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Students' Out-Of-School Experiences, Job Priorities, and Perceptions toward Themselves as a Scientist: A Cross-cultural Study

Hunkar Korkmaz [a] *, Julie Anna Thomas [b], Nilgun Tatar [c], Serpil Altunay [d]

[a] *Hacettepe University, Faculty of Education, Department of Curriculum & Instruction, Ankara, 06800 Turkey*

[b] *University of Nebraska-Lincoln, College of Education and Human sciencesteaching, Learning & Teacher Education, Lincoln, NE 68588-0355, USA*

[c] *Alanya Alaaddin Keykubat University, Faculty of Education, Department of Science Education, Antalya, Turkey*

[d] *Hacettepe University, Faculty of Science, Department of Statistics, Ankara, 06800 Turkey*

Abstract

The purpose of this study was to examine middle school students' out-of-school experiences related to science, priorities related to their future job, perception toward themselves as a scientist. One intact school was assigned randomly from each country. The study involved 479 students (363 Turkish students; 116 American students), aged between 11 and 13. It was used the survey instrument "Relevance of Science Education" was developed by an international team. Results show that for this sample there continue to be significant gender and cultural differences in science experiences and perceptions towards scientists and of careers. It is thought that the findings of this research will contribute to the development of universal education on science, to the researchers studying on comparative education, cultural diversity and also to the international literature on science education.

Keywords: Curriculum and instruction; science education; cultural study; comparative study

1. Introduction

In recent years, there is widespread concern that young people's participation in education and careers within science, technology, engineering and mathematics (STEM) is insufficient to meet future demands (EU, 2004; OECD, 2008; Stine & Matthews, 2009; Henriksen, Jensen & Sjaastad, 2014). Governments, industry and other stakeholders devote considerable resources to research and interventions aimed at understanding and responding to this challenge (Henriksen, Jensen, & Sjaastad, 2014). In this context, questions such as the following have become an important issue for STEM educators: Do

* Corresponding author. Tel.: +0-000-000-0000
E-mail address: hunkar@hacettepe.edu.tr

students enjoy dealing with science and technology activities out-of-school? What experiences do they have out of school related to science? Do they have books relating science and technology in their homes? Do they want to choose a job relating science and technology in their future? How do their perceptions have images of science and scientist? How do they see themselves as a scientist? What about topics relating science would they like to do a research and why? In this context, this study was aimed to examine the answers to these questions with a cross cultural perspective in two countries that are economically, historically, and culturally quite different – Turkey and the United States.

1.1. Out-of-school experiences

As cited in Pinar (2011, ıx), curriculum studies in an interdisciplinary academic field devoted to understanding curriculum. In its early year decades, the field was devoted to improving the school curriculum. In later years, efforts to improve the curriculum focused at various times, on its structures, both its internal structures (e.g., school subjects, their contents and sequencing, and assessment) and its external structures (e.g., the alignment of the curriculum with the world beyond the school). In spite of the proliferation of scholarly interest in outside-of-school experiences during the last decade (Ladwig, 2010; Vadeboncoeur, 2006), there is not yet a unified field of research devoted to understanding the impact of outside-of-school experiences on either children's achievement in school or their overall cognitive, emotional, and social development. To understand fully children's science learning, as in all fields, one should look not only at learning that takes place in the kindergarten and primary school but also at learning that takes place out of-school (Eshach, 2007). Students bring a variety of experiences to the classroom. This is very important considering the fact that 85% of the time children are awake is spent outside the classroom (Medrich et al., 1982).

Constructivism, a popular concept in new science curricula reform, sees learning as a dynamic and social process in which learners actively construct meaning from their experiences in connection with their prior understandings and the social setting (Driver, Asoko, Leach, Mortimer & Scott, 1994). Students construct their own knowledge by comparing new sensory experiences with previous concepts and using this information to arrive at a new level of understanding (Farenge & Joyce, 1997; Peterson and Knapp, 1993; Harlen, 1992; Yager, 1991). A number of out-of-school contexts contribute to interest development and engagement in STEM (Braund & Reiss, 2006; Maltese & Tai, 2009; Stocklmayer, Rennie, and Gilbert, 2010; Danielsson, 2013). In this new context, STEM educators should incorporate out-of-school experiences into science education. As Newton (1988) states incorporating out-of-school experiences into science education is 'commonly seen as having a strong motivational value and to hold promise for enhanced learning, retention and recall of what has been taught' (p. 8).

