The Effect of Think-Explain-Apply Teaching Method on the Success of Learning-Teaching: A Laboratory Study

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Abstract: The purpose of the present laboratory study is to make it possible to internalize the concepts, principles, theories and the laws of chemistry taught in the courses by observing the experiments, give information about the methods used and various techniques and tools applied and introduce some substances and their characteristics. The purpose of the laboratory courses help students realize real and meaningful learning by forming relations between theoretical knowledge learned in the courses and laboratory studies. The purpose of this study is to look at to what extent experiments conducted in laboratory setting are influential on students’ learning and emphasize the importance of think, explain, apply method. From the two groups of students of Science Teaching department four groups were constructed as Control 1 (C1), Experimental 1 (E1) and Control 2 (C2), Experimental 2 (E2) in two separate terms. Pre-test was administered to the groups and according to the results of this test, it was found that there is no significance difference between experimental groups and control groups (p<0.70). Success scores obtained from the post-test, on the other hand, indicated a significant difference in favor of the E2 group where think, explain, apply method was used (p<0.85).

Key words: Science teaching, think-explain-apply teaching method, laboratory study, traditional approach

INTRODUCTION

Active learning can be defined as students’ engaging in learning activities giving remarkable control to the students during learning. As the learning is active, most of the work is performed by students. They use their brains, they think, they solve problems and they apply what they have learned. Active learning is fast, entertaining and supporting as well (Meyers and Jones, 1993; Schoon and Boone, 1998; Çetin, 1998).

Nearly 2400 years ago, Confucius remarked: “I forget what I have heard. I remember what I have seen. I understand what I have done”. If we translate the statement of Confucius into active learning, the result can be stated as follows: I have forgot what I have heard. I remember a little what I have heard and seen. I gain knowledge and skill form what I have heard, seen, discussed and done (Angelo, 1993; Silberman, 1996).

Active learning teaches students the ways of having access to information from different sources in their research and allows them to evaluate and present the obtained information. Apart from these, students take responsibility in individual and group projects, they share and co-operate for the production of common information (Schoon and Boone, 1998; Çetin, 1998; Özer, 2002). Much of the scientific discovery has been done by scientist group of people rather than one person. When scientific publications are perused quickly, it will come into light that majority of the scientific research has been done by scientist groups (Johnson and Johnson, 1991). The point that to be reached by science education must be to provide an active learning process in which students are accustomed to behave like a scientist and being student at the center. Students’ constructing a cooperative learning environment by studying in groups give a possibility to a student centered teaching structure that modern education system requiring (Tatar and Oktay, 2008).

The most important reason behind the phenomenon of students’ forgetting the learned information is the difference between students’ speed of listening and speed of teacher’s speaking. While a teacher uses 100-200 words while speaking, a very careful student can listen to 50-100 words in a minute because students think more than a teacher while listening. No matter how interesting the subject taught, no matter how careful students listen to, and no matter how slowly the presents the subject in an appropriate order, learning by listening is limited (Açıklık, 2000; Özer, 2002). Human beings, as of the birth, are in a process of being educated. Learning is process starting in the family (Calderhead, 1997). The efficiency of an education system is evaluated through the behavioral changes taking place on students. In learning the necessity of students’ participation should be taken into consideration for students to learn scientific reasoning,
establish scientific communication; in short, transfer
science into their lives. Moreover, it should be
considered that students learn through different ways
and at different speeds and learning is a process realized
individually and within groups (Bonwell and Eison,
1991. Angelo and Cross, 1993). The purpose of
effective learning is to enable student participation.
Within the framework of the study carried out to
determine how strong this participation is, the
performance through which the students can show that
they can take the responsibility for their own learning is
attempted to be determined (Sahinel, 2007; Aşıkgöz,
2000; Silberman, 1996; Bonwell and Eison, 1991; Morgil
and Yörük; 2004). For this purpose, an experiment was
conducted on the students of Science Teaching
Department of The Faculty of Education, Muğla
University.

