

The Investigation of Relation between Attitude toward Mathematics and Attitude toward Science of 9th Grade Students in Eskişehir Science High School According to Some Variables

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Abstract: In this study, applying Likert-type scales of attitudes toward mathematics and science to 9th grade students in Eskişehir Science High School, it is investigated the relation between them.

It is investigated whether this relation changes according to academical successes and genders of these students or not.

In this research, the positive relation was found between attitudes toward mathematics and science. It is observed that this relation is on meaningful level according to academical successes, but unexpectedly, isn't on meaningful level according to genders. Besides, sketching the graph of attitude toward mathematics versus academical success in girl and boy students, the graph of attitude toward science versus academical success in girl and boy students, the graph of attitude toward mathematics versus attitude toward science in girl and boy students, the relation between them were investigated.

In obtaining these results, the computer programs of SPSS, Chi-square and some sketching programs were used.

Introduction:

It is a non-discussible reality that Mathematics and Science are the factors by which the men's life become easy. Completion of Mathematics and Science brings the success in Science. Science and Mathematics had occupied an important place through the history of Science. Besides, they had related with each other, i.e. the development in one of them had affected to other. The consistency, completion, concentration, between the Science education and Mathematics education and easing problem-solving must be common goals of educators.

Recently, educational researchers have investigated what factors, affect the success. For this reason, students' attitudes toward Mathematics and attitudes toward Science have been examined (Oppenheim, 1992). In these fields, Likert-type attitude scales are appropriate to designing-studies. Furthermore, it is very useful to obtain the opinion students' tendency to react toward Mathematics and Science, which define their beliefs, preference, decision, sensitive thoughts. (Hendley, et al., 1995).

Studies showed that the teaching method, the support of the structure of the school and the family, students' attitude toward the school affect the attitudes toward Mathematics and Science too. Usually, the way that mathematics and science is represented in the classroom and perceived by students, even when teachers believe they are presenting it in authentic and context dependent ways tends to alienate many students from mathematics and science (Barton, A., C., 2000)

Students' point of view to the nature of the Science change according to the educational materials. In the 10th and 11th grades of the high school, the positive attitudes toward Science decrease (Pyburn and Baker, 1993).

Students' knowledge of Science is random and has no plan. One of the factors which affects attitude toward Science negatively is abstraction increased in Mathematics and the other is irregular and heterogen structure of the Science classes. Besides, students' knowledge, environmental conclusions on their daily behaviours play role on the attitude toward Science negatively. (Stanisstreet, 1993).

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There are also many researches about the differences of attitudes toward Science between boys and girls. According to boy students, Mathematics is a discipline with high status. (Stables, 1990). In particular, there have been and continue to be, significant gender differences in favor of males in performance on complex mathematical tasks (Fennema and Carpenter, 1998).

Security degree of boy students' learning ability of Mathematics and Science is higher than girl students'. Girl students have lower positive attitudes toward Science and are not successful in Science. Attitudes toward Mathematics when the girl students are between the ages of 11 and 16 are variable. The tendencies to Mathematics in the age of 16 are gradually lower (Hendley, et al, 1995). Teachers can develop the attitudes toward Mathematics and Science of the students, via more approximation of students on center and more organized configuration of the class (Myers and Fonts, 1992).

The study's results do indicate that equitable Mathematics education that promote understanding, may not happen without specific attention to underachieving groups such as females (Fennema, et al, 1998).

Studies show that, children in many classrooms have spent too much time observing, experimenting and ostensibly doing science, while never really thinking about what they were doing, never articulating ideas and never developing and conceptual awareness the Science (McNay, 2000).

To develop especially the positive attitude toward Science, more contemporary and more persuasive hypothesis must be made (Crawly and Koala, 1994).

Problem:

This study investigates the presence of the relation between the attitudes toward Mathematics and the attitudes toward Science of the students on 9th grade in Eskişehir Science High School and whether this relation can change according to their successes and their genders or not.

Definitions:

Attitude toward Mathematics (ATM): Positive or negative individual reaction toward Mathematics.

Attitude toward Science (ATS): Positive or negative individual reaction toward Science.

Level of success in Mathematics (LSM): The grade of Mathematics taken from transcript of student in teaching year of 2000-2001.

Level of success in Science (LSS): The grade of Science taken from transcript of student in teaching year of 2000-2001.

The Design of the Study:

The study consists of 91 students attending to the 9th grades in Eskişehir Science High School through the teaching year of 2000-2001. Example and whole students in the design are consisted to the content of the as 25 girl students and 66 boy students.

