methods and creation of new technologies. One achievement is stressing the way of thinking and styles of creative thinking resulting in emerging creativity in life.

Creative Thinking discusses those thinking issues that are about solving hard problems, or even tries to find a solution for unsolved previous problems. This thought usually will lead to innovation. Scientific, artistic, industrial, agricultural creativities and having new vision n political, economical and social issues are inherited from this point of view (Shabani, 2007, 64; Shoari Nezhad, 317-337, 1975).

Strengthening the creative thinking helps us make better decisions, find better solutions and pass life deadlocks. Creative thinking enables people to use their previous experiences and relate them to new situations. In such case, people would be able to make also a relation between unrelated subjects thought to be fresh and significant.

There are many ways to evaluate creative thinking by each of which we can assess, rate and score the creativity rate of subjects according to parameters and standards of divergent creativity and thoughts.

Guilford (1962, 1967, and 1987) was the first one raised the subject of divergent thinking in psychology of creativity. In Guilford's theory, creativity has been defined based on divergent thinking and divergent thinking has made of various factors which are explained as follows:

**Fluency-** Producing several thoughts in a specified time.

**Flexibility-** Producing various and uncommon thoughts and solutions for a problem

**Originality-** Using unique and new solutions

**Elaboration-** Producing details and determining implications and functions

**Synthesizing-** Putting inconsistent thoughts beside each other.

**Analyzing-** Breaking symbolic structures into constructive components.

**Organizing-** Reforming the designs, functions and usages.

**Complexity-** Encountering various and related thoughts Simultaneously (Guilford, 1987) (Seyf, 2011, 398-399).

Paul Torrance (1962, 1966, and 1998) is a psychology and pedagogy scholar who has done many researches, given worthwhile theories and designed several methods of assessing creativity.

Among Torrance's services to the area of creativity we can refer to developing several tests the most famous of which is Torrance Test of Creative Thinking (TTCT) (Torrance, 1966). This test assesses creative thinking with some verbal and visual questions. Torrance's test is based on features of divergent thinking specially fluency, flexibility, extension, innovation or novelty. In Torrance's test, subjects are given a stimulus and are asked to react. For example, the image of a box is shown and subjects are asked to explain various ways of using box (ibid. 402-403).

Scientists and scholars of creativity area, including Torrance and Guilford, agree on four components of fluency, flexibility, innovation or novelty as the components of divergent thinking and creativity. They believe that the elements increase under the influence of education (Jebeli Ade & Sobhani, 2012, 152).

Following Torrance, so many tests were developed and categorized for measuring creativity. However, among all available tests, Torrance's test has been in the highest rank of application. Among these tests, we can refer to Torrance's multiple choice paper and pencil test for measuring creativity (MPPT). In psychological literature, this questionnaire is known as Torrance's creativity test and is based on his definition for creativity. The genuine test is so detailed and long and it requires many hours to be implemented. A test carried out in Iran under the title of Torrance's creativity test is a standardized and condensed version of this test. It was developed and introduced by Dr. Abedi, a professor at Tehran University, in 1993 and it is called CT in our psychological literature. He was initially encouraged by psychology students of University of Tehran in 1983 to 1984 to develop a 75 multiple choice question test according to Torrance's theory and definition. It was implemented on 650 guidance school students of third grade in Tehran. Following some scientific activities at University of California and by the aid of students, he started revising and remodeling the test. In 1994, he finally developed, normalized, standardized and delivered a 60 question form (16250 students). The current test has been employed by professors at Deusto University, Spain (1992) (Kefayat, 1994, 114).

Among measuring tools, Torrance's creative thinking test measures four composing factors of creativity, namely fluency, creativity, flexibility, and extension, each including 16, 22, 11, and 11 questions respectively.

