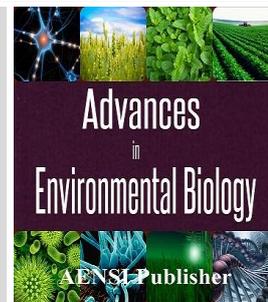




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## Investigation of the Rate of Grade Seven's Natural Sciences Book Adaption to Glifford's Creativity Elements on the Teacher's View of Kurdistan State

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### ABSTRACT

This investigation has been done to determine the rate of grade seven's natural sciences book adaption to Glifford's creativity elements on the teacher's view. Methodology is explanatory and survey one and applicable one on purpose view. Research statistical population is grade seven's natural sciences book and all teachers of empirical sciences teachers of Kurdistan state. The sample was selected by use of random categorical sampling. To gather the data we used a researcher-made questionnaire with 56 questions. This questionnaire validity was estimated by scholars' opinions of this area and also ringleaders of empirical sciences teachers and its reliability was calculated about 0.86 by retest method. To assess answers we used indexes of descriptive statistics and independent T- test. Research results showed that: the most adaption of divergent thinking elements in the whole book are respectively: 1- fluency; 2- originality; 3- flexibility. And adaption with the level of the mental functions are respectively: 1- convergent thinking; 2- cognitive memory; 3- divergent thinking; 4- evaluator thought. There was no difference between female and male teachers' view on adaption of applied elements of creativity in 7<sup>th</sup> grade's empirical sciences book.

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## INTRODUCTION

Despite its antiquity, creativity is counted as a new area in humanitarian sciences, as a collection of abilities and features that leads to fresh suggestion of concepts and meanings and become origin of innovations. Creativity is a type of thought and is regarded an ability that can be nurtured or as it is disregarded it can be depleted.

Indeed, creativity issue is related to the whole curriculum. A lot of things and instruments should surround a student to made him/her think creatively about things. He/ she should learn constructive criticism from his/ her or others' works to elevate his/ her creative thought measures. Since we can create these features under diverse conditions such as experience and teachers and parents' guidance, this kind of criticism doesn't have negative essence and it doesn't necessarily depend on a kind of completely sentimental cognition existence in children. For upbringing of scientific and creative thought, we should provide readiness for students so that they can probe the problems, observe them and identify and determine the problems by themselves and search suitable solutions for them [18].

#### Research necessity:

One of the basic reform manifest aspects is the change of education system that has been done in education ministry. In 2012, grade one and in 2013 grade two of guidance schools were eliminated and so the system of 6-3-3 that includes of elementary program of six years and binary periods of 3 years for high school will be positioned till the academic year of 2017- 2018.

Since guidance school students in Iran are in the range of 12- 15 years old, and on the base of growth psychologists' viewpoint, this stage is the abstraction thought stage or in the other words, is the stage when a student can act in a hypothesis- deductive manner as he/ she encounters the problems, as he/ she can construct hypothesis and present hypothetical solutions; And since at this stage his/ her thought is flexible as far as he/she

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can engage from a issue to another easily, and since he/she is able to predict the probabilities, he/she won't get confused because of abnormal results. Then observing these specifications, abilities and growth needs of students in text books and curriculum is very important.

Today school books can't merely give some information to the learners. Because memorizing the information and make mind full of them doesn't help citizens to encounter new daily life problems. Since today science grows very fast and the existent science is getting abolished, to be well versed in beneficial and necessary knowledge is not possible.

So students have to learn discovery and creative thought ways and be competent to face life matters. This magnificent responsibility is done mostly by school books [12].

Context analysis method, as the most upstanding known tool for investigation of text books contexes, has a lot of applications in curriculum. So curriculum programmers engage to this basic question: "To obtain learning purposes what issues should be regard?" Then we should answer this question: "How we should organize and present a context that has been selected for learning, so the students can learn and experience it?" In the other words, they engage the context and knowledge specifically at first, and then teaching and learning experiences [5].

