



MIDDLE SCHOOL STUDENTS' IMAGES OF SCIENTISTS AFTER A PROJECT CALLED "ARTVIN NATURE AND SCIENCE CAMP"ⁱ

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Abstract:

The aim of this study was to investigate middle school students' images of scientists who participated in a local project called Artvin Nature and Science Camp. This project was supported by The Scientific and Technological Research Council of Turkey with 115B089 code. For the purpose of the study, 30 middle school students were selected. Survey method was used. In order to evaluate students' stereotypic images, "Draw a Scientist Test" was used. The data obtained from this study were analyzed based on percentage and frequency. It was found that girls mostly draw scientists as wearing daily clothes; with well-groomed hair; in laboratory; test tube or beaker around him/her; and portrayed happy, young woman with glasses. In their drawing, boys described scientists as messy hair; in laboratory; test tube or beaker around him/her; and as young man without accessories. Boys also do not specify definite outfit on their images.

Keywords: scientist, draw a scientist test, middle school students

1. Introduction

With the advances in science and technology, raising individuals who are capable of producing knowledge and technology together rather than using technology in education has become more important. In this context, schools revised their educational programs and curriculums in order to train their students as experienced, performing active learning, designing experiments and capable of making different observations as actual scientists in addition to other skills. At the same time, schools are focusing on developing attitudes and perceptions of students positively towards science and

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scientists. Students' images of scientists are considered to be important in the literature in terms of encouraging them to learn science. Students develop their visual and verbal perceptions towards scientists through different media sources such as television, text books and fiction books in and outside of the school. These perceptions are very stable and resistant to changes because these are well resolved in the student's cognitive structure (schema) (Fung, 2002).

According to Chambers (1983), the first serious debates and analysis on students' images of scientists were conducted in the 1950s by the study of Mead and Metraux (1957). Since then, important studies (Andersen, Krogh, & Lykkegaard, 2014; Chambers, 1983; Finson, Beaver, & Cramond, 1995; Huber & Burton, 1995; Schibeci & Sorensen, 1983; Schinske, Cardenas, & Kaliangara, 2015) were conducted about students' perceptions and perspectives. Considering these studies, the common evidence indicates that students have a stereotyped (cliché, conventional) perspective about scientists.

Today, one of the subjects discussed and considered worthy of investigation is to determine whether students have stereotyped opinions about science and scientists and origin of these opinions. According to the common opinion of the researchers, the main factor leading students to have stereotyped perspectives about scientists is the way of teaching science (Carlton-Parsons, 1997; Finson, Pedersen, & Thomas, 2006; Rubin & Cohen, 2003).

Some researchers (Matkins, 1996; Moseley & Norris, 1999; Rosenthal, 1993) stated that teachers have more potential impact on the formation of stereotyped perceptions of students about science and scientists, because they suggest that instructors transfer their own opinions to their students (Medina-Jerez, Middleton, & Orihuela-Rabaza, 2011). Another possible cause shown as media (Fung, 2002) tools such as television shows, animated films, movies and books (Steinke, 1998; Thomas & Hairston, 2003).

It is highlighted that creating a perspective towards scientists and understanding the roles of scientists in the community is effective in engaging the students to develop positive attitudes towards learning and interest in science. At the same time, it is stated that instructors will be able to guide their students if they know students' images of scientists (Fung, 2002). Gottfredson (1981) and Finson (2003) suggested that choice of profession and career choices of students are significantly affected by their perspective about professions.

Therefore, it is important for students to have a positive perspective about scientists and a good consistency between their images of scientists and beliefs about themselves in choosing a professional job related to science in the future. Schibeci (1989) evaluated the importance of revealing students' images of scientists and suggested that this allows students to create a positive attitude towards science within a certain extent and develops their self-sufficiency.

According to Ryder, Leach and Driver (1999), professional science remains mostly outside of students' daily experiences. For many people, education constitutes an important part of human lives. Projects, assignments, exams and other school-related tasks are valuable parts of the education. These valuable parts and other school-related

activities provide students to gain critical behaviors and skills that are necessary for life. However, it should be noted that students may be insufficient to gain these skills if their instructors do not go beyond the walls of the classroom.

An effective learning environment (if a good consistency between their images of scientists and beliefs about themselves is desired) should be as flexible and inclusive as possible. In this sense, science camps provide golden opportunities for students to create a fun learning environment by exploring real scientists and science.

In these camps, students get the chance to observe studies conducted in a specific area of science and study and meet with professionals and their role models (Science Buddies, 2015). In addition, students can develop a more realistic insight into the scientists while having fun activities with the scientists from different fields. In this respect, it is considered important to determine the impacts of science camps on students' images of scientists. However, there is not sufficient amount of studies in the literature examined this matter.

In this study, it was aimed to demonstrate how middle school students' images of scientists after a project called "Artvin Nature and Science Camp" has changed. For this purpose, the question asking "Do students' images of scientists participating in the study differ by their grade and gender?" was tried to be answered.