Tools for Collecting the Knowledge:

1. The scale of attitude toward Mathematics

In measuring the level of ATM, "The scale of attitude toward Mathematics" developed by Aşkar (1986) is used. This scale consists 20 items, 10 of which are coded straightly and 10 of which are coded inversely.

2. The scale of attitude toward Science

In measuring the level of ATS, "The scale of attitude toward Science" developed by Azarkaya (1981) is used. This scale consists 51 items, 33 of which are coded straightly and 18 of which are coded inversely.

3. The grades of Science and the grades of Mathematics

The grades of Science and the grades of Mathematics, which were taken from the transcripts of the students in teaching year of 2000-2001.

Findings

Relation between ATM and ATS of Students

Table 1 Relation between ATM and ATS of Students

Variables	Relation Between Variables
ATM and ATS	r=0.324

As shown in Table 1, it was found that the correlation coefficient between ATM and ATS for 91 students is equal to 0,324. Relation that are meaningful at level of 1%. As expected, there is a positive relation between these two variables.

The Investigation of the Relation between ATM and ATS of Students According to Their Academic Successes

Table 2. Relation between ATM and ATS of Students According to Their Academic Successes

Variables	Relation Between Variables for Group 1 (n=48)	Relation Between Variables for Group 2 (n=43)
ATM and ATS	0,021	0.036

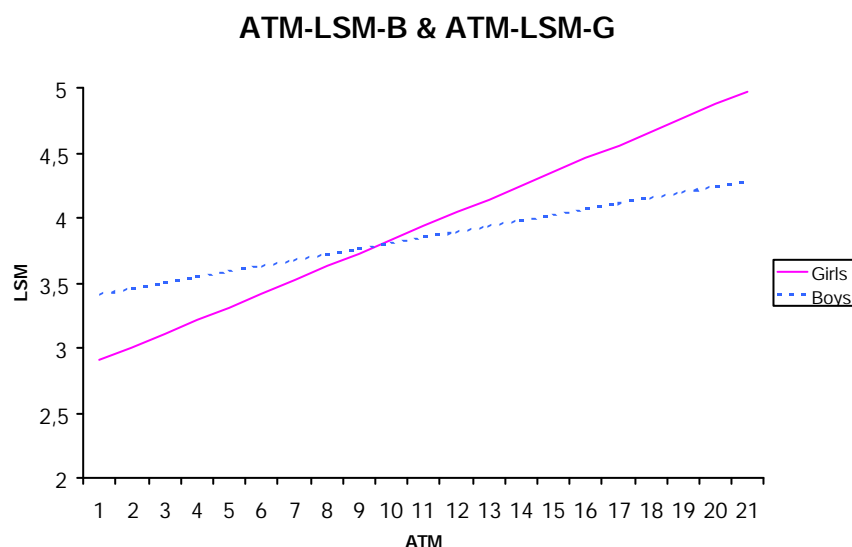
While the Relation between ATM and ATS of Students According to Their Academic Successes was investigated the students were divided into two groups according to academic successes. As can be seen in Table1, group1 consists of 48 students whose grades of Mathematics are lower than the average grade and group2 consist of 43 students whose grades of Mathematics are higher than the average grade. Correlation coefficients are 0,021 and 0,036 respectively. Results are meaningful at level of 5%. There is a positive relation between these two variables.

Relation between ATM and LSM of Students

Table3. Relation between ATM and LSM of Students

Variables	Relation Between Variables
ATM and LSM	r=0.322

As shown in Table 3, it was found that the correlation coefficient between ATM and LSM for 91 students are equal to 0,322. Relation is meaningful at level of 1%. As expected there is positive relation between these two variables.



The regression line between ATM-LSM for boys and girls are given by $y = 0.008x + 3.37$ and $y = 0.02x + 2.8$, respectively. As shown in regression lines between ATM-LSM for boys and girls, girls have a more positive correlation than boys.

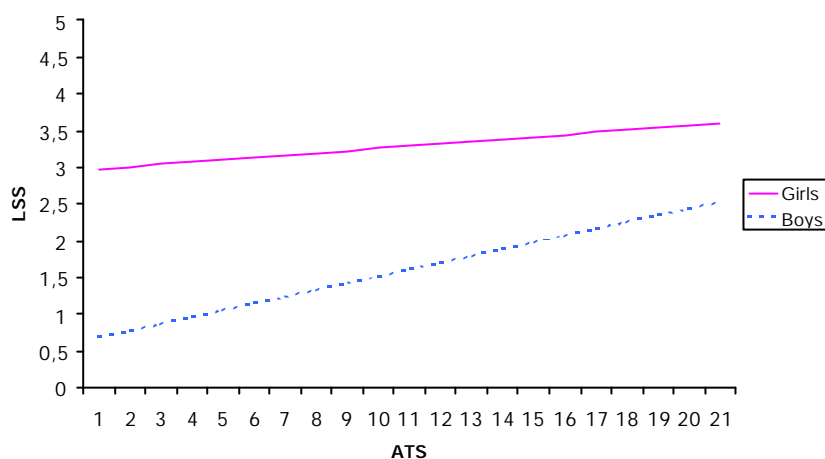
Relation between ATS and LSS of students

