The Impact of the 6E Model on the female student's Achievement in Science

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Abstract

The aim of this study was to investigate the influence of teaching methods E6 in comparison with the traditional method on student's academic achievement. Participants of the study 60 secondary school students whom were randomly assigned to the control (Traditional method, n=30) and experimental(E6, n=30) groups. The experimental group received E6 method during the 90-minute session of to 10. The control group as well as with the usual method of traditional method were trained in the schools that they did not receive a specific program. In this study, we used partially empirical pre-test and post-test with control group and in this way we performed pre-test and post-test on two groups. Reliability of researcher made science test with Kuder and Richardson 21 coefficients was estimated 0.9 and reliability were acceptable. The findings indicated that the teaching of science to traditional teaching methods in comparison with E6 on the increase science performance was effective.

Introduction

At the beginning of the 21st century, every one’s attention over the past, formal education system has been geared up to help change the social system in this collection and increasing the efficiency and adequacy of human communities, they are able to with issues and challenges that have faced ahead. [13].

In today's world, education has a different concept with the past. The transformation of science and technology, the necessity of transformation in the process of educational activities is undeniable.

Never be the last viewed mode and hand the old decision to students and their education or echelon who constitute. The thoughtful and creative humans bred its own method requires. Templates and framework of the past never can provide such a platform and position them. Unfortunately, most of the educational system because of the rapid expansion and development of schools, specialized training and recruitment of non-spontaneous process and not adverse ruling the teaching process is based on the ruling, especially those of the successor is the wrong habits of thought, engagement and participation of students in the classroom have been, and freedom of thought, the new review have taken from them, and instead of using new teaching methods on the implementation of the traditional methods, they insist [14].

In the traditional teaching methods are mostly superficial learning and emphasize parrot and the student are disabled during training. The students' mind in this method, little by little accumulated by material that does not fit with their needs and thinking. This would cause them to gradually learn to feel boredom, and such learning is not only an effective role in their construction does not play, but the scientific record and present scientific activity provides [8]. An effective teacher must have a treasure of different teaching methods and patterns to be up when needed and depending on the type of course and teaching conditions of one or some of them to work [11].

Teachers are enjoying a variety of active teaching pattern causes the acquisition of skills for life in the future, the students are citizens of the global village created the situation. Learner in active teaching is amenable to her freedom of action, and its basic role is to facilitate sustainable and learning to be effective. The related topics can be considered active, so that all the elements to active learning together are part of the interaction effect [6].

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So, to increasing the depth of the attractive learning, science education revised more frequency, but not yet taken in the face of the needs of all students are challenged. Science education must meet the needs of individual students to effectively meet the requirements. One of the most popular and highly effective learning courses can be applied to education, 6 E learning cycle model. This model uses the theory of the mental growth of Piaget as a basic model [2]. The learning cycle model helps students to become interested in the subject and they will be able to understand it on its own and give comment about it [7].

In this method, the student plays an essential role. The learners actively search through a variety of activities to explore solutions, concepts, principles and rules that is one of the most important goals in this method. Having the spirit explorer to create questions, design, performance, and innovation to obtain the answer, one of the characteristics of this method would be [15].

The proposed E6 Instructional Model which of the six steps to the name's "Engaging", "Exploration", "Explanation", "Express", "Elaboration", "Evaluation's". Teachers know the progress of the students in the learning cycle. Teachers can use this restraint in line with progress by monitoring the amount of students based on their understanding and perception is created [4]. The teacher establish on the basis of the amount of the progress of the students in the learning cycle, students in the three-tier or stage of the complex. In addition, the phase of the complex distinction, student to three-tier based on their unique learning needs of the division. That includes the level of beginner (row1), the level learn learning goal (row2), advance learning level (row3) [6].

Step express is a tool for students to access the distinguished opportunities as well as a tool for teachers to achieve the progress among the way students. This helps the students learning process distinct opportunities in their course content in the educational cycle skills fun. This does not mean that the minds of the students could not be challenged because every activity will enhance student thinking and will want to help her in training [6]. The stage also expresses a chance for all students to fully provide their ideas about teaching and learning that at this stage of the learning cycle happens, the expression. The teacher confirms whether students get content and bring the expected results. In addition, this step provides an opportunity that are misconceptions during the discovery and explanation of the steps involved, that is created? In that case, this step expression will allow the teachers to deter mine their impacts teaching and their analysis. Based on each student's response at this point, each teacher can have students in to three levels of beginner, inter mediate and the advance division. This will ensure that all students are successful and faced with the results of the course, be for the final evaluation is given to them or formal. Studies indicate that the stage of expressing is on effective and powerful way to evaluate. These probes uncover students’ ideas and provide the teacher with specific feedback to inform further instruction. The probes are especially helpful because they incorporate content from the Standards and findings from student misconceptions research-own thinking and misconceptions [9]. Answers to the assessment probes will vary according to student readiness, learning profile, and interests. The teacher then uses these responses to design three-tiered, differentiated instruction that is optimized for each student. Though these tiered activities focus on the same content and skills, they have different challenges, and provide levels of complexity.