2. Method

In the study, the screening model, which is one of the qualitative research approaches, was used. Screening model is an approach that describes and identifies a case as it is (Karasar, 2009).

2.1. Participants

This study was conducted on randomly selected 15 girls and 15 boys (14 students in 6th grade and 16 students in 7th grade) participated in Artvin Nature and Science Camp Project and studying in middle school of Artvin.

2.2. Research Instrument and Procedure

In the study, DAST-Draw A Scientist Test was used. The results of the test were interpreted by taking frequencies. In addition, gender and grade level were taken into account in interpreting the results.

3. Results

"DAST-Draw A Scientist Test" results of the students participated in the research were evaluated in terms of dress, head, gender, working environment, facial expression, age, accessories of the scientists and other people and figures drawn near by the scientist. Drawings of the students were analyzed according to grade and gender of them. Analysis results are summarized in Table 1.

Table 1: Analyses of Drawings of the Students by Their Gender and Grade

General Features		Gender		Grade	
		Female	Male	6 th Grade	7 th Grade
Dress	Laboratory gown	2	3	5	0
	Suit	1	1	1	1
	Daily / Sport clothing	7	5	4	8
	Clothing is not specified	3	7	3	7
	Other	1	0	1	0
Drawings around head	Messy hair	3	10	5	8
	Groomed hair	10	3	7	6
	Bald	1	2	2	1
	Beard	2	5	2	5
	Other	1	5	1	5
Data Symbols	Book / Notebook	5	2	2	5
	Pen	1	1	1	1
	Paper	0	1	1	0
	Computer	3	0	1	2
	Information symbol is not specified	9	11	10	10
	Other	1	2	2	1
Other pictures drawn with the scientist	Human	2	3	0	5
	Animal	2	2	2	2
	Plant	3	0	1	2
	Test materials / test tube / per	10	11	11	10
	Phone	1	1	0	2
	Telescope	0	0	0	0
	Robot	2	0	1	1
Other	3	8	6	5	
Gender	Male	5	16	9	12
	Woman	8	0	8	0
	Gender is not specified	1	0	0	1
Working environment	Laboratory	8	7	9	6
	Study room	2	4	4	2
	Home	2	1	1	2
	Forest	0	1	0	1
	Outdoor / space	1	1	0	2
	Environment is not specified	1	2	1	2
Facial expression	Happy	6	6	6	6
	Furious	0	0	0	0
	Surly	0	3	0	3
	Sad	0	0	0	0
	Considerate	4	4	6	2
	Vague expression	2	3	2	3
	Serious	2	0	0	2
Accessories	Glasses	8	4	6	6
	Cap / Hat	0	2	1	1
	Pendant / Earrings / Clip / Belt / Tie	4	0	1	3
	Accessories are not specified	4	9	6	7
	Other	1	0	1	0
Alternative	Danger sign / No trespassing / Keep away	1	0	1	0

figures	Bulb	2	2	0	4
	Mystical characters	0	1	1	0
Age	Young	9	9	10	8
	Middle aged	3	6	2	7
	Old	2	1	2	1

According to the table, most of the female students portrayed a young and happy female scientist wearing glasses with daily sports clothes, well-groomed hair, with test tubes or beakers around in a laboratory. On the other hand, most of the male students portrayed a young and happy male scientist without specifying a cloth with messy hair, with test tubes or beakers around, no accessories in a laboratory. Drawings of the students differentiated depending on their grades.

4. Conclusions and Recommendations

Considering the results obtained from the drawings, students think outside the box about the clothes of the scientists. However, female students draw scientists as a woman in general. In addition, since students draw scientists as a young person close to their ages, it can be interpreted that scientific activities performed within the scope of the project changed students' images of scientists and they considered themselves closer to do scientific studies. Besides, drawing scientists with glasses in a laboratory environment is consistent with typical drawings.

Chambers (1983) tried to understand each symbol referring to the basic elements in the drawings while emphasizing the importance of interpreting the perceptions of students. For example, he associated glasses with eye fatigue that occurs after making an intense observation. He associated the laboratory gown with dealing with work that may pollute the clothes while making an experiment and beneficial and positive (white color) works for people. Beard of the scientists was interpreted as having multiple meanings.

In the studies conducted, female students used to portray scientists as "*an alone and sad male scientist wearing a laboratory gown and glasses with test tubes, beakers and chemicals around in a laboratory*" (Camcı, 2008; Schibeci, 2006; Fung, 2002).

In the recent studies, it is determined that female students portray scientists especially as "*smiling women*" (Akçay, 2011). In the literature, it is emphasized that visual and written media has an impact on the images of scientist about their appearances (Schibeci, 1989; Song & Kim, 1999). In this respect, since students portrayed scientists with glasses in a laboratory environment, the impact of prior learnings and media continues.

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