World Conference on Educational Sciences 2009

Investigating the effect of drama activity called “mirrors and their usage” to student succession developed according to elaborating stage of 5e model

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Received October 08, 2008; revised December 25, 2008; accepted January 06, 2009

Abstract

This study was conducted in order to find the effect to 6th grade students’ succession by using the activity called “Mirrors and Their Usage” which is covered in 6th grade, “Light and Sound” chapter. The activity was developed considering elaborating stage of 5E model. Experimental method has been used during the research. The data was gathered by using open ended questions and interviews. Although at start control and experimental groups tend to have the same level, after the activity was executed the experimental group showed a meaningful difference. It is concluded that the drama activity executed on experimental group has improved the individual, social and scientific skills. Also it has been noticed that the experimental group has given more examples from daily life compared to control group. It is also found out that an elaborative material which is properly developed according to 5E model enhances the stability of learning. It is advised that during drama activities it is vital to give chance to learners to declare themselves and relate scientific issues to everyday life phenomenon. And drama materials should be prepared attractive enough.

Keywords; 5E Model; elaborating stage material development; learning settings.

1. Introduction

Science and technology is one of the most important gateways for scientific world for all humankind. Science is vital part of daily life since it is so much integrated with it. Therefore science and technology teaching plays an important role in order to make people understand their environment and to create new outcomes from their

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environment (Kıyıcı, 2004). It is also the fundamental aim of the educational systems to enhance learners to be 
creative and to develop their cognitive perception (Ergin, Ünsal, 2006). As a result, countries give special attention 
to improve their science and technology curriculum and promote inquiry based teaching at all causes (Bozdoğan, 
Altunçekiç, 2007).

Turkey also gives a special attention to curriculum development and has re-shaped the science and technology 
curriculum in 2000 according to constructivist approaches. And in year 2004 science and technology curriculum was 
renewed totally in a new perspective and philosophy with the help of Ministry of National Education (Bozdoğan, 
2007). The main aims of this great change was to educate pupils as being conscious about their learning styles,
interconnecting the old and the new knowledge in order to create a superior knowledge and being aware of using the 
appropriate knowledge in an appropriate way (Ergin ve diğerleri, 2006). This can be done only with learners who are 
willing to investigate, produce and aware of their meta-cognition.

This situation leads to a conclusion that learners need to be educated in such settings which allows them to 
participate in learning process actively (Ernas, 2008). So that learners could have the possibility to compare the new 
knowledge with the old ones while constructing a superior knowledge (Yaşar, 1998). This procedure is also the 
fundamental basics of the constructivist approach which was stated by Witrock, and supported with the idea of 
importance of pre-knowledge in constructing new knowledge by Ausebel (Köseoğlu, Kavak, 2001). Another 
supporter of this approach was Bodner who claimed that learning and teaching process should be considered as one 
whole piece and he emphasizes that the teaching process can not end necessarily with succession all the time 
although the teacher has the relevant proficiencies. According to him the learner constructs the knowledge in his or 
her mind so there is no possibility of direct transfer of the ready information (Ernas, 2008).

One of the most useful form of constructivist approach Model was developed by Bybee which is named as 5E 
Model (Özsevgeç, 2006). This Model let learners’ attention to increase, satisfies their expectations and gives 
opportunities to actively involve in learning process. At the same time it provides a suitable setting to learn a new 
concept or to elaborate already a known concept deeply. The Model consists of consecutive stages such as; enter, 
explore, explain, elaborate and evaluate (Ergin and others, 2006). It is thought to be that the most important stage of 
this Model is the elaborating stage since the teachers and the students have the possibility of experiencing the other 
stages in previous years (Ernas, 2008). In elaborating stage the teacher and the students face the new knowledge for 
the first time in their life therefore it is believed that this stage needs a special interference. In the elaborating stage 
learners are expected to apply the gained knowledge to new situations or problematic states. By this way they learn 
the new concepts which they have never knew before. Learners are promoted to transfer their new knowledge to 
other likewise situations (Gürses, 2006).

It is thought to be that if these processes can be used efficiently it will directly improve the quality of learning 
process. For his efficiency drama technique can be well used in science and technology teaching. The most 
important reason for using drama is that the nature of drama and the nature of constructivist approach fits to each 
other. In drama activities settings are created, which learners could experience the knowledge instead of memorizing 
or repeating it, just like constructivist approach (Çepni and others, 2007) Bearing in this mind the 6th grade 
developed drama activity which hard to be acknowledged (ODTU, 2002) called “mirrors and their usage” topic 
according to elaborating stage of 5E Model and the course book topics at elaborating stage have been compared and 
their student succession have been investigated in this study. In this study the effect of “mirrors and their usage” 
drama activity which is included in 6th grade elementary science and technology curriculum to students success was 
investigated which was differentiated from other classical activities according to elaborating stage of 5E Model of 
constructivist approach in this study