To connect new data with preexisting mental constructs, teachers need to be aware of students' prior experiences (Farenge & Joyce, 1997). Studies indicate that students who come from homes primed with experiences which parallel the school's curriculum function productively in school activities (Majoribanks, 1991; Midwinter, 1975). Similarly, the National Science Education Standards stress that science experiences, both formal and informal, are necessary to foster understanding about the natural world (National Research Council, 1996). It has been documented that popular culture in general and popular science in particular contribute to establishing and developing interest and to shaping young people's perception of science and scientists. For instance, Stocklmayer, Rennie, & Gilbert (2010) found that experiences with informal science settings such as museums and popular science in the media may influence interest and motivation in science and technology.

Students' out-of-school experiences are changed depend on their socio-economic environment, culture, norms and societal values (e.g., George, 1999; Yoloye, 1998; Jegede, 1995; Nganunu, 1988). Also, previous studies pointed out those experiential differences affect future learning outcomes in science (Harlen, 1985; Kahle, 1990). Therefore, it is necessary to define the students' out-of-school experiences related to science to develop a better understanding about the dynamics of science curricula and science classroom setting in future. State hypotheses and their correspondence to research design

After you have introduced 'the problem and have developed the background material, explain your approach to solving the problem. In empirical studies, this usually involves stating your hypotheses or specific question and describing how these were derived from theory or are logically connected to previous data and argumentation. Clearly develop the rationale for each. Also, if you have some hypotheses or questions that are central to your purpose and others that are secondary or exploratory, state this prioritization. Explain how the research design permits the inferences needed to examine the hypothesis or provide estimates in answer to the question.

1.2. Priorities for future job

Students in science and science-related careers have long been a dilemma for educators in the population-at-large that seek to improve the representation of all minorities in fields of science and technology. The goals for school science in many countries such as the United States, Canada, Ireland, and Turkey are to increase their economic productivity through the use of the knowledge, understanding, and skills of the scientifically and technologically literate person in their careers and to facilitate entry to the world of work. Thus, recently, to explore students' interests in science topics, educational choices, career aspirations, career motivation, and job priorities is become an important issue for science educators. To grow up trained scientists and engineers for countries' future, teachers need to be aware of students' interests in science topics, educational choices, career aspirations, career motivation, and job priorities is become an important issue for science educators .

On the basis of previous studies of career satisfaction and/or motivation, Shim, Gehrt, & Goldsberry (1999) examined three a priori dimensions of retail career preference: intrinsic, extrinsic, and lifestyle.

> *Intrinsic preferences are determined by the nature of the job itself, the variety of tasks, and the enjoyment of the job as a whole. Extrinsic preferences involve external aspects of the job, such as pay and benefits (Lucas 1985). Lifestyle preferences involve factors that are indirectly related to the job and that concern one's personal life (i.e., work-home interface, flexible working hours, and ability to manage home and family life) (Brooks & Betz 1990) (p.15).*

Literature on career development related to science has provided information on the influence of contextual factors, such as family socioeconomic status, parental emotional support, science self-efficacy, ethnicity, culture, gender (e.g., Kahle, Matyas, & Cho, 1985; Keeves & Kotte, 1992; Rennie & Dunne, 1994, Terry & Baird, 1997; Jones, Howe and Rua, 2000; Scott & Mallinckrodt, 2005). Also, Roe's theory of career choice focuses on the relationship between genetic factors and different child rearing practices and their influence on young individuals' personalities and styles that in turn influence a variety of vocational behaviors (Terry& Baird, 1997). With a cross cultural perspective, this study was examined to students' priorities in the following seven dimensions of their future work: self-realization, work creatively, leisure priorities, care for surroundings, power and glory, dynamism and excitement, and fix; use hands and tools (Schreineder, 2006).