Questions 1 to 22 measure creativity, questions 23 to 38 measure fluency, questions 39 to 49 measure flexibility and questions 50 to 60 measure extension. Each question has three different answers of A, B and C (qualitative) with ability to be converted into numerical quantities of 0, 1 and 2. It is supposed that answer A shows the lowest and answer B shows the highest rate of creativity. The total score for each subtest shows the subject's score at that part and the total score in four subtests shows the total score of creativity. The score of measuring all four factors alone and the total score in the whole are analyzable and explainable. The range of the total score of each subject's creativity is 0 to 120. Thus, according to Torrance's test, scoring of creativity is explained as follow:

- Very high: 100 to 120
- High: 85 to 100
- Medium: 75 to 100
- Low: 50 to 75
- Very low: 50 and under

The test used in this study is recognized as Dr Abedi Form. This questionnaire is given to students, who are the main objectives of measuring creative power, and they are requested to choose the favorable answers (Daemi & Barforoush, 2002, p 3).

#### 4. Research Results:

The research results, as said before, are measured by a 60 question questionnaire designed by Torrance and developed by Dr. Abedi. Abedi has confirmed the validity of this questionnaire by factor analysis, its correlation by similar tests (Torrance) and its reliability by retesting and Cronbach's Alpha.

Following the agreement and receiving the introductory letter of the General Office of Education and Pedagogy of Qom Province, creativity questionnaire is given to the subjects chosen randomly from quadruplet areas and districts. The pre-test is then taken from two experimental and proof groups. To increase the accuracy of holding test and motivate students to answer the questions, tests are corrected and scored by the method of interpretation and standard hand scoring. According to the reliable resources of psychology and pedagogical sciences and taking advantage of professors, the guided discovery learning is taught for four months in experimental group and the proof group is managed by the traditional method and a teacher. When the specified deadline is completed, Abedi's creativity test is hold in both groups. In this stage, the answers are checked carefully to determine the effect of this method on reinforcing the creative thinking. In this research, a pseudo-test scheme is used (pre and post-test with control group).

Johnson and Christensen (2008) think that these schemes (pseudo-test research) are used when it is impossible to control all potential disturbing variables because in such cases participants can not be randomly placed in groups. To contrast the dissimilar comparing group, they say that "this scheme is composed of a group receiving the experiment and a dissimilar comparing group not receiving the experiment. However, pre and post-test is done for both groups." As no random choosing is carried out, these groups are similar (although a controlling technique exists for resembling groups, including replication and statistical controlling). As the process of choosing is randomly done, there is no guarantee for similarity of groups from very beginning of the research." (Johnson and Christensen, 2012, 190)

In this scheme, the researcher has acted as follow:

1. The researcher initially chooses a sample of girl students in sixth grade of elementary school in Qom Province by the method of convenience sampling (R) and divides them randomly in two groups of experimental (RE) and control (RC) groups.
2. The subjects of both groups give Torrance's creativity test (Abedi) (O1)
3. The guided discovery learning for different subjects (of experimental sciences, thinking and researching, working, technology and art) is done for experimental group (X).

XT shows the type of experimental scheme (guided discovery learning method) and XC refers to the usual controlling or scheme (traditional and usual teaching method).

4. Both groups are given the Torrance's creativity test (Abedi) (O2)
5. The effect of guided discovery learning method on creative thinking is analyzed.

**Table 1:** A two- group design of pre-test and post-test and control group.

Two- group design of pre-test and post-test	Random Selection	Pre-Test	Experiment	Post-Test
	RE	O1	XT	O2
	RC	O1	Xc	O2

**Table 2:** Variable frequency of age.

Age	Frequency	Frequency Percentage	Percentage of Variable Frequency
11	11	44.0	50.0
12	9	36.0	40.9
13	2	8.0	9.1

Reliable Total	22	88.0	100.0
No Answer	3	12.0	
Total	25	100.0	

To study and analyze of research hypotheses, we used paired samples test and independent samples T-test. These tests allow checking the significance of approval or rejection of hypotheses by considering the significance level ( $\alpha < 0.05$ ). SPSS Software has been used because this software shows the level of significance after computing the test statistic. Thus, in analyses' results, if the level of significance is lower than 0.05, the researcher's hypothesis would be confirmed. The results of statistical tests have been presented in the following parts.