Usually the majority of students (Tier II) proceeds through the learning cycle and are ready for elaborate phase until they have deeper understanding. But probably a group of gifted students (Tier III) need to needs a more challenging elaborate phase to keep them deeply engaged in the lesson. Depending on the results of the express phase, students with disabilities that have Individualized Education Plans (also Tier I) may need another explore phase with similar or modified activities and content, perhaps followed by another explain stage [4].

Tomlinson (1995) investigated placing students in groups which relates directly to tiered activities. For example, he described how his class teacher how a classroom teacher separate her class into two different groups to learn the concept of extinction and one group focused on more concrete activities while the other group focused on more abstract activities. She said on how this is effective at meeting individual learning needs by writing, “the teacher proactively matches the “equalized buttons” of the tasks and materials to each group’s learning needs” [15]. So, the proposed solution suggested by the literature is that of grouping students according to their needs.

More precisely, Armstrong and Haskins (2010) discussed the importance of various factors that must be taken into consideration when grouping students according to their individual learning needs as the following: “the same learning goal is applied, the format of the activity remains the same, tasks are engaging, challenging, and respectful, and complex thinking activities take place in each group (p. 71). So, to eliminate the argument of students not being challenged when grouped by learning levels, when students are tiered into various groups such as the ones in the 6E Instructional Model of instruction, the students are being challenged but within reach of their cognitive abilities.

Therefore, assessment for students on their knowledge of the case is to be more than a simple test sheet with the right and wrong answers. In fact, should have been beyond help student to know what true expression through questions and answers on expansion and to help explain your thinking. As well as teacher attain information on where the student can keep different levels of abilities to properly distinguish the instruction. In addition to, using technology in science teaching improves it [6].
Chess in and Moore (2004) stated the technology experiences helped students develop their skills of exploring observation, classification, communication, and technical abilities. Doran and colleagues (2011) investigated the impact of model E6 and in this study students is divided in to categories “beginner inter mediate and advanced”, which provide the distinct opportunities to students in their educational process and recover skills curriculum content.

Fletcher [6] in the research of the impact of training is very effective for a reform model to address the needs of all students in a class in the course of payment. The results of this study showed that the group of students with the same abilities, to help improve student's science knowledge is important. On the statistical results in academic success model E6 student were approved.

There for, this study is the effectiveness of traditional methods of education on academic achievement and E6 students examined it. Percentage of respond to this question of whether teaching the traditional method in comparison with the E6 academic achievement of students in the course of increase

The aim of this study is to investigate the effect of traditional instruction methods and techniques embedded within 6E model on grade 8th students’ academic achievement in science.

Methods:

The researchers used a pretest-posttest quasi-experimental research design with a control group. The population included all secondary school girls in Ajabshir County (East Azerbaijan Province in Iran) who enrolled in the academic year 2014.

The sample included sixty female students who selected by multistage random cluster sampling, in turn, the first of two county schools of Ajabshir city was selected and then a class randomly was chosen from each school. According to the research plan, a = 0.005 and equal effect size 0.5, we consider that on the basis of table Cohen, 30 participants for each control and experimental groups, it is possible to be achieved the power test 0.97. Over the course of 10 sessions of groups were instructed about 90 minutes.

Instrument:

In this research to assess academic achievement of high school students, the author made test was used and for determination of the test items, at first the Bloom measuring specification table was employed and the goals and content of the science book were determined. Then by using test specifications table, several questions were designed for primary test. In order to measure science performance, different questions involving 20 pre-test and 20 post-test questions were used due to time limitation. The pre-test and post-test questions were different from form of the questions and they were the same from content validity and level of difficulty. For measuring content and nominal validity, the expert’s viewpoints and experienced teachers were employed. In order to measure reliability of the questions designed as test in the primary study; the test was conducted among 40 students independent of the sample. The Kuder Richardson Coefficient of reliability (K-R 20) is used to test the reliability of mathematics performance exam; the reliability coefficient was obtained 0.91.

Results:

In analyzing hypotheses, at first, covariance assumptions like normal data distribution and regression line homogeneity were investigated and the results showed that the data were distributed normally (Table 1) and regression line slope is homogenous. Thus, in the analysis of covariance, scores obtained in the preoperative exam scores adjusted and testable in the control and test can be compared. Any changes that are related to the action of the two groups will be testable.

Table 1: Results of Kolmogorov–Smirnoff

<table>
<thead>
<tr>
<th>Scores</th>
<th>groups</th>
<th>Number</th>
<th>Statistics z-kolmogorof, Esmirof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>E6method</td>
<td>30</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>traditional method</td>
<td>30</td>
<td>0.07</td>
</tr>
<tr>
<td>Past-test</td>
<td>E6 method</td>
<td>30</td>
<td>1.03</td>
</tr>
<tr>
<td></td>
<td>Traditional method</td>
<td>30</td>
<td>0.80</td>
</tr>
</tbody>
</table>

The first question asks about the existence of statistically significant differences (α < 0.05) between the students’ academic performance mean scores in science attributed to the 6E instructional model.