*Research aims:*

*Total purposes:*

Investigation of the rate of grade seven's natural sciences book adaption to Glifford's creativity elements (fluency, originality and flexibility) on the view of natural sciences teachers in Kurdistan state.

*Partial purposes:*

1-Determination of rate of grade seven natural sciences book adaption to the mind functions' levels (cognitive memory, convergent thinking, divergent thinking and evaluator thought).

2- Comparison of female and male teachers' viewpoints on the distribution of Glifford's creativity concave elements (fluency, originality and flexibility) in grade seven natural sciences school book.

*Research questions:*

1-How much is the rate of grade seven natural sciences school book adaption to the elements of Glifford's creativity on natural sciences teachers' viewpoints of Kurdistan state?

2- How much is seven grade natural sciences school book is adapted to levels of mental functions (cognitive memory, convergent thinking, divergent thinking and evaluator thought).

3- Is there any differences between female and male teachers' viewpoints on elements of creativity concaveness (fluency, originality, and flexibility) applied in grade seven natural sciences textbook?

*Concept of creativity:*

If it is not impossible, totally, to present a comprehensive and accurate definition of creativity, included of all of its dimensions and actions is very difficult. Because individuals have diverse understandings about creativity and naturally they have presented different definitions, after years of study and researches about creativity, psychologists and education experts couldn't have presented a comprehensive definition that is agreeable to all experts. The roots of such disagreements are traced to brain's complex and compound nature and its functions. Steinberg (1989) regards creative thought a complex of innovation power, flexibility and sensibility against the concepts that enables the learner beyond irrational thought, to think about generative and difference results that leads to personal satisfaction and maybe others' pleasure. Glifford (1962) considers the creativity a set of individual specifications and abilities. In fact in Glifford opinion, creativity is divergent thinking [9].

In Glifford's theory, both divergent thinking and convergent thinking play basic role in mental construction. But their different aspect is that in convergent thinking the result is definite before, namely there is always a answer (true or false). But in divergent thinking there is no determinant answer and there are numerous numbers of answers that may logically are true. Glifford has identified divergent thinking with three features of flexibility, originality and fluency in his theory [2].

*Creativity and sciences education:*

Creativity discussion of sciences education is indeed attributed to the whole of curriculum. A lot of things and instruments should surround a student to make him/her think creatively about things. He/ she should learn constructive criticism from his/ her or others' works to elevate his/ her creative thought measures. Since we can create these features under diverse conditions such as experience and teachers and parents' guidance, this kind of criticism doesn't have negative essence and it doesn't necessarily depend on a kind of completely sentimental cognition existence in children. For upbringing of scientific and creative thought, we should provide readiness

for students so that they can probe the problems, observe them and identify and determine the problems by themselves and search suitable solutions for them.

Aleh agha (2012) in a research with title "Analysis of grade two of guidance school natural textbook on the base of Glifford's creativity levels" achieved these results: In the all issues (sentences, questions, home works, illustrations and experiments) mainly the level of convergent thinking has been regarded and after that the level of cognitive memory, and in the third stage the concave has a little been considered and finally, evaluator thought has attracted trifling regard and consequently the rate of regard toward divergent thinking (creativity) in grad two textbook of natural sciences was very limited.

Hosseinzadeh [10] in an investigation with title "Analysis of natural sciences of guidance school on the base of Glifford's creativity indexes" got the following result: In grad three of guidance school, 17.10% of sentences were related to Glifford's creativity, considering that below 30% is not favorable amount, therefore the rate of considering of Glifford's creativity elements is not satisfying.

In Salimi's dissertation (2013) with title "Analysis of grade two of guidance school natural sciences book on the base of Glifford's creativity elements" the following findings has been observed: The most notation was attracted by cognitive memory with 68.53%, convergent thinking with 28.01%, and the least consideration was gotten by divergent thinking with 18.2% and the evaluator thought with 2.18%. So this school book can insufficiently provide the conditions for emergence of creativity.

