



Families' Attitudes towards Science and Science Education

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Abstract

It is important for today's education to assimilate and relate science with daily life. New education systems aim to raise individuals in this aspect. If it is about individuals then social environment includes itself into education process. Since families are the most small unit in social environment and eventually families are involved in educational process more than before. Thus the idea to investigate families' influence on education is becoming one of the crucial elements in education dynamics. In the light of this philosophy it is assumed that families affect their children's attitudes towards science and science courses. Thus main aim of this study is to investigate attitudes of families' towards science and science courses. To obtain the required data families are given a questionnaire which is consisted by 30 questions. Families' demographic data is also obtained through study and in addition to main problem; four sub-problems are determined and also investigated. For the analyzes of the data; reliability analyzes of the questions are done through Cronbach alpha values. Relations among items are determined through Spearman's correlation method, frequency table and ratio table is also done. Factor analyzes are also done the statistical values of the sub-problems.

Keywords: Science, Technology, Family, Attitude, Student attitude.

Introduction

Dogan¹ defines education as a process involving many elements within itself and one of the elements is individual's character. That character is shaped through many ways and family acts as a highway in this process. Thus a successful education system has to consider and contain families' attributes within its system and should drive those attributes into a desired solution which means students' gaining. Senemoglu² expresses individuals' experience is crucial for the educational gaining and those gaining could be achieved through experience. The very first step of experience directly comes from the family. According to Akgun³ second step is school system which enters the process after family and more experience gained in time, however the most important thing in that experience is that; it involves teachers and their students. Niu⁴ implies that situation turns schools and families into a gear of a big mechanism. But that mechanism should not be mistaken with mechanical ones, in fact it is a social mechanism which contributes many aspects of society and hence families.

Both Bergman⁵ and ŞendilandBalkan⁶ state that it is a well known fact that parenting styles affect the children attitudes and that causes different student character in the school. A democratic parenting style mostly leads the child to be an enthusiastic person whose interest is towards learning, an individual who has self-esteem, self-confidence, self-determination. An authoritarian parenting style mostly leads children to be an individual who has

the opposite attitudes and thoughts about him/herself or the world. Of course academic achievement of the students is also affected by parenting style or even by their interests. It is widely accepted that parents' interest affects their children success at school. A supportive parenting style helps the children to be successful at school. Researches show that most students who have low academic success come from families who has a disinterested parenting style.

In addition to Bergman⁵, Vural⁷ also indicates families are neither unique nor similar to each other. Every family has its own way of life and essentially effect on the education. That case leads education specialists to know families' idea and interaction with education. Thus for science education it is important to know families ideas and attitudes to science since science education itself directly related with science.

Wang and Wildman⁸ in their research mention that there are researches showing family commitment to the children's education has a positive effect on the students and students who have higher academic achievement than their peers usually comes from families who show commitment to their children's school success. Of course that success is also related to elimination or controlling of negative impacts and enhancing positive impacts coming from families. Purewal and Hashmi⁹ also state the family context and environment is one the factors which may affect the children' education negatively or in the

reverse way. Social norms can create inequalities in educational opportunities which as a consequence have great influence on education. Such as gender differences of the children and opportunities offered to boys or girls. In low developed countries it is a fact that girls do not have the same opportunity for education like boys. That situation might also be seen at conservative social structures.

Lastly, Niu⁴ points out that effect of families is not only related with families' education or their interest towards to education. Socio economic status (SES) of families is also one of the key factors affecting the education. Niu⁴ states that families' socioeconomic conditions is one of the factors affecting students' academic ambitions and courage which directs the students to attend to colleges. Other studies indicated by Caro, Cortina and Eccles¹⁰ show that children of families with low SES tend to develop less cognitive functions than their peers and that situation starts from even pre-school age up to adulthood. Hence those children have low academic achievement at school, tend to leave school early and have less ambition on pursuing post-secondary education. When they become an adult they have less success in labor market when compared with children of families with higher SES.

Purpose of the study: Main purpose of this study is to determine the ideas of families related to science and science education and effect of these ideas on students' tendency towards science and science education.

To investigate main problem; four sub-problems are determined. Those sub-problems are; i. parents' ideas on science, ii. interest level of parents to technology, iii. effect of families' on students tendency towards science education, iv. support level of parents to students' science education.

Methodology

A likert type scale is prepared as a data collecting instrument. Participants are 60 parents whose children studying at elementary school in Erzurum eastern province of Turkey. All parents' children are attending same elementary school. To prepare an efficient scale; a pilot scale is prepared and applied previously selected parents whose children are also studying at the same elementary school. After analyzing the reliability, items lowering reliability are removed from the scale. After that scale is finalized and applied to participants. Frequency table and ratio (%) table are done to examine the obtained data. Scale is divided into two parts. First part aims to determine demographic attributes of families; second part aims to determine attitudes of parents on the sub-problems.

Results and Discussion

Data and Its Implications: To determine SES of families; parents' job and their monthly income are investigated and results are shown in Table-1 and Table-2.