1.3. Perception toward themselves as a scientist

During the past 30 years there has been increasing academic and government interest in the students' knowledge of and its attitudes toward scientific discoveries and technological advancements that has attracted the attention of scientists. In this context, several surveys in levels of national and international have been used to determine students' scientific knowledge, interest in scientific research, attitudes toward scientific developments, and perceptions of scientists. Some commentators based on results of those surveys have expressed concern about the apparent low levels of scientific knowledge and poor attitudes toward scientific developments (Hayes & Tariq, 2000).

One of the researches in this area, when students responded to the question "Do you like science?", only 68% of eighth graders answered yes (Baker & Piburn, 1997). As cited in Chiapetta et al., (1998), students' science self-concept can be positively or negatively affected by what happens in middle school and secondary science classes (p. 65). There exists a relatively large body of science education research on students' interests, attitudes and participation in STEM. However, comparably little research exists on specific recruitment initiatives or campaigns (Andre´e & Hansson, 2013).

Finson, Beaver and Cramond (1995) state that if educators are to truly impact students' perceptions of scientists in a positive manner, and thus increase the number of students entering science programs and careers, then more study on student perceptions is needed (p. 195).

As mentioned above, this study report on a cross cultural investigation into 11-13 years old students' out-of-school experiences related to science, priorities related to their future job, perception toward themselves as a scientist. It was aimed to find out (1) If there are cultural differences in out-of-school experiences related to science, (2) If there are cultural differences in students' priorities related to their future job, (3) If there are cultural differences in students' perception toward themselves as a scientist

2. Method

In this study, qualitative and quantitative methods (mixed method) were combined. First and second research questions were analyzed using quantitative methods. Last question was analyzed using both qualitative methods (including content analyses) and quantitative methods (descriptive statistics).

2.1. Participants

The present study reports data from a sample of Turkish and the US students. One intact school was assigned randomly from each country. Thus, the number of the students are different in both schools. A total 479 students, aged between 11 and 13 (363 Turkish students including 202 girls and 161 boys; 116 the US students including 53 girls and 63 boys) participated in the study. The overall mean age 12.41 (Turkish sample=12.46, American sample=12.23) is years with standard deviation of 0.532 (Turkish sample=0.542, American sample=0.464). The schools are located in urban area in both countries. Teachers were selected based on their willingness to volunteer. Teachers gave the instrument during sixth and seventh grade science classes and unlimited time to complete all items. Include in these subsections the information essential to comprehend and replicate the study. Insufficient detail leaves the reader with questions; too much detail burdens the reader with irrelevant information. Consider using appendices and/or a supplemental website for more detailed information.

2.2. Instrumentation

The survey instrument used in this study "Relevance of Science Education (ROSE) Test" was developed by international team science educators for cross-cultural comparisons of students' perceptions of science and science education. Also, an international advisory group has been established to serve as main partners in the development of the ROSE instruments (e.g., Akenhead, Jenkins, Ogawa, & Corrigan). Face validity was established by review of the instrument by an international panel and subsequent field testing in three countries. ROSE involves a wide range of countries from all continents. Key international research institutions and individuals work jointly on the development of theoretical perspectives, research instruments, data collection and analysis.

In this study, for the US students, the final version of the questionnaire was written in English so that problems of translation into another language did not arise in connection with the study reported. For Turkish student, it was translated to Turkish by the English, Turkish and Science educators. In the Turkish edition, firstly the original version was translated from English to Turkish by the one of the researchers and science educators checked all item on the questionnaire as Turkish science curricula for content validity. Secondly, the Turkish version was controlled by the Turkish specialist. Thirdly, an English specialist checked the translation version. Fourthly, Turkish specialist again controlled as to Turkish grammar. Fifthly, Turkish version written as to grammar was again translated to English. Finally, original ROSE questionnaire was compared with translated English version by the English specialist. Researchers decided to translation process that it was structured as correct. Then, researchers applied final Turkish version for Turkish students.

In the present article, attention is focused on students' out-of-school experiences related to science, priorities related to their future job, perception toward themselves as a scientist. Thus, it was used the following three subtests in original survey instrument: "My future job" (Question B), "My out of school experiences" (Question H), and "Myself as a scientist" (Question I). Reliability was determined by calculating internal consistency for each subtest. Cronbach's coefficient alpha statistics for each subtest included: out-of-school experiences (The United States sample=0.91, Turkish sample= 0.91), My Future Job (The United States sample=0.81, Turkish sample= 0.83). It was explained below these subtest based on Schreiner (2006), Schreiner and Sjøberg (2004), and ROSE Project Handbook (Schreiner & Sjøberg, 2002).

