Is there any difference between learning styles of student science teachers in relation to both their grade and gender?

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Abstract

In this study, the difference between learning styles of 1st and 4th grade university students, according to both their grade and gender is investigated. “Learning Styles Survey” developed by Renzulli, Smith, and Rizza is used as data collecting tool. The study group consists of 172 1st and 4th grade students from Science Teaching Department at Education Faculty of Marmara University. In data analysis of the study, Independent Group t-Test is used. At the end of the research, it is found that learning styles differ according to both grade and gender.

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1. Learning Styles

One of the most important characteristics of human beings, which differentiate from other living things and make a social being, is the ability of learning. Human beings learn the behaviors needed for living both by innate features and as the effects of environment. Although learning is defined in different ways, most psychologists agree that learning occurs as a result of the interaction with the environment and it creates long term differences in the behaviors (Fidan & Erden, 1991).

Learning is a process occurring individually. It is needed to be known that certain features of the learners in order to make learning at school occur in the most effective way.

On the basis of research has been done, it is possible to group learner characteristics, which have effects on learning, into three (Heinich, Molenda, Russell & Smaldino, 1996. cited by: Şimşek, 2002). These are:

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1.1. Group characteristics

age, educational level, experiences, childhood environment, socio-cultural characteristics, economic level, etc. of learners. When doing an instructional design, analyzing these characteristics and planning the design accordingly will guide to choose the materials and the methods used.

1.2. Entry competencies

What learners know or do concerning the subject being taught. Students may fail in such a learning environment that they have no proper entry competencies for the subject being taught. A learning environment that is not suitable for the entry competencies of students may be waste of time for both students and teachers.

1.3. Learning styles

Individual preferences having effects on how to learn, how to solve a problem, how to study, how to play a role in different activities, how to react in groups, how to communicate with others (Renzulli, 1996).

Relax studying environments differ from one person to another. Some people prefer quiet learning environments whereas others don’t feel disturbed by noise. Some people like studying in a group whereas others study alone much efficiently. Some people like studying while lying whereas others can’t focus without studying on the table. These preferences being different from one to another are related to learning styles.

Everyone has a learning style. Although learning styles are defined in many ways, most of the researchers agree that learning styles are the characteristics that identify the way to learn for the individual, are peculiar to the individual, and are naturally formed.

Like every individual has different and peculiar personality and needs, learning styles so do. Also, no learning style is dominant to others (Galloway & Labarca, 1990).

Purcell and Renzulli have constructed the model of style classification by dealing with the models constructed by different writers of learning styles. The purpose here is to arrange learning environments intended for learners by expressing learners’ many learning preferences. Purcell and Renzulli (1998) state that students have natural abilities and teachers should know these for the sake of effective learning.

Learning styles survey developed by Renzulli, Rizza, and Smith aims identify learning preferences of students in a learning environment. Dimensions in the survey have an attribute of inferring students’ learning styles from teachers’ teaching strategies (Renzulli & Reis, 1997; Renzulli, Rizza & Smith, 2002:1). In this study, student Science Teachers’ learning styles are determined by using this model. The survey is thought as a realistic tool that can be used as a guide in developing the instruction (Öğretme, 2001). The survey has nine dimensions and consists of 65 items related to the dimensions. These dimensions are explained below (Renzulli, Rizza & Smith, 2002).

1. Preference of learning by projects:
The best way to learn for whom prefer learning by projects is researching and discovering. Researching for a subject, going to the library for this purpose, planning and applying the research, discussing about the results of the research; these all are the activities being liked by students having this preference.

2. Preference of learning by independent study
Individuals who prefer learning in an independent environment choose a specific area and a title to study on alone, develop own plans to gather information, and present the results as a production. The best way to learn efficiently for those is to study alone. They prefer being alone even the task is so hard.

3. Preference of learning by drill and recitation
This preference includes raising questions and discussing the answers. Students who prefer this way like verbal communication which is the best way to show what they know.

