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High School Students' Images of "Biology Teacher"

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Abstract
Images of the individuals about any matter are one of the most important factors influencing learning. In this regard, images have become of the mainly discussed matters in education. Teacher is one of the most important factors of education. Since teacher is a natural role model for students, students' "teacher" images influence their academic achievements, personality development, perspectives about science and nature. In this respect, it is highly important to reveal how biology teachers are perceived by the students. The purpose of this study is to reveal the images developed by high school teachers about biology teacher by means of the Draw a Biology Teacher Test. In line with this purpose, 254 high school students in Konya province were applied the "Draw a biology teacher" scale as a single question in the academic year 2016-2017. As a result of the analyses of the drawings, it was revealed that the biology teacher image of the students was rather a "biology teacher making site research in nature", a "biology teacher doing experiments in the laboratory", a "biology teacher using technology in the classroom". Additionally, the biology teachers had a camera, telescope and microscope in the student drawings. The results showed that there was a change in the students' traditional-stereotype biology teacher images.
Keywords: Biology teacher images.

1. Introduction

One of the important factors which affect the learning is the images which individual have on a certain matter. In this regard the images became one of the leading subjects discussed in the education. The teacher is one of the most significant factors of the education. Since the teacher is a natural role model for the students, the students' "teacher" images affect their academic achievements, personality development, professional tendencies and the attitudes toward science and nature. In this context, it is highly significant to reveal the way the biology teachers are perceived by the students.

The images are in general the stereotyped view created since childhood. Newton and Newton (1998) reported that the images of the students started to develop early in the elementary school and remains stable during the years. The images may present differences from individual to individual. The individual perceive and asses the world realities under the effect of their past lives, in line with their abilities and based on their value judgement. Thus the images are subjective. In the development of the scientific opinions, emphasis is put on the development of norms in order to minimize such subjectivity (Ülgen, 2001, p.102).

It has been observed that until now most of the drawing based studies focused on the "scientist" images Buldu, 2006; Kaya, Doğan & Öcal, 2008; Korkmaz & Kavak, 2010; Rosenthal, 1993; Schibeci & Sorensen, 1983). However there are fewer studies on "teacher image" (Arslan Cansever, 2017; Aykaç, 2012; Harrison, Clarke & Ungerer, 2007). The "biology teacher" image of the high school students is important because the biology teacher represents a role model for the students within this age group. Thus the "biology teacher" image of the high school students is influential on the shaping of their attitudes and behaviors toward the science and nature and the selection of profession in their future educational lives.

The teachers affect significantly the opinions and views of the students on the nature of science and scientist. However the studies revealed that the students from different age groups have naive and flawed opinions regarding the nature of the science (Abd-El-Khalick & Lederman, 2000). Moreover, the biology teacher image of the students affects their understandings of nature of the science. The stereotyped biology teacher image of the students, may indeed affect their perspectives regarding biology and other sciences and the scientist. The literature scanning did not indicate any study regarding the determination of biology teacher image of high school students in Turkey. Knowledge of the images of students regarding the biology teacher is one of the key factors to take significant proactive educational actions because the students' biology teacher image affects the student's performance regarding the career choice and academic achievement.

1.1. Purpose

Within this context, the purpose of this study is to reveal, by drawing, the images developed by the high school students regarding the biology teacher. Accordingly, the answers to the following questions were sought:
1- How is the physical appearance of the biology teacher according to the drawings of the high school students?
2- How is the teaching character of the biology teacher?
3- What are the most common educational elements observed in the biology teacher drawings?

2. Methodology

2.1. Participants

This study was performed by participation of a total of 254 high school seniors who are studying in five different high schools in Konya during the educational year 2016-2017. 139 of the participants were womans and 115 were mans. The average of the students was 18.3years (range 17-19). Random sampling method was employed for determination of the participants.