2. Method

Experimental method was used in order to reveal the relation between causes and consequences. This study was 
conducted in the second term of the academic year of 2007-2008 with groups of 18 students in experimental and in 
19 control who are at the 6th grade. Open ended questions and interviews were used in order to gather data. Open 
ended questions were prepared according to elaborating stage of 5E Model and mirrors and their daily used areas. 
These questions were asked before and after the application took place as pre and post tests. The studies were 
executed with experimental group with the prepared activities and the control group continued their lectures with 
their current course books. Seven open ended questions were asked in order to examine the mirrors and their daily
usage. Open ended questions were reshaped again with an expert after their plot study has been done. In order to determine whether there is a meaningful difference between for the answers of the cognitive level of experimental and control group questions were asked. The data gathered was analyzed and comparisons were made related to experimental and control group.

Also after the application was done semi-structured interviews were done with five students who had such changes like; wrong to wrong, missing to wrong, missing to right and questions which were asked in pre and post tests previously. Interviews were conducted in a quiet setting and direct quotations were given without any change.

3. Results

Gathered data shown in the tables and interview findings were given for vital conclusions of the study. The table below shows the comparison of control and experimental group according to seven open ended questions analyzed answers which were asked in pre and post tests.

<table>
<thead>
<tr>
<th>Questions</th>
<th>CONTROL GROUP</th>
<th>EXPERIMENTAL GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right Pre</td>
<td>Wrong Pre</td>
</tr>
<tr>
<td>Q1</td>
<td>6 14</td>
<td>8 2</td>
</tr>
<tr>
<td>Q2</td>
<td>5 13</td>
<td>6 3</td>
</tr>
<tr>
<td>Q3</td>
<td>1 10</td>
<td>13 7</td>
</tr>
<tr>
<td>Q4</td>
<td>2 4</td>
<td>11 4</td>
</tr>
<tr>
<td>Q5</td>
<td>1 2</td>
<td>14 11</td>
</tr>
<tr>
<td>Q6</td>
<td>5 6</td>
<td>12 11</td>
</tr>
<tr>
<td>Q7</td>
<td>7 10</td>
<td>1 1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>27 59</td>
<td>65 39</td>
</tr>
</tbody>
</table>

In order to clearly show the differences in the change of the answers of the according to students Table 2 and Table 3 were presented. Table 2 shows the dispersion of control group students while Table 3 stands for the experimental group students answer dispersion. The abbreviations in tables used are; Q1 which stands for question one and the numbers stand for the students’ number like 5 stands for the fifth student.
Table 2. Students’ answer dispersion according to open ended questions in Control Group

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
<th>Q7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>1,5,8,10,11,13</td>
<td>1,8,9,13,15</td>
<td>3</td>
<td>13,8</td>
<td>8</td>
<td>8,11,14,15,16</td>
<td>1,2,4,8,9,11,12</td>
</tr>
<tr>
<td>Right</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrong</td>
<td>4,6,17,18,19</td>
<td>3,19</td>
<td>1,4,5,12,13</td>
<td></td>
<td></td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Wrong</td>
<td>2,7</td>
<td>4,16,18</td>
<td>10,11,14,16,17,18,19</td>
<td>2,3,4,6</td>
<td>2,6,7,9,12,13,14,15,17,18,19</td>
<td>2,3,4,6,7,9,10,12,18,19</td>
<td>3</td>
</tr>
<tr>
<td>Wrong</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>16</td>
<td>7</td>
<td>7</td>
<td>5,7,9,11,12,15,17</td>
<td>4,11,16</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>3,9,12</td>
<td>5,6,10,11,12,17</td>
<td>2,8,9,15</td>
<td>1,18</td>
<td>1</td>
<td>5</td>
<td>10,15</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>14,15</td>
<td>2,14</td>
<td>6</td>
<td>19,16,10,14</td>
<td>3,5,10</td>
<td>13</td>
<td>6,7,13,14,16,17,18,19</td>
</tr>
</tbody>
</table>

Table 3. Students’ answer dispersion according to open ended questions in Experimental Group

<table>
<thead>
<tr>
<th></th>
<th>Pre -------&gt; Post</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
<th>Q7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>Right</td>
<td>3,4,12,16</td>
<td>11,15,16</td>
<td>7,12,15</td>
<td>1,4,15,16,18</td>
<td>3,4,13,15</td>
<td>13,15,16</td>
<td>1,4,5,11,12,13,15</td>
</tr>
<tr>
<td>Right</td>
<td>Wrong</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrong</td>
<td>Right</td>
<td>1,7,9,11,14,18</td>
<td>1,3,7,9,17</td>
<td>3,5,6,9,11,17</td>
<td></td>
<td></td>
<td>2,5,6,8</td>
<td></td>
</tr>
<tr>
<td>Wrong</td>
<td>Wrong</td>
<td>13</td>
<td>6,14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Wrong</td>
<td>Missing</td>
<td>10,17</td>
<td>8,12,13</td>
<td>1,2</td>
<td></td>
<td>1,7,9,10</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>Right</td>
<td>5,6,8,16</td>
<td>2,4,5,10</td>
<td>4,8,10,18</td>
<td>7,9,10,11,13,17</td>
<td>1,2,6,8,9,10,11,12,16</td>
<td>3,4</td>
<td>2,3,6,8,10,16,18</td>
</tr>
<tr>
<td>Missing</td>
<td>Wrong</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>Missing</td>
<td>18</td>
<td>13,16</td>
<td>2,3,5,6,12</td>
<td>5,7,17,18</td>
<td>12,18</td>
<td>7,9</td>
<td></td>
</tr>
</tbody>
</table>

