The Effect of Computer Supported Education and Internet Usage on Pre-Service Chemistry Teachers’ Transferable Skills in Active Learning Environments

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SYNOPSIS

Introduction

Transferable skills which are widely applicable are independent from disciplines. Transferable skills can be identified as adapting the knowledge and skills into changing situations. These skills are different from basic skills. Transferable skills are very important for mental and personal development of the individuals. Individuals are born with some skills but these skills need to be discovered and further developed. Skills can also be gained after birth. The transferable skills that assigned to 7 groups in chemistry education are: searching skills, team working skills, communication skills, written and oral presentation skills, problem solving skills, personal development skills and using technology skills. Chemistry education aims to develop reasoning, critical thinking, problem solving and decision making generally in science-particularly in chemistry education. Asking questions, making decisions and critical thinking are higher order cognitive skills. Higher order cognitive skills are in the same group with transferable skills. Consequently, for effective chemistry education, developing and using transferable skills play an important role. In chemistry education, student centered activities which support internet usage help students to develop some of their skills.

The Purpose of Study

This study aims to investigate the effect of computer supported education and Internet usage on pre service chemistry teachers’ transferable skills in active learning environments.
Methodology

a-Samples
39, 3rd year pre-service chemistry teachers attending to Hacettepe University, Faculty of Education, and Chemistry Education Department participated in the study.

b-Instruments
Transferable Skills Questionnaire Form has been developed to use in the study. The transferable skills are classified and the questionnaire is developed in the highlight of some researches in the literature (Clarkeburn, et all, (2000); Howe, (2002), Mottershead & Suggitt, (1996); Zoller, (1999). The questionnaire consists of 7 main transferable skill groups and there are totally 33 items in the questionnaire. The transferable skills main groups and sub skills are: Searching skills: (finding sources, using knowledge and sources effectively, organizing information, making conclusions, and summarizing skills), teamwork skills (working in groups, respecting others’ ideas, motivating people, being responsible, collaborating, and making decisions with group members), communication skills (working with others positively, persuading people, respecting others, empathetic), written and oral presentation skills (expressing ideas clearly, preparing written and oral presentations, speaking in society comfortably, preparing effective reports, and presenting reports), problem solving skills (noticing problems, creating new ideas, planning meetings, working independently), personal development skills (time management, being creative, working with discipline, being self-confident), using technology skills (using the computer, preparing reports with a computer, using presentation materials, conducting effective presentations). In the pilot study, the questionnaire was given to the 147 pre-service chemistry teachers and its’ Alpha reliability coefficient was found to be 0, 9112. The scoring of the questionnaire form is shown below:
0 point: I don’t have any skill in this field
1 point: I have not had any experience in this field before
2 point: I have noticeable skill in this field
3 point: I am skillful in this field

c-Procedure
In the study, quasi-experimental pre-post test single group design is used. The application was conducted in the chemistry education and chemistry education seminar courses. At the beginning of the semester, Transferable Skills Questionnaire Form was administered as pre-test to the pre-service chemistry teachers. Instead of teaching pre-service chemistry teachers by using traditional lecture method, they worked in teams and conducted researches. The aims of the courses are teaching pre-service chemistry teachers how to prepare a lecture plan and how to conduct the learning activities in the classroom. Pre-service chemistry teachers used computers and Internet in their research process. Internet was the primary resource for students while developing the content of their presentation, searching experiments related to their subject and providing visual material. After completing their researches, pre-service chemistry teachers presented their lecture plan in details to their classmates. After the presentations, in the discussion setting, pre-service chemistry teachers asked questions, made comments, explain new ideas. With the help of that discussion setting the quality of the learning process was increased. In the applications, pre service chemistry teachers participated in the learning process actively, worked collaboratively, had opportunity to explain their ideas and discuss those ideas. To determine the effect of the applications on pre service chemistry teachers’ transferable skills, Transferable Skills Questionnaire Form was administered as post test following to the applications. Each pre-service chemistry teacher filled the form and evaluated their
At the end of the semester the pre test and post test results were compared by paired samples t-test.

**Findings**

Table 1 displays paired sample t-test results of Transferable Skills Questionnaire Form.