My future job (Question B) subtest has been explored priorities that students have for their future and affecting their approaches toward learning. This subtest includes 26 statements which might be important for the choice of a future job. These statements are arranged a 4 –point Likert scale from Not important (coded 1) to Very important (coded 4). Missing responses were coded 9. My future job subtest included items describe students' priorities in the following dimensions of their future work: (1) Self-realization (B9, B13, B15, B16, B25); (2) Work creatively (B8, B10, B11); (3) Leisure priorities (B12, B17, B23), (4) Care for surroundings (B1, B4); (5) Power and glory (B20, B21, B22, B24);

(6) Dynamism and excitement (B5, B18, B19, B26); (7) Fix; use hands and tools (B6, B7). A t-test was used to examine differences in responses by students' culture.

My out-of-school experiences (Question H) subtest has designed to explore the prior experiences that students affect their teaching and learning science. This subtest asked students to respond "How often have you done this outside school?" for duties such as "visited a zoo" or participated in fishing". These statements are also arranged a 4 –point Likert scale from Never (coded 1) to Often (coded 4). Missing responses were coded 9. A t-test was conducted to determine if cultural differences in student experiences were present.

Myself as a scientist (Question I) subtest has aimed to exposed students' ideas about science and scientist. This is the only open-ended question, where the pupils are invited to express opinions with their own words. The question has two parts. The first asks about what they would like to work on, the other asks for reasons for this particular choice. As recommended by the ROSE project organizers on the website, students' responses were coded into predetermined categories by the organizers. The first part which students answers' were coded as to scientific field (biology, technology, chemistry, physic, psychology, social and economic sciences, etc.) and students thinks about why they study this fields were coded five groups (Curiosity, interests, seems fun, want to, exciting, Related to the profession I want, Important in general or for society/humanity, Help (people, animals, etc.), Get rich, popular, famous). Student answers that don't to take part scientific fields and reasons were coded "other" group. After all data are coded, frequencies, percent and chi-square values were calculated for each item.

3. Results

3.1. Out of school experiences

As shown Table 1, there were significant differences for 37 of the out of the school experiences. More Turkish students than U.S. students reported prior experiences outside of school including collecting stones and shells, watching an animal being born, caring for animals on a farm, milking animals, making dairy products, using a windmill and a science kit, charging a car battery, taking herbal medicines or had alternative treatments. More U.S. students that Turkish students reported prior experiences such as visiting a science center or science museum, planting seeds, using a camera, a mobile phone, binoculars, and an air gun or rifle, measuring the temperature with a thermometer, searching the internet for information baking bread, playing computer games. However, there were no cultural differences for 24 of the out of the school activities, including experiences such as, been to a hospital as a patient, recorded on video, DVD or tape recorder, opened a device (radio, watch, computer, etc.), made a model such as toy plane or boat etc., visited a zoo).

Table 1. Percent of out of school experiences by country

Statements	Turkey	USA		
	Mean (SD)	Mean (SD)	t	p
Higher Turkish Students reports				
Collected different stones or shells	2.51 (1.12)	2.27 (1.12)	2.057	.040
Watched (not on TV) an animal being born	2.18 (1.12)	1.90 (1.14)	2.379	.018
Cared for animals on a farm	2.42 (1.09)	1.89 (1.12)	4.522	.000
Milked animals like cows, sheep or goats	2.12 (1.14)	1.63 (0.98)	4.146	.000
Made dairy products like yoghurt, butter, cheese or ghee	2.16 (1.12)	1.74 (1.01)	3.558	.000
Taken herbal medicines or had alternative treatments (acupuncture, homeopathy, yoga, healing, etc.)	2.09 (1.08)	1.69 (0.98)	3.595	.000
Used a science kit (like for chemistry. optics or electricity)	2.31 (1.12)	2.07 (1.20)	1.991	.047
Used a windmill, watermill, waterwheel, etc.	2.20 (1.12)	1.91 (1.18)	2.416	.016
Charged a car battery	2.13 (1.20)	1.72 (0.99)	3.406	.001