Table-1 implies that each job category is close to each other in numbers. Data in Table 2 could be divided into five sub SES categories. Table 2 shows SES of families mostly belongs to low SES and mid SES which is first and second row respectively. Total amount of Low-SES and Mid-SES 40% + %45 = %85 is also considered to reflect SES of parents in the city in which research is carried out.

Table-1
Job of parents

Job	Frequency	Percentage
Government civil servant	12	20
Freelancer	20	33,3
Worker	11	18,3
Other	17	28,3
Total	60	100

Table-2
SES of families

Income (Turkish Lira)	SES Category	Frequency	Percentage
500-1000	Low SES	24	40
1000-1500	Mid SES	27	45
1500-2000	Semi High SES	6	10
2000-2500	High SES	2	3,3
2500 and above	Above High SES	1	1,7
Total		60	100

Table-3
Parents' Education Level

Education	Frequency	Percentage
Primary School	14	23,3
Elementary School	6	10
High School	24	40
University	16	26,7
Total	60	100

Table-3 shows that there are not any parents who did not attend a school and they all know how to read and write. 66,7% of parents have theoretical science literacy with respect to education they have (university + high school). It is also assumed that most of the parents have the knowledge between science and science education.

Table-4 points out number of children in the families. It is a usual case that families with Low-SES and Mid-SES tend to have more children. Another point from the table is that; families with 3 or more children consists of 74,9% and families with 4 or more children consist of 39,9% of the sample. Table also implies that money spend on each children education is divided to 3 or 4.

Table-5, items 2, 3, 5 and 6 aims to determine level of parents' science literacy and its relation with daily life. However it is also shown in the table that those items have the lowest percentage among other items in the table. Their frequency is (% 66,6), (% 51,6), (% 45) and (% 53,3). This is very interesting because although parents state that science and science education is important in life, yet it is also revealed by the questionnaire that they are unable to comprehend relationship between science and daily life. When other items are examined it is also understood from the table highest percentage accumulated on the items related with job occupation, such as items 7 and 8. Their frequency is (% 86,6) and (% 75).

This also approves the idea that parents support their children in science education due to economic reasons since jobs related with science is also high paid jobs such as engineering and medicine.

Table-6 shows that parents' attitudes towards technology is not high as expected. Parents are not interested in all the branch of science (35%) and are mostly focused on opportunities offered by science such as occupation which usually means high paid jobs. Table also implies that analyzes of Table 5 is coherent with analyzes of Table-6.

Table-4
Children number of parents

Children Number	Frequency	Percentage
2	15	25
3	21	35
4	17	28,3
5	5	8,3
6 and above	2	3,3
Total	60	100

Table-5
Parents' attitudes towards science

	Always		Usually		Sometimes		Rarely		Never	
	f	%	f	%	f	%	f	%	f	%
1. I pay attention to the science	39	65	14	23,3	6	10	1	1,7	0	0
2. I take advantage of my science education background	20	33,3	20	33,3	11	18,3	6	10	3	5
3. Science education I took is enough for me	8	13,3	23	38,3	5	8,3	21	35	3	5
4. Science is interesting for me	27	45	19	31,7	9	15	3	5	2	3,3
5. I have enough science knowledge for myself	9	15	18	30	11	18,3	17	28,3	5	8,3
6. I associate my life with science	14	23,3	18	30	17	28,3	8	13,3	3	5
7. I want my kid to have a profession related with science	38	63,3	14	23,3	3	5	4	6,7	1	1,7
8. I prefer science due to the fact that there are more job opportunities	24	40	21	35	6	10	4	6,7	5	8,3
9. I indoctrinate my kid to be a better scientist	25	41,7	20	33,3	10	16,7	5	8,3	0	0

Table-6
Parents' attitudes towards technology

	Always		Usually		Sometimes		Rarely		Never	
	f	%	f	%	f	%	f	%	f	%
10. I keep abreast of the advances in science	10	16,7	16	26,7	22	36,7	6	10	6	10
11. I am interested in all branches of science	9	15	12	20	13	21,7	19	31,7	7	11,7
12. I wish I had a job related with science	23	38,3	10	16,7	10	16,7	10	16,7	7	11,7
13. Science and Technology is part of my life	29	48,3	12	20	4	6,7	9	15	6	10
14. There are science magazines and books in our house	18	30	15	25	11	18,3	13	21,7	3	5
15. I am interested in visiting the science and technology centres	17	28,3	18	30	14	23,3	6	10	5	8,3
16. I purchase new technological devices	6	10	14	23,3	17	28,3	9	15	14	23,3