It is shown in the tables that when results for pre tests number of right, wrong and missing answers were compared it could be seen that both number of right answers are the same (27), number of wrongs in control group is 65 and 42 in experimental group. Number of missing answers in the control group is 42 while experimental group has 53. In the post test the number of right answers is 59 for control group while it is found out 86 in the experimental. Number of wrong answers is 39 in control group while it is 11 in the experimental group. And it is 35 for control group while it is 28 for experimental group. It basically means that although the groups have similar properties at the beginning numbers have changed favoring the experimental group.

5. Discussion

According to findings of the study it is found out that the drama activity which is developed and executed regarding elaborating stage has contributed students’ succession and has improved cognitive skills and social development. Also experimental group was able to give more examples from daily life regarding mirrors and their usage which is a meaningful finding that the activities do contribute to students’ success.

It could be seen in the first table that pre knowledge of experimental and control group is about to be the same. Post test results show that the experimental group has achieved a better success compared to control group after the
execution of the drama activity. This situation clearly indicates that the drama activity has contributed students’ succession in a positive way. Also there exists a same result in the literature supporting the idea that activities developed according to elaborating stage of 5E Model enhances learning in experimental groups more than control group (Ermis, 2008). Students were curious when they have seen the mirrors. It is with the help of interviews found out that some students forced themselves to solve the problems after the drama activity was done. This situation let students to transfer their knowledge and become desirous. Students have adopted themselves to required roles which made the drama activity more realistic and funny and increased their attention.

There is a connection between the studies done regarding drama activities developed according to elaborating stage in the literature and with the results of this study. There are studies which states that activities which are developed according to elaborating stage of 5E Model improves students’ succession (Sağlam, 2006). Experimental group students’ alternation of answers was clearly observed about wrong to right and missing to right in pre and post tests. It is found out that experimental group found the activity interesting and different and interviews showed that activity had a positive impact on the experimental group. It has acquired student participation and cooperation and it enhanced cooperative peer learning. The control group was unable to catch up the same level and they were unable to give daily examples of how to use what they have learned according to course book.

It is determined from the semi-structured interviews which were conducted with experimental and control group students that experimental group students were more active and more acknowledged about the daily use areas of mirrors compared to control group. This was mainly because of attractiveness of developed drama activity which has stimulated their attention better and prepared an entertaining class setting. Bayar (2005) states as a result of his study that teaching activities which are prepared according to 5E Model improves cooperative learning, lets student to experience the facts personally. There is an overall agreement on the fact that the basic reasons why the drama activity had a positive impact on students’ succession is that it let the activation of students’ curiosity, has given an opportunity to experience the facts and related the theory with daily life use.

Gürses (2006) suggests that content of the materials developed according to 5E Model could be well supported with caricature, riddles, attractive activities and daily life relating to improve students succession in a positive way.

It is also found out that some students had misconceptions about the basic concepts of mirrors from the findings that it was revealed from their wrong answers in post test which they did it right in pre test previously. Students were mixed the instruments stretoscope and telescope. They were able to define telescope orally but they have defined stretoscope when it is deserved to be written.

These results show that there is a positive impact of drama activity which is developed according to constructivist approach and elaborating stage of 5E Model. Experimental group which the drama activity was performed is more successful compared to control group where course book was followed. Studies of Ermis (2008), Özsevgeç (2006), Bayar (2005) and Gürses (2006) supports this result too.

6. Suggestions

It is important to establish the relation of the subjects of science and technology courses with daily life. The concepts can be forgotten more quickly and reduces curiosity if they are not supported with concrete daily examples. Daily examples motivate students to research and let them make connections with daily life which would enhance their motivation. There should be materials to influence students’ attraction in the settings that would promote students to express themselves without any worry. Every stage of the 5E model has a unique value but the elaborating stage provides the stability of acquired knowledge therefore preparing effective and entertaining materials for this stage would make the learned knowledge permanent. Using interactive techniques and being able to prepare such settings is one of the most important sufficiency therefore in service training courses can be arranged and teachers can be promoted to participate in such courses in order to use drama technique efficiently. As this study and other studies express using drama technique in all of the stages of 5E model not only at the elaborating stage would enhance learning.