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The Effects of the Characteristics of Adolescence on the Science Process Skills of the Child

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Abstract: The research has been carried out in order to raise the interest levels of the adolescents who study at the secondary school for science and technology and in order to determine the science process skills to establish the information themselves by finding out the research ways like a scientist. Scanning technique is used in the research. The research has been carried out on the secondary school students whose socio-cultural level is high and study at Yavuz Selim Primary School which is in the centre of Sivas and on the students whose socio-cultural levels are comparatively rather low and study at Kıranardı Primary school which is far from the city centre of Kayseri at 2006-2007 education period. In the research, Science process skills test is used to test the science process skills the adolescents own. The data gained from this testing vehicle (too) have been evaluated by the help of t-test and analyze. Consequently; it has been discovered that the science process skills of the adolescents do not differ according to their sexes and ages but according to their socio-cultural conditions.

Key words: Adolescent, science process skills, science and technology, education

INTRODUCTION

The most important part of the human beings thought their lives is perhaps the adolescence which takes part between the childhood and adult period. Recently, the interest on the last periods of adolescence and the subjects about being an adult is increasing. The concern of first years of being an adult shows that this process has an important impact on human life and that the period from childhood to adultness is getting longer (Shullman and Ben-Artzi, 2003). Although it is claimed that the researches about the adolescence started in the 20 century, some writings of Aristo and Plato about the behavioral structures of adolescents have been found (Petersen, 1988).

According to Adams (1995), the adolescence is a process which includes education, maturation and waiting as the basic responsibilities which should be faced. Another adolescence definition from the point of view of psychology is that it is the process of alterations which occur at the behavior and cognitive skills of the person (Papalia *et al*., 1998).

The adolescent does not become mature only by getting older or getting taller. Maturity improves with the help of some certain interpersonal experiences and educational results or success (Adams, 1995).

It is observed that the people who spent their last education years as successful confused or undecided individuals went on their adultness period mostly on the same way. It is generally one of the hardly achieved works to come up with the thing that could not be succeeded at the adolescence period at the next term. That is, a healthy adolescence personality development means that this development will also go on at the adultness period (Josselson, 1987).

Forisha-Kovach (1983) has put the factors that affect being successful or fail at the school in an order like this; approaches of the parents, the influence of the friend groups, the effects of the teachers, school size (big or small), characteristics of the school (traditional or modern). With the help of the researches that have been carried out in order to determine the relation between the academic success and socio-economical factors of the students at the adolescence, it is found out that academic achievements of the students with higher socio-economic level is higher (Berber, 1990; Türkan, 1990). Studying comprehension of the children start generally in the family. As the young children get nearer to the adolescence, parents affect them directly or indirectly. This influence may be on the form of undertaking the family business or the expectation of going on the job of one of the parents (Gander and Gardiner, 1993).

The school life at the adolescence and the life style of the parents has an effect on the future tendency of the adolescent. The results of the most studies have come to a conclusion that the future tendency of the adolescents has been shaped according to the cultural-sex roles and past experiences in that culture (Nurmi, 1987).

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According to the researches that have been carried out to define the effect of the social class of the adolescent on him, there are some findings about the raise at the income level of the family and education level also increase the level of self respect of the child (Kulaksızoğlu, 1998). Palmonari *et al.* (1991), at the and of their study, stated that the level of overcoming the problems of the adolescents with lower socio-cultural status is much lower than the adolescents with higher socio-cultural status. From the point of view of handling the troubles, it is looked for findings about the sexual differences, it is discovered that females consult much frequently to the social support about handling the problems while males use the ignoring method about the matter. It is determined that girls about solving a problem is much more fatalistic and believe that the problem is out of their control; on the other hand boys use a witty manner against the problems (Plancherel *et al.*, 1998). According to a research performed by Çuhadaroğlu *et al.* (2004) in our country, girls, compared with boys use much healtier methods about solving problems. When Frydenberg and Lewis (1993) investigated the methods of handling troubles of adolescents between 16-18 ages, they designated that girls and boys have no difference about changing their environments and creating alternative solutions.

Nowadays, there is need for individuals who are skillful decision makers and can actively solve problems at the scientific and technological fields of every occupation. Because of this, basic science definions and scientific process skills must be acquired by the students (MEB, 2004). Science process skills are some of the most important products that must be thought to the students by the educators (Germann, 1989). Science process skills are defined, by Çepni *et al.* (1997), as the facilitative of learning at science, providing the students being active, improving the sense of taking the responsibility at their own learning, basic skills which demonstrate the methods and ways of research and also increase the permanence of learning.

It is more important for the students at the science lessons, to learn how to apply science rather than learning fact, concept, generalization, theories and laws. For this reason, it is necessary fort hem to learn how to use science process skills. Teaching the science process skills helps establishing the knowledge (Carey *et al.*, 1989). Science process skills of the students will improve as long as they use them, but the age of the students must be considered. At the early stages of primary school, scientific research designs and applications should not be expected from the students but they should be laid their foundations. It should be aimed to improve the students skills of making detailed observations with the help of possible little activities, making evaluation, recording of data and the things performed, interpretation of the data, making assumptions based on the data. These kind of skills are called as the basic process skills since they form abase to the above kills (Abruscato, 2004; Martin *et al.*, 2002).