Table 1. Percent of out of school experiences by country (Continued)

Higher U.S Students reports				
Tried to find the star constellations in the sky	2.30 (1.18)	2.67 (1.06)	2.999	.003
Visited a science center or science museum	2.71 (1.05)	2.93 (0.98)	1.973	.049
Participated in hunting	2.12 (1.14)	2.55 (1.37)	3.339	.001
Participated in fishing	2.15 (1.13)	2.79 (1.18)	5.235	.000
Planted seeds and watched them grow	2.48 (1.05)	2.83 (1.12)	3.017	.003
Put up a tent or shelter	2.28 (1.06)	3.07 (1.01)	7.072	.000
Made a fire from charcoal or wood	2.43 (1.05)	2.73 (1.25)	2.553	.011
Prepared food over a campfire. open fire or stove burner	2.33 (1.13)	2.64 (1.18)	2.588	.010
Cleaned and bandaged a wound	2.60 (1.04)	3.20 (0.96)	5.466	.000
Seen an X-ray of a part of my body	2.49 (1.13)	2.86 (1.07)	3.127	.002
Taken medicines to prevent or cure illness or infection	2.44 (1.14)	2.88 (1.08)	3.649	.000
Used binoculars	2.52 (1.12)	2.84 (1.13)	2.678	.008

Used a camera	2.63 (1.11)	3.41 (0.85)	6.943	.000
Used an air gun or rifle	2.20 (1.17)	3.10 (1.51)	6.707	.000
Made a model such as toy plane or boat, etc.	2.33 (1.13)	2.87 (1.16)	4.482	.000
Changed or fixed electric bulbs or fuses	2.31 (1.16)	2.61 (1.13)	2.498	.013
Measured the temperature with a thermometer	2.52 (1.11)	3.17 (0.84)	5.862	.000
Used a measuring ruler. tape or stick	2.51 (1.13)	3.19 (0.97)	5.830	.000
Used a mobile phone	2.73 (1.10)	3.17 (1.17)	3.738	.000
Searched the internet for information	2.81 (1.12)	3.55 (0.75)	6.650	.000
Played computer games	2.76 (1.12)	3.54 (0.81)	6.949	.000
Used a dictionary, encyclopedia. etc. on a computer	2.72 (1.14)	3.21 (0.95)	4.183	.000
Sent or received e-mail	2.47 (1.15)	3.43 (0.96)	8.138	.000
Used a word processor on the computer	2.42 (1.10)	3.34 (0.98)	8.049	.000
Baked bread, pastry, cake, etc.	2.37 (1.21)	3.28 (0.92)	7.411	.000
Cooked a meal	2.67 (1.10)	3.16 (0.99)	4.228	.000
Used a rope and pulley for lifting heavy things	2.12 (1.11)	2.53 (1.16)	3.445	.001
Used tools like a saw. screwdriver or hammer	2.45 (1.17)	2.91 (1.10)	3.699	.000

$p<0.05$

Turkish students in this study reported they had biologically oriented experiences (milking animals like cows, caring for animals, watching an animal being born, making dairy products like yoghurt, butter, taking herbal medicines or had alternative treatments) and physical sciences oriented experience (charging a car battery, using a science kit, using a windmill) . However, although U.S. students reported they had technologically oriented experiences (using a camera, a mobile phone, binoculars, playing computer games, searching the internet for information, Sending or received e-mail) they also reported biologically oriented experiences (planting seeds, baking bread, participating hunting and fishing) and physical sciences oriented experience (using a rope and pulley for lifting heavy things, changing or fixing electric bulbs or fuses).

3.2. Importance for a future job

There were statistically significant differences by culture for 16 of the characteristics of future jobs, as shown Table 2.