4. Preference of learning by discussion
In this preference, also known as two-way communication, teachers and students or students and students are in interaction with one another. The best way to learn for whom prefer learning by discussion is to discuss on the subject being learnt. Among pleasurable activities for those students are discussing others about a subject they learnt in class or by themselves, and observing others who are discussing about any subject. Those students like both listening and participation. They also like express their ideas verbally.
5. Preference of learning by lecture
Lecture means presenting concepts and ideas of a specific area by teachers or experts verbally. Learning by lecture includes giving lessons, explaining new information, describing different views by teachers. The best way to learn for whom prefer learning by lecture is to listen. The important points for those students to learn are their teachers’ presentation of new subjects, listening to their teachers, and their teachers’ outline consisting of concrete steps for the homework given.

6. Preference of learning by programmed instruction
Students who prefer learning by programmed instruction like studying with materials consisting of structured questions about the subject. Those students want to study step by step at their own pace and get instant feedbacks about the subject they studied in order to know how much they understood it. They enjoy studying with educational drill and practice software.

7. Preference of learning by simulations
Learning by simulations is based on learning by playing a role. It is about playing roles of real life situations by students. The best way to learn for whom prefer learning by simulations is to learn any subject directly by experiencing it. For example, in order to learn election process, playing the role of a candidate for an election campaign by trying to collect votes for himself is the best way for those students. They like participating to role-playing activities in learning process.

8. Preference of learning by peer teaching
In these learning environments, students teach each other certain information or skill. Students who prefer learning by peer teaching want to get help from their friends for learning a new subject, studying an examination, learning how to do their homework. Those students need to get approval for figuring out that what they do is right from a friend who they believe he is successful.

9. Preference of learning by teaching games
Students who prefer learning by teaching games enjoy learning by playing games. Those students like getting instant feedbacks about their performances and competing. The best way to reinforce what they learnt for whom prefer learning by teaching games is to play games that include drills about the subject they learnt. They enjoy studying with educational game software.

It is very important to evaluate learning styles of individuals for teaching-learning process (Hein and Budny, 2000). Information gathered by evaluating individuals’ learning styles may be helpful to determine what method to be developed in teaching-learning environments for adult education (Akkoyunlu, 1995).

In this sense, teacher is the architect of students’ behaviors. The person who aims to construct intended behavior change at students and who is qualified and effective as he succeeds in this aim is the teacher. On the other hand, characteristics of teachers also have to be known. One of the characteristics of teachers is learning styles since teachers have an inclination to teach in parallel to their own learning styles.

From this point of view, in this study, it is investigated whether learning styles of 1st and 4th grade students from Science Teaching Department differ in relation to their grade and gender or not.

2. Method

In this study, it is aimed to investigate that the difference between learning styles of undergraduate students in relation to both their grade and gender. “Learning Styles Survey” developed by Renzulli, Smith and Rizza is used as data collecting tool in the study. Descriptive research model is used in this study. According to Karasar (1999), descriptive model is the research model that explains existing circumstances with fidelity, i.e. it seeks for the answer to the questions of “What is was?” and “What it is?”

2.1. Participants

The study group of the research consists of 172 1st and 4th grade students from Science Teaching Department, Education Faculty, Marmara University. Table 1 shows the frequency distribution of student’s in relation to grade and gender.
Table 1. Frequency Distribution of Students Inrelation to Grade and Gender

<table>
<thead>
<tr>
<th>Grade</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>47</td>
<td>44</td>
<td>91</td>
</tr>
<tr>
<td>4</td>
<td>44</td>
<td>37</td>
<td>81</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>81</td>
<td>172</td>
</tr>
</tbody>
</table>

3. Findings and Comments

The first sub-problem of the study is stated as “Do learning styles of student science teachers differ in relation to their grade?”

Independent Group t-Test is used in order to determine whether there is a statistically meaningful difference between learning styles average points of student science teachers in relation to their grade or not. The values from the test are given in Table 2.