Considering the preceding researches we can conclude that in grade two of guidance school natural sciences, considering levels of Glifford's creativity, the levels of cognitive memory and convergent thinking have been noted, but other levels such as divergent thinking and evaluator thought have attracted a little regard.

Laur (2008) determined the level of practical works difficulty of elementary and highschools' text books so low that it can mar the upbringing and growth of students' mental skills. In continuation, he recommended that the practical works of school books should be designed in the way that the high levels of thought, namely upbringing of analysis, combination and assessment can get adequate considerations.

Regarding the preceding researches, we can conclude that in natural sciences school books, evaluator and divergent thinking have attracted a little notation and cognitive memory and divergent thinking have been more considered.

#### *Methodology:*

The used methodology in the current study, is a descriptive one of the kind of context analysis, and regarding the purpose it is an applicable one.

Descriptive research, describes whatever that exists and includes of registration, description, analysis and change of existent conditions. In the current research, we used context analysis method on the base of mental functions levels and Glifford's creativity elements for investigation of seven grade natural sciences school book (text, practical works, tables and illustrations).

#### *Statistical population and sample of the research:*

##### *Statistical population:*

1- Natural sciences school book of grade seven of the first program of high school with code 104, that is consist of 5 parts, 15 chapters and 152 pages.

2- Natural sciences teachers of the first program of high school working in education system in the cities and zones of Kurdistan state. (290 eople)

##### *Statistical sample:*

1- In this research, number of sample and number of population are equal. In the other words, the whole context of grade seven natural sciences text book has been investigated.

2- For sampling from teachers' population, we used random classified sampling method and for estimating of sample number we used Morgan table (172 people)

#### *Research tools:*

Our research tools consist of researcher- made 56 question questionnaire and to codify it, we used the model of knowledge type, levels of mental factors and Glifford' creativity features. To check the research tools' validity, we used view points of education experts' and the masters of educational and psychology sciences of Tabriz Azad university, consist of 2 masters of curriculum curse and 2 masters of psychology and two ringleaders of natural sciences. And to estimate its reliability we used retest method and it was about 0.86%.

#### *Context analysis method:*

Analysis of grade seven natural sciences textbook has been done in three steps:

1- At first, we divided book context into four parts of text, practice, illustrations and tables.

2- Then, we prepared segregation table of knowledge type, levels of mental functions, and Glifford's creativity elements for each part of textbook (text, practice, illustrations and tables).

3- We adjusted each part of book (text, practice, illustration and table) to separation of levels of mental functions, type of knowledge and Glifford's creativity elements by natural sciences teachers.

This model indexes are:

Cognitive memory ingredient: It prefigures whatever that has already happened, and in the book they are explained and it is merely counted cognizance.

Convergent ingredient: In this area, the numerous truths have been arranged in the special composition that returns to a possible result.

Evaluator ingredient: The ingredient that assesses something in the text and gives a view about it.

Divergent ingredient: It prepare necessary context for free thinking in the learners and orders them to act and give multiple answers.

Glifford has presented three main criteria to identify divergent thought that are:

Fluency: The number of presented ideas and solutions that are expected from student in the determinant time.

Originality: The number of unexpected and atypical related to the issue, the book wants the student to present.

Flexibility: It implies the student's ability to create diverse ideas if the situation changes. In this manner, if problem changes or it emerges in other form, the creative student has ability to change his mind direction.