As seen Table 2, more U.S. students than Turkish students wanted to “work with animals”. “Use talents and abilities”. “Have lots of time for friends, family, interests, hobbies, and activities”. “Control other people”. “Work at a place where something new and exciting happens frequently”. “Become famous”. “Work with something that find important and meaningful and fits my attitudes and values”. More Turkish students than U.S. students wanted to “Work with people rather than things”. “Help other people”. “Work in the area of environmental protection”. “Work artistically and creatively in art”. “Work independently of other people”. “Become 'the boss’ at my job”. There were no cultural differences for 10 of the out of the characteristics of future jobs including characteristics such as working with something easy and simple, working with machines or tools, making my own decisions, earning lots of money, developing or improving my knowledge and abilities.

Table 2. Students’ reported important characteristics for future job (Turkey and USA)

	Turkey	**USA**		
	Mean (SD)	Mean (SD)	t	p
Working with people rather than things	3.00 (1.07)	2.78 (0.98)	1.982	.048
Helping other people	3.50 (0.81)	3.28 (0.93)	2.481	.013
Working with animals	2.50 (1.08)	2.91 (1.09)	3.504	.001
Working in the area of environmental protection	3.14 (1.04)	2.47 (1.15)	5.805	.000
Working artistically and creatively in art	2.95 (1.10)	2.61 (1.20)	2.818	.005
Using my talents and abilities	3.32 (0.99)	3.63 (0.76)	3.080	.002
Having lots of time for my friends	2.81 (1.04)	3.34 (0.92)	4.902	.000
Working independently of other people	2.92 (1.05)	2.58 (1.06)	3.044	.002
Working with something I find important and meaningful	3.28 (.95)	3.64 (0.68)	3.811	.000
Working with something that fits my attitudes and values	3.02 (1.00)	3.59 (0.78)	5.551	.000
Having lots of time for my family	3.20 (.95)	3.66 (0.62)	4.864	.000
Working at a place where something new and exciting happens frequently	3.05 (1.03)	3.36 (0.90)	2.962	.003
Controlling other people	2.81 (1.09)	3.33 (0.90)	3.630	.000
Becoming famous	2.55 (1.17)	2.80 (1.14)	2.051	.041
Having lots of time for my interests. hobbies and activities	3.22 (.94)	3.46 (0.77)	2.485	.013
Becoming 'the boss' at my job	3.07 (.98)	2.55 (1.12)	4.805	.000

$p<0.05$

3.3. Perception toward themselves as scientist

The answers to the question “If you were a scientist in which field would you like to work?” to the students from Turkey and America is shown on Table 3. It was seen that the Turkish and American student only had separate thoughts in 4 fields of studies (Biology. Technology, Chemistry, Social and Economic Science).The American students were more willing than the Turkish students to work in the fields that are in the brackets.

In the field of biology; “Deceases, medicine, cure” and “Animals, plants, nature” interested the students. Also some American students wanted to work on some other topics of Biology that were not in the ROSE instrument. These subjects are “General biology” and “Marine biology” and in the field of Technology; “Weapons”, in the field of Chemistry an “Atomic reactions, etc.” were the subjects they wanted to work on. They implied that the reason why they wanted to study on these subjects were; “Curiosity. Interest, seems fun, wanting to, excitement”, “Importance in general or for society/humanity” and “Help (people, animals, etc.)”.

Table 3. “Myself as a scientist”: cultural differences in responses

	Turkish students	**USA students**	**Chi-square**	**p**
What	f (%)	f (%)	X^2	Level of Significance
Biology: deceases, medicine, and cure	23 (6.3)	32 (27.6)	39.057	.000
Biology: animals, plants, and nature	11 (3.0)	17 (14.7)	21.584	.000
Biology: other	1 (0.3)	3 (2.6)	5.668	.017
Technology: weapon	0 (0.0)	2 (1.7)	6.285	.012
Chemistry: atoms, reactions, etc.	1 (0.3)	4 (3.4)	8.567	.003
Social and economic science	0 (0.0)	2 (1.7)	6.285	.012
Why				
Curiosity, interests, seems fun, want to exciting	86 (23.7)	83 (71.6)	88.186	.000
Important in general or for society/humanity	5 (1.4)	10 (8.6)	15.204	.000
Help (people. Animals, etc.)	36 (9.9)	29 (25.0)	17.051	.000

$p<0.05$

4. Discussion, implications, and limitations

4.1. Discussion

The results of this study show significant cultural differences in out-of-school science experiences for middle school students. The middle school years are defined as a critical stage and the last opportunity for students to relate to science and technology in any organized framework (Scherz & Oren, 2006). It is very important in High School to direct the student to the field they have interest and skills in science, before their career choices. Otherwise, without finding out the interest and skills for science upon the student we might not be able to get the results we wanted in training up well qualified scientists and engineers.