Table 4. Relation between ATS and LSS of Students

Variables	Relation Between Variables
ATS and LSS	r=0.037

As shown in Table 4, it was found that the correlation coefficient between ATS and LSS for 91 students is equal to 0,037. Relation is meaningful at level of 5%. There is positive relation between these two variables.

ATS-LSS-B & ATS-LSS-G



The regression line between ATS-LSS for boys and girls are given by $y = 0.018x + 0.5$ and $y = 0.004x + 3.2$, respectively. This research reinforces previous researches the confidence of boys in science in comparison to girls.

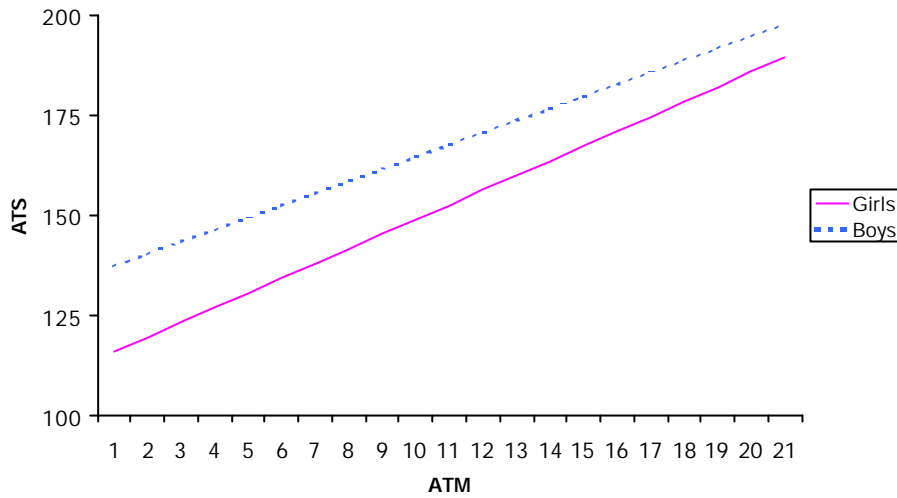
The Investigation of the Relation between ATM and ATS of Students According to Their Genders.

Table 5. Relation between ATM and ATS of the Students According to their Genders,

Variables	The Relation for Girl Students (n=25)	The Relation for Boy Students (n=66)
ATM and ATS	0,485	0.821

The results given in Table 5 aren't meaningful at level of 5%. As, contrary to expected, relation between ATM and ATS of the students according to their genders isn't meaningful. Reason of this result is that high school investigated is Science high school. Winning some selection exams the students come to this school. This manner removes the gender difference.

ATM-ATS-B & ATM-ATS-G



The regression line between ATM-ATS for boys and girls are given by $y = 0.60x + 134$ and $y = 0.73x + 112$, respectively. Then, girls have higher correlation than boys.

Results and Suggestions:

According to findings of this research, there is positive relation between ATM and ATS of the students in the 9th grades (15-16 years old) of Eskişehir Science High School. Relation connects to students' academical successes and because of the structure of this high school it doesn't connect to students' gender. There isn't any meaningful difference on relation between ATM and ATS of girl and boy students. This phenomenon due to structure of this high school is the manner desired for every high school.

First of all the levels of knowledge and teaching strategies of our teachers must be developed to rise the level of knowledge of students and level of education on Mathematics and Science in our country. The context of science, taught the students, must be connected to the students' out of school lives. Because, social empowerment and sociocultural transformation are important tenets in science education. However, it must have a look at the teaching methods and curriculums in mathematic and science, periodically. Besides, number of students in classroom must be reduced. The self teaching possibilities in laboratory to get to students, tools and materials in laboratory must be improved.

Besides applying the scales of ATM and ATS to the students in high schools by educational experts in specific periods the results of these scales must be followed. According to the results of these scales educational experts must give the suggestions to the students about their studying methods to improve their levels of success. Results of these pursuits done continuously must be used to prefer their careers and professional training programs in the university. Our society becomes to happier community at which citizens who have made conscious preferences of profession live.

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