#### Data analysis method:

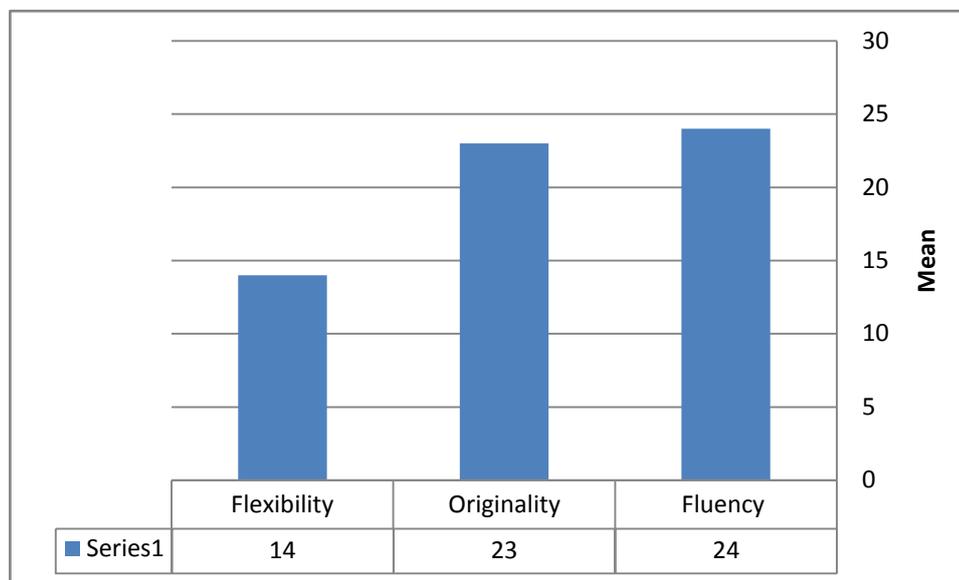
In this research, we used descriptive statistics (concentration measures, deviation measures and frequency tables with the related plots), considering the type of variables. And to codify research question, we used deductive methods (T- test) by SPSS22.

#### Research question analysis:

1-How much is grade seven natural sciences textbook adapted to Glifford's creativity elements (fluency, originality and flexibility) on the view of natural sciences teachers of Kurdistan state?

**Table 1:** Statistical indexes of divergent creativity elements of grade seven natural sciences on the view of Kurdistan state teachers

Variable	Mode	Median	Mean	S.d	Skewness	Max	Min
Fluency	23	23	24.1	8.92	1.1	52	
Originality	26	23	22.81	5.55	0.36	47	12
Flexibility	7	12	13.53	7.51	1.89	56	3



**Plot. 1:** Frequency of divergent creativity elements of grade seven natural schoolbook on the base of Kurdistan state teachers' viewpoint

The mean of answering opinions on the base of fluency variable is 24.2, in the range of 0-56 and percent of frequency is 39.88, and the mean of originality variable is 22.8, with the frequency percent of 37.74, and the mean of flexibility variable is 13.53, frequency percent of 22.38.

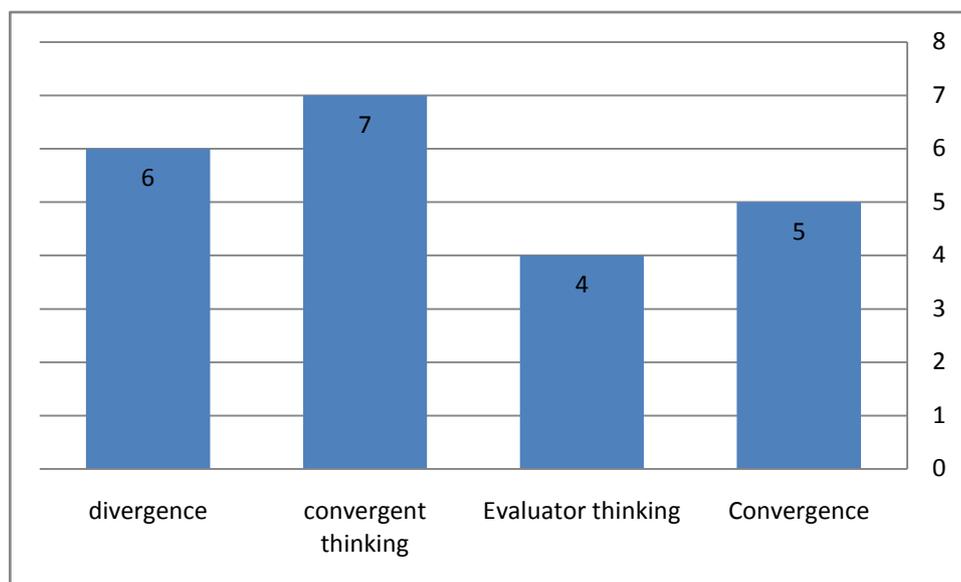
On the base of Kurdistan state teachers' viewpoint the most adjustment of divergent creativity elements in the whole book are respectively as: 1- fluency, 2- originality, 3- flexibility.