In studying the research questions, two groups were initially compared with each other in a pre-test to see if there is any difference between them in case of research variables. To do this, independent samples T-test was used. In the next part hypotheses are tested by paired samples test.

**Table 3:** Independent samples T-test.

Variable	Group Kind	Number	Mean	Standard Deviation
Fluency	Experiment	25	17.76	3.609
	Proof	25	19.36	4.030
Flexibility	Experiment	25	17.80	3.873
	Proof	25	20.36	5.082
Creativity	Experiment	25	16.88	4.521
	Proof	25	18.80	4.472
Extension of Meaning	Experiment	25	20.56	4.407
	Proof	25	21.64	6.251
Creative Thinking and Creativity	Experiment	25	73.00	14.422
	Proof	25	80.44	17.414

**Table 4:** Independent samples T-test.

Variable	Hypotheses	Levene's Test for equality of variances		Independent samples T-test				
		F Statistic	significance	T Statistic	Degree of Freedom	Significance	Low Limit	High Limit
Fluency	Equality of Variances			-1.479	48	.146	-3.775	.575
	Inequality of Variances	.317	.576					
Flexibility	Equality of Variances			-1.479	47.427	.146	-3.776	.576
	Inequality of Variances	2.568	.116	-2.003	48	.051	-5.129	.009
Creativity	Equality of Variances			-2.003	44.848	.051	-5.134	.014
	Inequality of Variances	.119	.732	-1.510	48	.138	-4.477	.637
Extension of Meaning	Equality of Variances			-1.510	47.994	.138	-4.477	.637
	Inequality of Variances	5.240	.027	-.706	48	.484	-4.156	1.996
Creative Thinking and Creativity	Equality of Variances			-.706	43.133	.484	-4.165	2.005
	Inequality of Variances	1.979	.166	-1.645	48	.106	-16.532	1.652

To do the independent samples T-test, the hypothesis of equality of variances should be checked. This action is done by Levene's test. If the significance of Levene's test for variables of fluency, flexibility, creativity, creative thinking is higher than the level of 0.05, equality of variances is not rejected and the information of first line should be checked for conclusion about average. If the significance of Levene's test for meaning extension is lower than 0.05, the quality of variances is rejected the information of first line should be checked for conclusion about average. Since the numerical significance of T-test for all variables is higher than 0.05, there is no difference between the scores of experimental and proof group in case of research variables.

To study the hypnos, paired sample T-test was used. The results have been presented in the following table.

*Main Question: does the guided discovery learning have influence on student's creative thinking and creativity?*

As it is observed in the following table, the significance level for experimental student's creative thinking and creativity in pre and post-test is 0.000 and lower than 0.05. Thus, there is a significant difference between creative thinking and creativity in pre and post-test. And as the high and low limit is negative, we can see that creative thinking and creativity is higher in post-test than in pre-test. In proof group, there is no such difference. So, the guided discovery learning has influence over creativity and creative thinking.

*Sub-Question 3: does the guided discovery learning have influence on creativity?*

As it is observed in the following table, the significance level for creativity in pre and post-test is 0.001 and lower than 0.05. Thus, there is a significant difference between creativity in pre and post-test. And as the high and low limit is negative, we can see that the variable of creativity is higher in post-test than in pre-test. In proof group, there is no such difference. So, the guided discovery learning has influence over creativity.