Covariance analysis was used to determine which teaching method contributes the most to which experimental group. Before conducting an ANCOVA – independence, homogeneity of variance and the assumption of normality and the homogeneity-of-regression (Slope) assumption should first be examined. The test evaluates the interaction between the covariate and the factor (Independent variable) in the prediction of the dependent variable. Tables 2 showed non-significant interaction between the covariate and the factor, suggests that the differences on the dependent variable among groups not vary as a function of the covariate (p>0.05). As
result, the equality of regression confirmed. Recall that the covariate must be linearly related to the dependent variable.

**Table 2:** Covariance analysis of pre-test and group

<table>
<thead>
<tr>
<th>Source of change</th>
<th>a total of squares</th>
<th>df</th>
<th>Average of squares</th>
<th>F</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect group of pre-test</td>
<td>7.82</td>
<td>1</td>
<td>7.82</td>
<td>3.15</td>
<td>0.08</td>
</tr>
<tr>
<td>Error</td>
<td>138.94</td>
<td>56</td>
<td>2.48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows that the effect of pretest was significant \((F = 56.31, p = 0.001, R^2 = 0.497)\).

In addition to, adjusted average scores show that average scores in science lessons in E6 model \((15.40)\) to significantly more than the traditional method.

**Table 2:** Results of covariance analysis for scores.

<table>
<thead>
<tr>
<th>Scores of change</th>
<th>a total of squares</th>
<th>df</th>
<th>F</th>
<th>MS</th>
<th>Significant level</th>
<th>Eta square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>144.99</td>
<td>1</td>
<td>56.30</td>
<td>.001</td>
<td>0.497</td>
<td></td>
</tr>
<tr>
<td>Group effect</td>
<td>221.71</td>
<td>1</td>
<td>86.1</td>
<td>.001</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>146.78</td>
<td>57</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>11433</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion:**

According to the results of the study, it is evident that the performance of students in the experimental group, which has been thought by E6 model, was substantially better than the control group. Therefore, E6 method improves the performance of students in this course. This finding is in line with that Chesin and Moor (2004), Derran and Colleagues (2011) and Flecher (2011). It was evident that the globalization process kind of fits; look at education with traditional thinking prevails, what the different is. Education must improve their cultured learners through the creativity, the ability to make quick decisions and help raise aware ness.

So the basic task of planners and teachers, education is the ability to solve real life problems in students can be. However, with respect to such worker participations, teachers have with students and engage them in various topics and issues, the spirit of dealing with problems and how to solve them in they are breeding. This is the main purpose of the shadows expect for the use of active teaching methods are not possible. That is including this active approach is that approaches E6 as previously mentioned is composed of six steps.

Express E6 model with the learner's steps different requirements, in-class of way useable of activities stepped spillway bring on makes.

Tomlinson (1999) important of activities multiple time discussion that saying: the activities stepped spillway and classify when teacher want to certain the students with different requires with necessary texts equal work and of main skills equal use (Tomlinson, 1999). Distinguished recognition starting with acting of training stepped spillway that all text lessens for every student is suitable (Armestrang and Haskyns, 2010). There for, with useable activities stepped spillway in apart three groups in E6 approach, every group according to individuals' requirement teaching distinguished receipt.

Tomlinson (1999) placing students in groups, reviews that are associated directly with the activities will be stepped spillway. For example, he described how his class to two separate groups to learn the concept of extinction has been split and a group on activities more coherent while the other group will focus on the activities of the abstract. This is because the teacher said: the teacher directly passively (equal button) exercises and training with the needs of the course material each group match offers, how to have an impact on bringing describes individual needs [15]. Thus, the solutions offered by this research, grouping students is according to their needs. It is interesting that the relationship with the E6 model training [1] effective teaching process steps with the initial assessment, the assessment of students cognitive argue. Then the next stage of training actions stepped spillway by placing the students in small groups, which all students must go to where it says. Finally, the last stage of the selection of the best teaching methods for educational purpose to reach specializes in need of every student. This subject is highly related to educational model is expressed with the phase of the E6 where the structural evaluation named and teacher should be after the training stage to explaining use to training do distinguish or stepped spillway and at the end of teaching method choices. So it helps the students to reach the special goals training [1].

For more support in the phase of expression in training E6 method [1], Important evaluations discuss reliable in relative to evaluation structure and saying in training E6 method in the phase of expression useable. When it was said, if valid information with upgraded training, teachers have this goal through their asse are achieved as well, which is this case is a complete professional information to prove their students are [1].

So in this way the training by providing examples and examples on the course learned and learn to do in the process of actively-involved, learning more and better than a passive listener can learn. On the mode of thinking in the teaching and understanding and is focused on understanding and remembering that usual on outsourcing and memorize more effective focusing. Because students must discuss their ideas and opinions and
criticism and defend their ideas against others can learn. They learn their participation in a social acceptable condition to evaluate that to succeed in the real world is a fundamental principle. So according to the mentioned tips it can be concluded that the method of teaching is better than traditional methods of E6. Because learning this deeper way and to live the future of people is very effective.

REFERENCES