2.2. Data Collection

The data collection tool used in this study is based on Draw-a Scientist Test (DAST) designed by Chambers (1983) to reveal the perception of students from different age groups regarding a scientist. This test was initially developed by (Chambers, 1983) and has been frequently used to analyze the scientist images of the students according to miscellaneous criteria. According to this method the students are asked to draw a scientist on a white paper. Then the drawings are analyzed using seven indicators: (1) laboratory coat, (2) knowledge symbol (3) glasses, (4) technology usage, (5) research symbol, (6) bear, mustache and whiskers, (7) drawing foot note. In this study DAST was appropriately redesigned and used as a data collection tool. In this test the participants were asked to draw a biology teacher and to portray their drawings in order to reveal the image of a biology teacher. The students were allowed 20 minutes to answer the questions.

2.3. Data Analysis

During the analysis of the data, firstly, the number of the drawings made by the students and of the genders of the biology teachers drawn was determined (Table 3.1.2). Later, each of the drawings was analyzed based on the indicators of biology teacher image (Table 3.1.1). Description method was used in the analysis of the data (Table 3.3). The frequency distribution was indicated by coding the answers of the students.

This study was validated by applying to the specialist opinions during the planning, enforcing and assessment processes. The processed were explained in detail and the results were given together with the drawings. In order to ensure the reliability the students' drawings were directly submitted to the study and the findings and results were checked. The researchers avoided the subjectivity during the study and tried to obtain objective results and to report the same clearly. All the drawings analyzed and ranked by one of the researches and by a domain expert were discussed in terms of "consensus" and "dissensus" and the necessary adjustments were done. The reliability formula suggested by Miles and Huberman (1994) was used to calculate the reliability of the study. The results calculated according to this formula which were over 70% are accepted as reliable for this study (Miles & Huberman, 1994). (Reliability = Consensus / (Consensus + Dissensus). As a result of the calculation the reliability of the study was calculated 91% for biology teacher drawings and the study was accepted as reliable.

3. Results and Discussion

The analysis of the data obtained from the drawings made by the students and from the portraying of such drawings, revealed thoroughly the biology teacher image of the students. The results obtained from the data were summarized under headings and discussed.

3.1. Physical appearance of the biology teacher

The physical appearance and gender of the biology teacher were analyzed from the drawings made by the students. The drawings made by the students were analyzed according to the seven indicators of a teacher. Analysis results were provided in Table 3.1.1 with frequency and percentages. Since the drawings of many participants were classified in more than one category, the numbers were different from the general total.

Table 3.1.1. The physical appearance of the biology teacher according to the drawings

The physical appearance of the biology teacher	f	%
Laboratory coat	103	40,5
Knowledge symbol	97	38,2
Glasses	79	31,1
Technology usage	62	24,4
Research symbol	44	17,3
Beard, mustache, whiskers	31	12,2
Drawing foot note	6	2,3

The most popular main characters of physical appearance of the biology teacher were the "laboratory coat" (40,5%), "Knowledge symbol" (38,2%) and "Glasses" (31,1%). The technology usage, research symbol and beard-moustache-whiskers indicators were lesser described in the drawings. These results indicated that the physical appearance of a biology teacher is partly analogous to the physical characteristics revealed as images of standard scientists depicted in previous studies (Demirbas, 2009; Song & Kim, 1999; Thomas & Hairston,

2003). However, unlike the others, in the present study, attention was drawn to the fact that the use of knowledge symbols and technology took place at a higher level in the drawings. Although the student centered education biology program has been implemented and current teaching strategies have been included, it has been seen that traditional stereotypical biology teacher images still exist.

The gender of the biology teacher drawn by the students was analyzed and four categories were formed. As seen in Table 3.1.2, the image of female biology teacher (49.2%) dominates the image of male biology teacher (40.2%). 7.1% of the drawings were included in the "indefinite" category because they did not exactly reflect the gender. In addition, there were drawings (3.5%) showing both the male and female teachers together. These drawings, although were fewer in numbers, reflected the collaboration between the teachers. In the drawings of the female students, the female biology teacher is the dominant image while the male biology teacher image is dominant in the drawings of male students. The biology teacher prototype of the students seemed to be identified with their own gender.