**Table 9:** Paired sample T-test and the influence of guided discovery learning on creativity.

Group	Couple	Mean	Standard Deviation	Low Level	High Level	T statistic	Rate of Freedom	Significance
Experimental	creativity Pre and post-test	-2.280	2.979	-3.510	-1.050	-3.826	24	.001
Proof	creativity Pre and post-test	-.400	3.617	-1.893	1.093	-.553	24	.585

*Sub-Question 4: does the guided discovery learning have influence on extension of meaning?*

As it is observed in the following table, the significance level for extension of meaning in pre and post-test is 0.020 and lower than 0.05. Thus, there is a significant difference between creativity in pre and post-test. And as the high and low limit is negative, we can see that the variable of extension of meaning is higher in post-test than in pre-test. In proof group, there is no such difference. So, the guided discovery learning has influence over extension of meaning.

**Table 10:** Paired sample T-test and the influence of guided discovery learning on extension of meaning.

Group	Couple	Mean	Standard Deviation	Low Level	High Level	T statistic	Rate of Freedom	Significance
Experimental	extension of meaning Pre and post-test	-1.400	2.799	-2.555	-.245	-2.501	24	.020
Proof	extension of meaning Pre and post-test	-.040	4.198	-1.773	1.693	-.048	24	.962

**4. Conclusion:**

This research which was carried out to check the influence of guided discovery learning method on students' creative thinking was implemented with a pseudo-experimental method at the same time with a traditional teaching method in a proof group and in an experimental group. After comparing the both groups' scores of creative test, the total scores of creativity and its quadruple subset, including fluency of creativity, flexibility of creativity, creativity and extension of meaning were collected and after analyzing, it was determined that the method of guided discovery learning has influence on four components of fluency, flexibility, creativity, extension of meaning and the total score of students' creativity and creative thinking.

The findings of this research match the results of researches done by Jerome Bruner (1961), Goertzel and Goertzel (1962), Eggen and Kauchak (2001), Woolfolk (2004), Fetsko (2005), Odanel, Rio and Smith (2007), Briant (2010), Dao Gaspar (20011) and the results of international researches done by Frushani (2007), Gologavand (2007), Shavakhi et al. (2007), Arani and Kakia (2008), Sharifi and Davari (1389), Afshar Kohan (1990), Lahuni (2012), Jalili and Nick Farjam (2012) and Jebeli Adeh (2012). They match local researches done by Ahmadi and Abdolmalecki (2012) in all cases except the influence of discovery learning on flexibility. They refer to the influence of this method on significant creativity but think that the influence is significant just in regard of three components of fluency, creativity and extension of meaning.

Considering the above facts in theoretical principles and results of international and local researches, the method of guided discovery learning has positive influence on students' creative thinking and the related components (fluency, creativity, flexibility and the extension of meaning). Therefore, contrary to the traditional method, the guided discovery learning as one of the active teaching method helps students be responsible in self-learning and try to discover the important facts. On the whole, being active encourages students to reinforce their creativity skills and keep what they have learnt.

In any research, a set of unwanted factors controllably and uncontrollably create some limitations and have influence on the results. These factors interrupt researchers and have destructive effects. In any way, they should be controlled and decreased (Seyed Abas Zadeh, 2001). Among such restrictions we can refer to limitations of time and facility, impossibility of randomly choosing experimental and proof groups, complexity and difficulty of implementing the guided discovery learning, being time consuming, difficulty of implementing the method for all lessons and consequently generalizing the results for teaching all materials.

Since the guided discovering method has influence on reinforcement of creative thinking and variables of fluency, flexibility, creativity and extension of meaning, it is recommended that this method should be explained

in all teaching and university levels and the proper approaches should be considered in books and pedagogical planning. As pedagogical role of parents in developing creativity is highly respected in most of researches, parents should be provided with some courses to be familiarized with discovery method and other active methods and their effects on their children's creativity. As in teaching with the method of discovering learning, teachers can be so influential, it is recommended to engage teachers in related courses. Some totally enrichment courses are also recommended. Creativity of these teachers should be assessed before and after passing such courses. To turn this method more attractive, some creative plays as art activities and extra program can be added to the teaching procedures.

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