Table 2. t-Test Results of the First sub-Problem

<table>
<thead>
<tr>
<th>Style Dimensions</th>
<th>N</th>
<th>Av.points (Grade 1)</th>
<th>Av.points (Grade 4)</th>
<th>Av.Diff.</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects</td>
<td>172</td>
<td>34.03</td>
<td>31.52</td>
<td>2.51</td>
<td>2.35</td>
<td>.02*</td>
</tr>
<tr>
<td>Independent Study</td>
<td>172</td>
<td>31.58</td>
<td>32.90</td>
<td>-1.32</td>
<td>-1.11</td>
<td>.26</td>
</tr>
<tr>
<td>Drill and Recitation</td>
<td>172</td>
<td>24.93</td>
<td>23.30</td>
<td>1.63</td>
<td>1.94</td>
<td>.05*</td>
</tr>
<tr>
<td>Discussion</td>
<td>172</td>
<td>31.18</td>
<td>33.10</td>
<td>-1.92</td>
<td>-1.14</td>
<td>.25</td>
</tr>
<tr>
<td>Lecture</td>
<td>172</td>
<td>28.69</td>
<td>25.80</td>
<td>2.81</td>
<td>2.81</td>
<td>.006*</td>
</tr>
<tr>
<td>Programmed Instruction</td>
<td>172</td>
<td>25.44</td>
<td>24.2</td>
<td>1.25</td>
<td>1.82</td>
<td>.07</td>
</tr>
<tr>
<td>Simulations</td>
<td>172</td>
<td>19.87</td>
<td>21.09</td>
<td>-1.22</td>
<td>-1.56</td>
<td>.11</td>
</tr>
<tr>
<td>Peer Teaching</td>
<td>172</td>
<td>24.24</td>
<td>22</td>
<td>2.24</td>
<td>3.22</td>
<td>.002*</td>
</tr>
<tr>
<td>Teaching Games</td>
<td>172</td>
<td>18.01</td>
<td>13.50</td>
<td>-4.58</td>
<td>-0.73</td>
<td>.46</td>
</tr>
</tbody>
</table>

*p<.05 statistically meaningful

According to Table 2, while learning styles of student science teachers have a meaningful difference in relation to their grade in the dimensions of “Projects”, “Drill and Recitation”, “Lecture”, and “Peer Teaching” no such meaningful difference can be seen in the other dimensions. In the dimensions with a meaningful difference, 1st grade students have higher average points than 4th grades.

The second sub-problem of the study is stated as “Do learning styles of student science teachers differ in relation to their gender?”

Independent Group t-Test is used in order to determine whether there is a statistically meaningful difference between learning styles average points of student science teachers in relation to their gender or not. The values from the test are given in Table 3.

According to Table 3, while learning styles of student science teachers have a meaningful difference in relation to their gender in the dimensions of “Lecture”, “Programmed Instruction”, and “Peer Teaching” no such meaningful
difference can be seen in the other dimensions. In the dimensions with a meaningful difference, female students have higher average points than males.