Table 3.1.2. Gender of the biology teacher from the drawings

Gender of Teacher				
	Female	Male	f	%
Female	105	20	125	49,2
Male	30	72	102	40,2
Uncertain	14	4	18	7,1
Female and Male	9	-	9	3,5
Total	158	96	254	100

According to these results, the biology teacher image of the students differed from the stereotypical traditional images described before in terms of gender because the dominant image of the male gender was frequently revealed in the previous studies with students from different groups of age (Demirbas, 2009; Fung, 2002; Kaya et al., 2008; Thomas & Hairston, 2003; Turkmen, 2008). This may be due to the small number of male teachers or prospective teachers in Turkish society or the image of the male teacher reflected in the media or textbooks. The gender of the teacher emphasizes the importance of role models as individuals presented in the visual media or textbooks. Role models often affect the cognitive learning of students. Maybe, because the teachers depicted in the visual media and textbooks are often female leads to the perception that the teachers are women in general. Nevertheless, it is clear that there is a need for further research in order to determine how students determine the notion of gender of the biology teacher.

3.2. Teaching character of the biology teacher

As a result of the analysis of the drawings and descriptions of the students, the teaching character of a biology teacher was categorized in six categories (Table 3.2.1).

Table 3.2.1. The teaching character of the biology teacher in the drawings

Category		f	%
1	Biology teacher teaching in laboratory by experiment	82	32,3
2	Biology teacher teaching lessons in the class	70	27,6
3	Biology teacher teaching lessons outdoor	64	25,2
4	Biology teacher who makes the students to do research	14	5,5
5	Unconventional biology teacher	13	5,1
6	Others (general drawings)	11	4,3
Total		254	100

When the teaching character of the biology teacher drawn by the students was examined, it was seen that most of the drawings were "biology teacher teaching lessons by experiment method in the laboratory" (32.3%) (Figure 3.2.1; Table 3.2.1). However, a lesser proportion of the drawings reflected the "biology teacher teaching lessons in the class" (27.6%) (Figure 3.2.2) and the "biology teacher teaching lessons outdoor" (25.2%) (Figure 3.2.3). In addition, there were student drawings reflecting the categories of "biology teacher who makes the students to do research" (5,5%) and "unconventional biology teacher" (5,1%) (Figure 3.2.4; Figure 3.2.5).

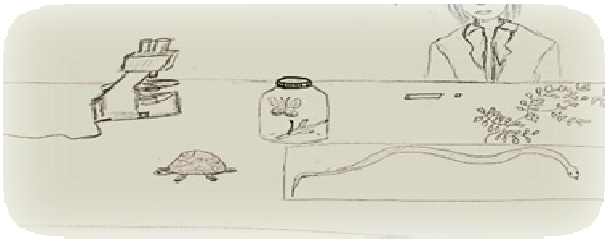

Figure 3.2.1. Biology teacher teaching lessons by experiment method in the laboratory (43 Student).

Figure 3.2.2. Biology teacher teaching lessons in the class (28 Student, 217 Student).

Figure 3.2.3. Biology teacher teaching outdoor (171 Student).

Figure 3.2.4. Biology teacher who makes the students to do research (95 Student; 102 Student).

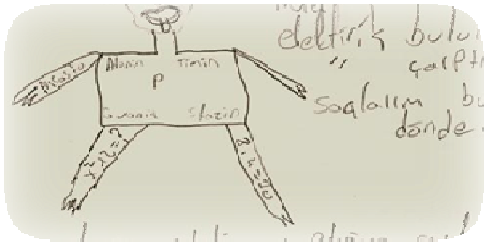

Figure 3.2.5. Unconventional biology teacher (117 Students).