**METHODOLOGY**

The study group of the study consists of total
78 first year students of the Science Teaching
Department. These students are divided into two
groups; (20+20) experimental group and (19+19)
control group; taken from two academic years

In order to administer to working group, an
achievement test was developed. An achievement test
consisting of 30 classic lecturing questions was
administered to the first year students of Science
Teaching Department. In classical written explanation,
the first year students of the science teaching
department are asked questions as to how to explain any
subject in the primary school curriculum to students and
how to get the primary school students to conduct an
experiment.

In 2001-2002 academic year, first year students
of Science Teaching Department (n=39) were divided
into two groups. Both of the groups performed the
experiment with the guidance of the same teacher.
Information was provided for the students and a pre-
test was administered. The Experiment that can be
conducted with primary school students was only
explained through classical lecturing to Control 1 (C1)
group. On the other hand, together with the lecturing, a
demonstration of the experiment was performed by the
teacher. And students were asked to write a report
individually. The students in the control group write the
results of the experiment in a classical way. Then, a
post-test was administered to the students in 1st
working group.

In 2002-2003 academic year, the students of
the 2nd study group was informed about the experiment
they would conduct and a pre-test was administered to
them. The students in Control 2 (C2) group were
subjected to the same procedure used for the students
of E1 in the first working group. On the other hand, the
students of Experimental group 2 (E2) were asked to
search the given experiment, think about it and perform
it using simple devices on their own. Then, all the
students in second study group were asked to report the
results of their experiments individually. Post-test was
administered to the students of second working group.

**RESULTS**

Before the experiments were conducted, both
study groups were administered pre-test, and no
statistically significant difference was found between
achievement scores of experimental groups (E1 and E2)
and control groups (C1 and C2 (p<0.70). When the
achievement test scores obtained from the post-test

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**Table 1. Pre-test and post-test achievement scores of the study groups**

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Tests</th>
<th>Groups</th>
<th>Achievement</th>
<th>Student number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Control 1 (C1)</td>
<td>18.50 ± 5.71</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental 1 (E1)</td>
<td>19.00 ± 4.31</td>
<td>20</td>
</tr>
<tr>
<td>First study group</td>
<td>Pre-test</td>
<td>Control 1 (C1)</td>
<td>25.00 ± 2.30</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental 1 (E1)</td>
<td>35.30 ± 3.80</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>Control 2 (C2)</td>
<td>20.00 ± 5.10</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental 2 (E2)</td>
<td>20.05 ± 3.10</td>
<td>20</td>
</tr>
<tr>
<td>Second study group</td>
<td>Pre-test</td>
<td>Control 2 (C2)</td>
<td>34.00 ± 3.10</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental 2 (E2)</td>
<td>56.65 ± 4.10</td>
<td>20</td>
</tr>
</tbody>
</table>

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students in second study group were asked to report the
results of their experiments individually. Post-test was
administered to the students of second working group.
were compared for 1st and 2nd study groups, no significant difference was found between them. Yet, statistically significant difference was found between D1 and D2 groups (Table 1).

As can be seen from Table 1, the achievement score obtained from the pre-test for group E1 is 19.00±4.31 but academic achievement score obtained for C1 is 18.50±5.71 and achievement score obtained from the pre-test for D2 is 20.05±3.10, yet for C2, it is 20.00±5.10. In both study groups, between the achievement scores of the both groups (control and experimental) obtained from pre-test, no statistically significant difference was found. While the post-test achievement score of C2 was found to be 50.65±4.10, the same score was found to be 34.00±3.10 for C2, and for E1, it was found to be 25.00±2.30. Here the difference between E1 and C1 and between E2 and C2 was found to be significantly significant (p<0.85).

CONCLUSION

As a consequence, think, explain and apply method can contribute to the meaningful learning and teaching of the students. Hence, It plays an important role in equipping students with research skills, problem solving skills and observation skills, and the ability to establish a connection among them (Schoon and Boone, 1998). In order to be able to use laboratory courses as a real learning setting and get rid of traditional approach of memorizing, it is necessary to draw on think, explain, apply learning approach. In addition, the students gain the ability of using their imagination and knowledge about how to use it in the future through this approach.

References