### Table 3. t-Test Results of the Second sub-Problem

<table>
<thead>
<tr>
<th>Style Dimensions</th>
<th>N</th>
<th>Av.points (females)</th>
<th>Av.points (males)</th>
<th>Av.Diff.</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects</td>
<td>172</td>
<td>33,54</td>
<td>32,20</td>
<td>1,33</td>
<td>1,23</td>
<td>.21</td>
</tr>
<tr>
<td>Independent Study</td>
<td>172</td>
<td>32,19</td>
<td>32,15</td>
<td>0,033</td>
<td>.028</td>
<td>.97</td>
</tr>
<tr>
<td>Drill and Recitation</td>
<td>172</td>
<td>24,64</td>
<td>23,68</td>
<td>0,95</td>
<td>1,12</td>
<td>.26</td>
</tr>
<tr>
<td>Discussion</td>
<td>172</td>
<td>30,47</td>
<td>30,96</td>
<td>-0,48</td>
<td>0,51</td>
<td>.60</td>
</tr>
<tr>
<td>Lecture</td>
<td>172</td>
<td>28,89</td>
<td>26,61</td>
<td>2,28</td>
<td>3,43</td>
<td>.001*</td>
</tr>
<tr>
<td>Programmed Instruction</td>
<td>172</td>
<td>25,60</td>
<td>24,03</td>
<td>1,52</td>
<td>2,24</td>
<td>.02*</td>
</tr>
<tr>
<td>Simulations</td>
<td>172</td>
<td>20,33</td>
<td>20,51</td>
<td>-0,18</td>
<td>0,23</td>
<td>.81</td>
</tr>
<tr>
<td>Peer Teaching</td>
<td>172</td>
<td>23,87</td>
<td>22,48</td>
<td>1,39</td>
<td>1,97</td>
<td>.05*</td>
</tr>
<tr>
<td>Teaching Games</td>
<td>172</td>
<td>18,71</td>
<td>17,67</td>
<td>1,03</td>
<td>1,38</td>
<td>.11</td>
</tr>
</tbody>
</table>

*p<.05 statistically meaningful

4. Conclusion, Discussion, and Suggestions

At the end of the study, the researchers found that there is a meaningful difference between various learning style dimensions of student science teachers’ according to their grade and gender.

According to the grades of science teacher candidates, 1st grade students have much more “Projects”, “Lecture”, “Drill and Recitation”, and “Peer Teaching” dimensions of learning styles than 4th grade students. In order to be successful in the national university examination in Turkey, high school students must have some skills like learning by peer teaching in group studies. Also, at high schools in Turkey, teaching-learning process consists of mostly lecture, drills, and recitation. The preference of 1st grade students’ “Lecture”, “Drill and Recitation”, and “Peer Teaching” learning styles can be considered as natural results when their success in the national university examination and their ongoing studies are taken into account. On the other hand, it is arguable that “Projects” learning style is preferred by mostly 4th grades than 1st grades.

According to gender of student science teachers, female students have much more “Lecture”, “Programmed Instruction”, and “Peer Teaching” dimensions of learning styles than males. The reason for this may be the roles given to female and male children in Turkish society. In Turkish society, female children have been grown up as obeying the rules, having the habit of studying systematically, and having extensive peer communication much more than male children. Thus, it may be evaluated as an expectable result that female students prefer learning styles that require these features observed at female children grown up such a society.

In the literature, there are researches which show learning styles differ according to gender. In one of these studies, Keri (2002) expresses that learning style preferences of female and male students differ. According to his study, females have abstract and conceptual learning styles whereas males have rather concrete and practical learning styles. According to a study of Zelazek (1986, cited by: Jonassen & Grabowski, 1993), males have learning styles which are related to being more isolated whereas females are more participative. On the other hand, there are some researches in the literature which show gender is not a distinctive factor for learning styles. According to a study done by Babadoğan and Arslan (2005), it is stated that learning styles do not differ according to gender.
Additionally, a study of Demir (2006), which is done on primary school teacher candidates, shows that there is not a meaningful difference between students’ learning styles according to gender.

In the activities taking place in newer curriculum of science courses, student-centered approaches like learning by projects and cooperative learning have been taken into consideration. In order to apply these approaches, it is expected that teacher candidates should be educated in this way and they should apply these approaches in their classes. The results of this study are unfortunately not in parallel to the expectations stated above. Thus, in order to meet these expectations, teacher candidates should be educated with a curriculum based on student-centered approaches.

In the future researches, more general results may be obtained by evaluating learning styles of various teacher candidates from different education faculties. Moreover, relationship between student teachers’ learning styles and academic successes can be investigated. The last but not the least, relationship between student teachers’ learning styles and teaching styles that they use in their classes when they start to their professional life can be studied.

References