Some of the drawings were ordinary drawings that did not clearly reveal the teaching character of the biology teacher (4,3%). These are grouped under the general drawings category (Figure 3.2.6).

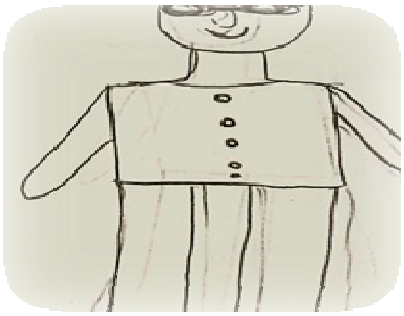

Figure **3.2.6.** General biology teacher drawing (241 Student).

According to these results, "the biology teacher teaching in the laboratory by experimental method" was the dominant category. (32.3%). Closely to the dominant category, 27.6% of the high school students described the biology teacher as a person teaching with traditional methods. These students did not include activities such as experiment, project, discussion, material development of the biology teacher in their drawings. These students had a traditional teacher perception that centers the biology teacher on the learning environment. These findings are analogue with the previous study results (Thomas & Hairston, 2003) although they differ in terms of revealing the image of “biology teacher teaching lessons outdoor”.

3.3. The most frequent educative elements encountered in the biology teacher drawings

The most reoccurring elements in the drawings were presented in Table 3.3.1. These elements were drawn by at least 10 students. Among them, the most frequently used microscope in biology laboratories was the dominant element (27,2%). On the drawings, the concept of plant was found more than the concept of animal. This can be explained by the fact that plants are used more frequently as test samples in biology laboratories.

Table 3.3.1. The most common elements observed in the biology teacher drawings

Elements for Biology Teacher			%
1	Microscope	69	27,2
2	Plant	58	22,8
3	Board	49	19,3
4	Table	43	16,9
5	Beaker	28	11
6	Laboratory coat	24	9,4
7	Cell model	21	8,3
8	Bird	19	7,5
9	Beaker	18	7,1
10	Lame-lamelle	15	5,9
11	Test cabinet	14	5,5
12	Book	11	4,3
13	DNA model	10	3,9
14	Projection device	10	3,9
15	Smart board	10	3,9

4. Conclusions and Implications

As mentioned previously, the students' images of biology of high school students affect significantly their understanding of the nature of science and their attitudes towards biology and professional choices. In this study, it was revealed that high school students produced drawings that generally display positive images of the biology teacher, i.e. image of the biology teacher who teaches lessons by means of experiment in the laboratory or who makes the students to do research. The representations of the students regarding the biology teacher indicate that: physical characters of the biology teacher are similar to the standard image of the scientist revealed in the previous studies. These images are somehow superficial and stereotyped. The biology teaching depicted by the participants reflects primarily the teachers who use the experimental method, and then those using the traditional teaching method in the classroom environment.

Taking these results into consideration, it is thought that in terms of education of the teachers, it is necessary to implement student-centered teaching rather than traditional methods. Using learning-based learning as a teaching method in the classroom is known to help students to understand scientific concepts by participating in activities such as a scientist. Because of the importance of biology teaching for future generations, it is important that the role of the biology teacher in the schools and the miscellaneous works done by them to be known and understood by the students. The teacher image is, perhaps, one of the most important basic factors in the nature and environment education. None of the biology curriculums or educational system may affect the student as much as the character of a biology teacher does. It is known that the teachers are directly affecting the achievement of the students. Thus, not only the biology teacher image but also the images of the other science teachers shall be revealed by miscellaneous methods. The results to be collected from these studies shall be taken into consideration in the teacher training programs. Drawings can be used as a powerful research tool because high school students' teacher drawings can provide information about teacher roles accepted by them and teaching-learning approaches. In addition to students, the teachers may be asked to make drawings on "teacher" and many other elements within the educational system and the results obtained may be transferred to the prospective teachers who are studying in the faculties of education.

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