Table-7
Parents' attitudes to guide their children to science education

	Always		Usually		Sometimes		Rarely		Never	
	f	%	f	%	f	%	f	%	f	%
17. I ask ingredients of chemicals (cleaning, coloring etc.) used at home	8	13,3	5	8,3	17	28,3	14	23,3	16	26,7
18. I subscribe science and technology magazines for my kid	5	8,3	4	6,7	3	5	7	11,7	41	68,3
19. I make my child to take extra science and technology courses	17	28,3	8	13,3	9	15	11	18,3	15	25
20. I make my child to take science and technology seminars	10	16,7	9	15	9	15	12	20	20	33,3
21. I ask my kid questions about physical phenomena happening around us	13	21,7	18	30	21	35	6	10	2	3,3
22. I encourage my kid for phenomena related with science	29	48,3	17	28,3	9	15	4	6,7	1	1,7
23. I create opportunities for my kid to make observations	19	31,7	24	40	7	11,7	7	11,7	3	5
24. I let my kid use our house like a lab	12	20	10	16,7	16	26,7	10	16,7	12	20

Table-7 implies that although parents claim that they are supporting their children towards science yet it is clearly understood from the item 18 (15%) they do not subscribe to science magazines for their children. For item 22 and 23 parents claim they support their children to make observation on phenomena happening around themselves yet they do not encourage their children in daily household appliances such as asking chemical attributes of cleaning materials which are used at home. In item 24 it is also seen that parents do not approve their children to use the house as a laboratory. it is also

understood from the data and previous tables that parents mostly concerned about the grades of their children get at school courses. Frequency table for the items 19 and 20 also approves that idea.

Table-8 implies that parents think giving academic support or supplying materials which are not regarded as harmful by the parents is a good way and caring way to support their children science education (item 25, 28, 29 and 30). However it is also understood from the table that parents do not encourage their

children in plays or actions regarded as dangerous by the parents such as tampering with the devices at home (item 27) which also has the lowest ratio 40% (through reverse coding).

Although parents claim that they let their children to play with electrical devices which are used at home (item 26), still it contradicts with previous item answers.

Reliability analyzes of each sub problems are done and it is found out that first three sub-problems' reliability fall in acceptable category whereas fourth sub-problem falls in poor category.

Data in Table 10 is analyzed with respect to Pearson correlation. Correlations between items and demographic characteristics examined with respect to data obtained. According to data in Table 10 items 25, 26 and 30 shows positive correlation with occupation where item 27 shows negative correlation. Parents

who are working as government civil servant are usually have high school or university degree.

However parents whose occupation fall within other categories do not require to have similar degree in their education life. It is clear that parents who have high school or university degree do not like their children to use computers. Reason for that is believed due to children computer usage habits. Children tend to use play games, using internet as a socialization tool which might be regarded as time waste. On the other hand educated parents see that as a unnecessary thing. Same situation applies for the 26th and 30th items. However 27th item shows a negative correlation.

That means parents who have higher education degree like their children to tamper with tools at home. One of the possible reasons for that might be related with economic conditions of the parents. Parents who have higher income do not afraid their children to break the tools.

Table-8
Parents' support to their children in science

	Always		Usually		Sometimes		Rarely		Never	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
25. I am content with my kid's spending time on computer	22	36,7	11	18,3	16	26,7	4	6,7	7	11,7
26. I am content with my kid's using electrical devices	22	36,7	12	20	11	18,3	7	11,7	8	13,3
27. I dislike my kid's tampering the devices at home	13	21,7	7	11,7	16	26,7	10	16,7	14	23,3
28. I purchase the publications containing intelligence training games for my kid	17	28,3	7	11,7	15	25	10	16,7	11	18,3
29. I purchase intelligence developing toys for my kid	18	30	11	18,3	11	18,3	8	13,3	12	20
30. I enjoy to take my child to technology centers	14	23,3	11	18,3	18	30	7	11,7	10	16,7

Table-9
Reliability analyzes of scales related to four sub problem

Sub Problem	Cronbach's Alpha	Number of Items
1. Sub Problem	,791	9
2. Sub Problem	,795	7
3. Sub Problem	,777	8
4. Sub Problem	,546	6

Table-10
Pearson Correlation of Items

Variable		ITEMS			
		25	26	27	30
Occupation	Pearson correlation	,342	,257	-,333	,262
		,008	,047	,009	,043
		25	26		
Education	Pearson correlation	-,261	-,319		
		,044	,013		
		27			
Income	Pearson correlation	-,440			
		,000			

Conclusion

This study reveals that parents' support towards their children science education is positively related with families' economic conditions. Caro, Cortina and Eccles¹⁰ also draw similar conclusions on their study. An interesting outcome of the study is that although parents try to support their children science education yet they also do not comprehend relationship of science with daily life. One of the possible reasons for that is might be lack of science experiments they had in the school. Due to that negative factor parents also do not encourage their children on chemical experiments since it requires expertise and experience. In fact parents encourage their children to make observations on physical phenomena which are also regarded as safe and need less expertise. Which draws the idea that schools should be encouraged to have more science facilities and by that way children could avoid being in the same situation of their parents. Another interesting thing is that parents do encourage their children towards science education due to economic benefits of science related jobs. For that reason parents also do encourage their children to take extra science courses or seminars. Purewal and Hashmi⁹ also states that rational behind sending children to school and investing in them is the idea of that one day children will be economically productive contributors to the family.

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