Gaffari(2011) in a research with title "Analysis of Elementary School Natural Sciences in the Fourth and Fifth Grades , Regarding Mental Functions and Glifford's Creativity Elements" got these results: Adaption to Glifford's creativity elements, respectively fluency, originality and flexibility, has been noted and emphasized by authors and programmers, and about the rank of these variables, current research is in agreement with fluency variable and flexibility and originality are not incompatible to this research.

2-How much is grade seven natural sciences schoolbook adapted to mental functions (cognitive memory, convergent thought, divergent thinking and evaluator thinking)?

**Table 2:** Statistical indexes of mental functions in natural sciences text book of grade seven on teachers' viewpoint of Kurdistan state

Variable	Mode	Median	Mean	S.d	Skewness	Max	Min
Cognitive memory	5.09	5.09	5.99	2.52	1.47	13.94	2.41
Convergent thinking	8.85	7.77	7.5	1.87	0.31	14.75	2.41
Evaluator thinking	3.22	3.49	3.89	2.02	1.91	14.75	1.07
Divergence	5	5	5.4	1.01	2.73	10.81	4.56



**Plot. 2:** Frequencies of mental functions in natural sciences text book of grade seven on teachers' viewpoint of Kurdistan state

The mean of the whole schoolbook adaption to cognitive memory is 5.99 in the range of 0-15, and frequency percentage 26.31%. The total mean of convergent thinking is 7.5 with frequency percentage of 32.91%. The mean of evaluator thinking is 3.89 with frequency percentage of 17.08. And the mean of divergent variable is 5.4 with frequency percentage of 23.71%.

Research result: Adaption of mental functions in the book are respectively: 1- convergent thinking, 2- cognitive memory, 3- divergent thinking and 4- evaluator thinking.

Imamjome'h [11] and Ujani have mentioned in their studies that all of natural sciences schoolbooks have considered the first function of mental, namely cognitive memory, more than other levels of category that is not in agreement of the current study, Since on the base of this study, the convergent thinking has been regarded more.

Arabi, Dadsetan [4], Sedaghat [19], Golzari [8], Manthegei [13], Vaseghi, Rahmati, Schawgwsney, Laur And Lauma have mentioned in their researches about schoolbooks that divergent creativity had been considered nugatory and this is not in agreement with the current research, because in this research almost 24% of categories proportion (text, practical works, figures and table) is belonging to divergent thinking.

3- Is there any significant differences between female and male teaches' viewpoints on divergence of creativity elements (fluency, originality and flexibility) applied in natural sciences textbook of grade seven?

**Table 3:** Results of mean comparing test for creativity divergence on the base of female and male teachers' viewpoint in Kurdistan state

Variable	D.f	S.d	t - statistic	Sig.	Confidence level of 95%	
					Lower level	upper level
Fluency	170	1.36	1.35	0.18	-0.85	4.52
Originality	170	0.85	-0.62	0.53	-2.21	1.15

Flexibility	170	1.51	0.01	0.99	-2.26	2.29
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I. We used independent T-test for comparison of fluency variable in the natural schoolbook of grade seven, between female and male teachers. Considering table 3, since significance level is more than 0.05 (sig=0.18), then there are not adequate observes to reject null hypothesis and the alternative hypothesis is rejected. Then, there is statistically no significant difference between female and male teachers' viewpoints on adoption of fluency variable to natural sciences schoolbook of grade seven.

II. Since significance level is more than 0.05 (sig=0.53), there are not enough observes to reject null hypothesis and the alternative hypothesis is rejected. Then, there is statistically no significant difference between female and male teachers' viewpoints on adoption of originality variable to natural sciences schoolbook of grade seven.