In the ROSE Project the comparison of cultures of the high school students is generally done. High School is a late period to direct the student in their educational and career choices. The ROSE results can give us an idea of about the interest to Science and Technology, according to the countries of the students who will be sharing the world in the future. The results of this study can at least help us direct the student earlier to the studies of Science and Technology for at least the students of Turkey and America.

The data from subtest “Out of School Experiences” showed that American students compared to Turkish students are more interested in some of the activities in the field of Physics and Biology particularly reported having more interest in the Technologically oriented out ofschool experiences (e.g., using a camera, a mobile phone, binoculars, searching the internet for information). As mentioned before “Out of School Experiences” changes depending on the educational environment, family, socio economic status, cultural, and ethnic origins. In this context, we can say that, living in a country that is stronger in economy, the American students have more technology in their environment out of the school compared to the Turkish students and that they use these opportunities.

Besides it is noticeable to see that the Turkish students compared to the American student are more interested Biology related activities (milking animals like cows. caring for animals. watching an animal being born. making dairy products like yoghurt. butter. taking herbal medicines or had alternative treatments). If we focus on these activities it is noticeable that the activities need little or no technology and tool or devices. In both the countries the practice is done in schools that are in the urban parts of the cities and the students are in the same age group. There was a difference in the activities the students were interested in the “Out of school Experiences”. We can explain the difference by the educational environment, socio economic status, and cultural features. It is noticeable to see the difference in the answers given to the questions under the topic of Science and Technology by the students from England or other developed countries compared to students from Turkey or other developing countries (Jenkins, 2006).

Another test the sub-test being “My future job” according to the data there was a noticeable difference in most of the questions between the American students and Turkish students about the priorities that interfere with job selection.

According to the Turkish and American students they have declared that the most important features that they will be looking for in their future careers are: self-realization including using their talents and abilities. working with something they find important and meaningful, working with something that fits their attitudes and values; leisure priorities including having lots of time for their friends, having lots of time for their family, having lots of time for their interests, hobbies and activities; dynamism and excitement including working at a place where something new and exciting happens frequently; and power and glory includes becoming famous.

According to the Turkish and American students care for surroundings including working with people rather than things and working in the area of environmental protection; work creatively including working artistically and creatively in art; power and glory including becoming 'the boss' at their job will be their priorities and features when their future career choice. Beside it was found that the Turkish students compared to the American students were more involved in helping other people, working with animals, working independently from other people. These kinds of features were the priority for the in the choice of employment for them. When we take notice of the cultural features the American students who live more individually when they are doing their career choice they prefer to work with people get noticed by the other people, become famous, needs to be exiting and help them in their individual development. Compared with the American community having a more social life, the Turkish students prefer to work in professions that are in need of individual work, environmental protection, independent and creativeness. In almost in every single house in America there are pets like cats and dogs kept, in the future career choices it is found that the American students compared to the Turkish students take more interest in working with animals. American samplings belonging to Jones, Howe & Rua (2000) out of school experiences related to science affect the most in their employment choices, according to investigations related to science and the scientists senses the findings in this investigation are not related to the findings of the American students.

In the last sub test it was asked to the students in which scientific topic they would like to do research and with open ended questions. According to this sub test the data showed that the American students compared with the Turkish students wanted to do more research about biology including deceases, medicine, cure, animals, plants, nature; technology including weapon; chemistry including atoms, reactions, etc.; and social and economic science. Furthermore the American students compared to the Turkish students informed the reasons why they wanted to do research as: a) Curiosity, interests, seems fun, want to, exciting and b) Important in general or for society/humanity.

Also in this research Roe's theory is the theory that in addition made us see the research in different perspective. Roe's (1952) stated that early extracurricular interests that appeared to relate directly to later career interests (Joyce & Farenga, 1999). According to Lyons (2003) it is a wrong approach to assume the career choice is not done directly and only by the scientific experience they get at school but it has so many different factors and some of these factors are out of the control of the school.