<table>
<thead>
<tr>
<th>Transferable skills</th>
<th>N</th>
<th>X</th>
<th>s</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Searching skills</td>
<td>39</td>
<td>2,523</td>
<td>2,647</td>
<td>.2047</td>
<td>-2,772</td>
</tr>
<tr>
<td>Team working skills</td>
<td>39</td>
<td>2,614</td>
<td>2,766</td>
<td>.2657</td>
<td>-2,628</td>
</tr>
<tr>
<td>Communication skills</td>
<td>39</td>
<td>2,604</td>
<td>2,752</td>
<td>.2822</td>
<td>-2,397</td>
</tr>
<tr>
<td>Written/Oral presentation skills</td>
<td>39</td>
<td>2,185</td>
<td>2,428</td>
<td>.3265</td>
<td>-3,409</td>
</tr>
<tr>
<td>Personal development skills</td>
<td>39</td>
<td>2,466</td>
<td>2,623</td>
<td>.2399</td>
<td>-3,001</td>
</tr>
<tr>
<td>Problem solving skills</td>
<td>39</td>
<td>2,495</td>
<td>2,676</td>
<td>.3281</td>
<td>-2,528</td>
</tr>
<tr>
<td>Technology using skills</td>
<td>39</td>
<td>1,933</td>
<td>2,219</td>
<td>.3582</td>
<td>-3,656</td>
</tr>
</tbody>
</table>

Results

When the findings investigated, it is seen that in all of the 7 skill groups, there is a significant increase in favor of the post test. As a result of the applications, pre service chemistry teachers’ transferable skills have been developed. As a result of the activities pre service chemistry teachers’ searching skills developed (t= -2,772, p<0.05).

As a result of the activities pre service chemistry teachers’ team working skills developed (t= -2,628, p<0.05). Working in teams helps pre service chemistry teachers to share the tasks, take responsibility and communicate with others.

When the pre and post test results of communication skills investigated, it is seen that there is a statistically significant increase in favor of the post test (t= -2,397, p<0.05). Collaborative learning plays an important role development of communication skills.

As a result of the activities, in problem solving skills, there is a statistically significant increase in favor of the post test (t= -2,528, p<0.05). Problem solving is one of the most important cognitive skills in our daily lives and developing this skill is the primary aim of the education process.

As a result of the activities pre service chemistry teachers’ personal development skills developed (t= -3,001, p<0.05). In collaborative learning environments students focus on a problem and share the learning responsibility with group members. In the activities pre service chemistry teachers shared their ideas.

As a result of the activities pre service chemistry teachers’ written and oral presentation skills developed (t= -3,409, p<0.05). Students’ oral presentations in the class helped them to develop these skills.

When the pre and post test result are compared, it is seen that there is a significant increase in favor of the post test (t= -3,656, p<0.05). In the applications pre service chemistry
teachers used computers and Internet at every stage of their study, they helped them to develop these skills.

In the study, when the pre test and post test results are investigated, it can be seen that the mean score of technology using skills are lower than the other ones. This result reflects our countries’ reality related to the technology usage in education process. Most of the schools do not have adequate technology support. In the last years there have been some innovations to improve the technology support in education. Unfortunately most of the students do not have computer literacy and adequate abilities to use technology. To solve these problems, students should be taught with technology supported education at all stages of their education process. Students should be computer literates and they should learn to use Internet. In the education process, in addition to teach pre service teachers knowledge related to the study field, it should be aimed to develop their skills and some activities should be planned to develop these skills.

Suggestions

Nowadays, it has been important to educate students as individuals who know how to reach and utilize the resources and can use knowledge in daily life situations. This case supports meaningful learning. Students should develop themselves in addition to learning knowledge. Teachers are the people who educate students. Therefore they should know searching, have good communication with their colleagues, follow innovations, and develop their teaching strategies to meet different needs of students. For this reason, pre service chemistry teachers should be graduated with some skills in addition to the field knowledge. Transferable skills not only help individuals in their professional lives, also help them in their daily lives while adapting knowledge to changing conditions. Searching and problem solving skills are very important for individuals. Therefore the educational activities make pre service teachers search and learn to find utilize resources. Instead of traditional lecture method, intensive research homework should be given and project studies should be planned.

References