III.. Since significance level is more than 0.05 (sig=0.99), there are not enough observes to reject null hypothesis and the alternative hypothesis is rejected. Then, there is statistically no significant difference between female and male teachers' viewpoints on adoption of flexibility variable to natural sciences schoolbook of grade seven.

Sbourn [17] believes that maybe women are weaker in physical power than men, but in the imaginary power they are not. In fact, several studies show that women have more talent in creating novel ideas. The scientific researches haven't reached definite results in matter of the relational creativity of women and men [2] that is in agreement of the current research.

Sharifi [21] in a research with the title "Investigation of Relation between Learning Styles and Creativity with Educational Improvement of Female and Male Students of High School Grade Three of Boukan City" reached the following result: There is significant difference between gender and creativity, and it is not in agreement with the current research.

Razaviyeh [15], in a research with title "Effect of Extrinsic Motive on Children's Creativity" reached this result: A significant difference was seen between boys and girls on the base of four elements of creativity (fluency, originality, flexibility and extension) in two elements of originality and

extension to advantage of boys. In interaction between sex and motivating situations, the findings showed that there is significant difference in the dimension of fluency, that are not in the agreement of current research results.

#### *Discussion and conclusion:*

1-It seems that the authors could lodge all three elements of Glifford creativity into this schoolbook and this matter has been done regarding ministry of education protocol goals and perspective. In this protocol, creativity and innovation has taken special attention. We mention 3 cases of them:

I. Development of governmental and non- governmental parts in the affairs of production, publication and distribution of educational resources and materials under supervision of ministry of education policies, with stress on policy of educational packages production and regarding multi-author policy in schoolbooks (strategies 3-9)

II. Development and deepening of the culture of research and assessment, creativity and innovation, making theories and documentation of local, educational and scientific experiences in formal public education system (Macro goals, 2,2,1,8).

III. Deployment of creativity and innovation in educational system in order to complete education and moral and spiritual growth and finance and spiritual supporting of creative, innovator school masters, teachers and students.

2- Taking attention to new roles of learner in learning process, increasing changes of sciences and technology, adjustment to daily life needs and the obvious and precious role of creativity and innovation, has made authors to take more attention to creative context for books (rather than the previous publications).

One of the causes of cognitive memory variable decrease is that each chapter of natural sciences schoolbook has been formed on the base of some background of learning of students' real daily life and it provides an opportunity for students to combination sciences with daily life and it doesn't allow students convert this opportunity into memory- centralquestions and answers.

3- Key point in publication of seven grade natural sciences schoolbook is that lesson text, questions, figures and practical works has been written simply and without any ambiguity that doesn't confuse student and teacher and it explains clearly whatever it expects students to do. Also elevating of teachers educational certificates, holding of training periods for teachers in all cities of Kurdistan state, joint meetings and good cooperation of ringleaders of natural sciences active websites and weblogs of natural sciences with membership of many of teachers in them, have caused there is no significant difference between viewpoints of female and male teachers.

Totally, we can conclude that the elements of divergent creativity and high levels of mental functions, have been taken special attention that is of the goals of authors of grade seven natural sciences schoolbooks and

programmers of educational system. And the method of book has converted from presentation of memorizing issues to convergent thinking and divergent thinking.

*Recommendations:*

1- Current research has applications and usages for schoolbooks authors and programmers of curriculum, such as they should take more attention to rate of divergent creativity in text, figures and tables and obviate the shortcomings in the other publications.

2- Education of teachers for appraising of students' creativity.

3- The results of this research showed that the most major advantages of current grade seven natural sciences schoolbook rather than the former books, is the decrease of cognitive memory frequency in text of the book. So we recommend that this trend should be continued in writing of grades eight and nine.

4- Since new schoolbook considering creativity issue has changed a lot rather than the former books, holding the training periods and stress on the role and necessity of creativity of schoolbook in these periods is necessary for teachers.

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