4.2. Implications

What are the implications of these findings for research in school science education including teachers, interest researchers, and curriculum developers? Some cautions are needed in replying this question.

4.2.1. Implications for teachers

Although each student' interests have a crucial factor on learning, their usage in educational settings may be problematic. Hide& Anderson (1992) state that catering to the personal interests of individuals in the classroom might be an extremely time-and effort- consuming task, especially if the classes are large. However, a few steps have already been taken down the path of incorporating students' interest into the science classroom (Baram-Tsabari, Sethi, Bry, & Yarden, 2006). Today, school science curricula in most of the countries, design based on students' needs and interests. The organization of a curriculum has an influence on the teaching method of the content. Interest plays a role in learning through its contribution to individuals' connections to the content; it helps maintain this connection long enough for learning to take place (Ainley, Hidi, & Berndorff, 2002). Expert teachers can use students' individual interest in their classrooms as opening points or triggers for the study of less popular subjects which are required by the curricula (Baram-Tsabari, Sethi, Bry, & Yarden, 2006). In some educational approaches, such as science fairs, problem-based learning, project based learning are taken into account students' interests as a pedagogical tool. Teachers in these educational contexts allow students to create their own research questions based on their lives, experiences and interests within a given topic. Interest in science is also an educational goal since more interested students are more likely to pursue science-related careers (Tai, Liu, Maltese, & Fan, 2006). In this context, another implication of this study would be prompt science teachers to help more students for orient and motivate advanced science course and careers based on their students' interest in science.

4.2.2. Implications for Curriculum Developers

Adults including politicians, teachers, researchers, scientists, and other stake holders, construct the curriculum based on their notions of what appeals and is important to children. Hagay & Baram-Tsabari (2011) suggested a strategy for incorporating students' interests into the formal science curriculum by drawing on the political meaning of “shadow government” defined as alternative policies developed by parties not in office. A “shadow curriculum” is an annotated curriculum that reflects the interests and informational needs of its users. A “shadow curriculum” thus reflects the interests and information needs of those who have no voice in deciding what the formal curriculum should include, although they are the ones who are most influenced by it. Students’ input is mapped to the relevant milestones in the curriculum and their contributions are translated into the curricular language of principles, phenomena, and concepts (Hagay & Baram-Tsabari, 2015). The implications of this study help us better understanding for incorporating students’ curiosity questions into the curriculum as a way to reduce the disparity between students’ interests and curricular requirements and using a human context may useful to be more of a turn on.

4.2.3. Implications for Interest Researchers

All studies have limitations and this study is no different. Before all in this study the sample, extent has a limitation. The study could be restructured by extending the sample having the same age group and including more cultures. When we focused on the difference of the cultures in this study we did not look at the connection of the out of school activities and the priorities in their career choices. In the studies after this we can look at the effect of out of school activities and the scientific study they want to do or the connection between the out of school activities and the priorities in their career choices.

In this study, the responses given by the students are subject to the general limitations of any questionnaire-based study and to those that follow from using a Likert-type scale for scoring responses. These limitations are well-rehearsed in the methodological literature (Robson, 2002) and are therefore not repeated here. The findings in this survey can be built up with findings of more accurate and well-qualified methods such as observation, vision, and focus group.

Additionally, to be able to form a more accurate table and if possible for the cultural contexts the answer to the following questions can be investigated. The interest and approach of the students for science, scientist, scientific studies and experiences, priorities in their future career choices: Can the difference be attributed to school-based factors such as the content of the science curriculum, the way science is taught and/or assessed and the alleged difficulty of the physical sciences as subjects of study? How important are other factors such as the influence exerted by parents, students’ peer groups within and outside school or careers’ advisers, and what is the nature and extent of their interaction? How and why do students’ attitudes towards, and interest in. science and technology change as they progress through compulsory schooling and how are any changes related to success in these subjects at school and to the factors that influence that success? These questions can be answered using different research pattern and models.

As a result, it is impossible to catch a standard single style scientific education. Even if similar educational programs are used our educational scientific and technologic output will not always be the same. The results in this study indicate this. Every culture has their own dynamics but cultures can learn from one another.

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