This study has been carried out to determine the science process skills for the adolescents at the primary school, who study second stage in order to increase their interest levels to the science and technology and provide them to learn the research ways like scientists and so to form the input by themselves. The acquisition of these information about their learning during this period in which their physical, emotional and social changes take place, will help the teachers at their teaching styles. And thus, more positive feedbacks will be able to obtained (Karakaş, 2001). For this goal, the answers of the research questions below have been searched for;

- Are there any differences between the science process skills of the adolesecents who study at the second stage of a primary school according to their genders?
- Are there any differences between the science process skills of the adolescents who study at 6 and 8 class?
- Are there any differences between the science process skills of the adolescents who study at primary school that is situated at the city centre and with a higher socio-cultural level and the adolescents who study at a country-side school with a much lower socio-cultural level?

MATERIALS AND METHODS

Scanning method is used in the research. Before starting to the research, school managers have been interviewed and obtained some information about the students' socio-cultural status. Then, some information forms which were prepared by the researchers have been handed out and got data about the socio-cultural levels of the students. After this investigation, it has been decided to carry out this research on the students of Yavuz Selim primary school which is in the city centre of Sivas and with a higher socio-cultural level and on the adolescents who study at Kıranardı primary school 6, 7 and 8 class with a lower socio-cultural level. In the research, 2006-2007 education period, in autumn term, science process skills of the adolescents who study at these schools have been measured and the data acquired have been analyzed by t-test according to their genders, classes and social level factors.

In the research, Science Process Skills Test (SPST) is used which is improved by Tatar (2006) in order to measure the science process skills of the adolescents. Test is prepared to measure the skills of making observation, classification, obtaining a result, interpreting, making measurements, communicating, forming space time relation ships, making hypothesis, making tests, defining the variables and control them, interpreting the data. There are also some problems about using the numbers and operational defining process skills in the content of the test. The test which consists of 18 questions is a multiple choice test and has four alternatives.

Thirty minutes were given to the students for applying the test. In the test, 1 point is given for each correct answer and 0 point is given for each wrong answer.

RESULTS

In this section; the data obtained from the science process skills test which was applied on the students of various ages and genders in order to define the effects of characteristic of adolescence period on the science process skills of the child is analyzed with the help of t-test. The findings acquired at the end of the analyses are detailedly planned according to the bottom problems and interpretations are made based on the analyses.

To test the first lower değree problem, the SPST is applied on 62 females and 70 males in secondary school and the results are evaluated with the analysis method of the t-test to show whether there are differences between genders.

It is found outs that the SPST measurement score averages of the students for the female students is 8.112 and 7.185 for the male students. Also, it is discovered that the standard deviation of the female students is 3.264 while it is 3.293 for the male students. According to the t value calculated, in the confidence space (gap, interval) of 95% ($t = 1.62$; $p>0.05$), it is observed that there is no remerkable difference between male and female students from the point of view of the scores they got for the SPST. To test the second lower degree problem, SPST is applied on 53 adolescent students in 6th class and 48 adolescent students in 8th class and the results are evaluated with the analysis method of the t-test to show whether there are differences between classes.

The SPST scores average of the adolescents studying at 6 class is 7.622 and the standard deviation is 2.802. the SPST scores average of the adolescents studying at 8 class is 8.375 and the standard deviation is 4.013. According to the t value calculated at the end of the t-test ($t = 1.100$; $p>0.05$); it is observed that there is no meaningful difference from the aspect of SPST scores.

SPST is carried out on the adolescents of the same age group (8 class) who are studying at schools with different socio-cultural levels in order to test the third bottom problem of the research. The results obtained are evaluated with the analysis method of t-test to obtain whether there are differences between groups.

The average point of SPST for the 43 teenage students in Yavuz Selim Primary School is 10.860 and its standard deviation is 2.899. The average point of SPST for the 47 teenage students in Kıranardı Primary School is 6.042 and its standard deviation is 2.053. At the and of the t-test analysis, according to the t-value calculator ($t = 9.157$; $p<0.05$); it is observed that there is a meaningful difference between the test scores. When averages and standard deviation values are taken into consideration, it is determined that this difference is in favor of the SPST scores of Yavuz Selim Primary School.

CONCLUSION AND SUGGESTIONS

It is seen that there is no meaningful difference between girls and boys about science process skills according to the t-test analysis results which show the changes of science process skills according to the gender.

It is observed that there is no difference between the science process skills of the adolescents studying at 6 and 8 classes of secondary school according to the t-test analysis results which show the changes of science process skills according to the 6 and 8 classes.

It is proved that, at the same age group, science process skills of the adolescents with fine socio-cultural level are higher than the skills of adolescents with a poor socio-cultural level.

When the researchers about the socio-cultural levels of the adolescents are examined; it is observed that self-respect levels, their levels of handling the problems and academic success of the adolescent with fine socio-cultural levels are higher than the adolescents with lower socio-cultural levels. These results acquired from literature show a accordance with the research results.

These differences in the adolescence which is a very important period for the developments of people are not only an event related to the person himself and his family but also on problems concerns the society very closely.
The schools which have great responsibility for the students' personality improvements and for their training for life have a lot of responsibilities about decreasing these differences to the minimum possible levels.
With this aim;

- There should be quiding services at every school and communication must be made with students one by one.

- Seminars should be organized providing the increase of information level about the characteristics of adolescence of the students and teachers.
- It is being though that the physical, emotional, mental, social and psychological changes at the adolescence of the students at primary school period in which the acquisition of science process skills is very important should be taken into consideration and it is being thought that it will be useful that teachers will develop behavior that will provide healthy conditions suitable to this situation.

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