Investigation of primary education second level students' motivations toward science learning in terms of various factors

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Received 12 Mar., 2014
Revised 7 Dec., 2014

Contents

Abstract

The purpose of this research was to investigate the primary education second level students' motivations towards science learning in terms of various factors. Within the research, the variation of the total motivational scores in science learning

according to the gender, class, socio-economic levels, success in science-technology course and variables of science-technology scores were investigated. The sample of the research was composed of 413 second level students of public primary schools in the city center of Ankara and Adana who were selected randomly. The "Motivational Learning Environment" and the "Personal Information Form" were used as data collection tools throughout the study as survey models. As a consequence of the research, it was confirmed that there was a meaningful difference between the scores that the students got from the REAL version & IDEAL version of the scale and this difference was in favor of the scores that were gained from the 'IDEAL' version. Moreover, students' total motivational scores in science learning (REAL version & IDEAL version) displayed a meaningful difference in favor of the female students. It was also observed that students' total motivational scores in science learning exposed a significant difference according to the class level and this difference was in favor of the 6^{th} and 7^{th} grade students. On the other hand, students' total motivational scores in science learning (REAL version & IDEAL version) revealed a significant difference according to the socio-economic factors. Another result was that, students' total motivational scores in science learning (REAL version & IDEAL version) were in favor of the students who were successful in science-technology whose course scores varied between "85-100".

Keywords: second level of primary education, motivation toward science learning, gender, class level, socio-economic level, success in science and technology, course score in science-technology

Introduction

The coordination among various intrinsic-extrinsic factors is of high importance in order to achieve the aim of the educational system. The contact between the teacher and the student, the attitude formed as a result of this contact, socio-economic status of the student, curriculum, and physical structure of the school are some important examples of these factors. In this respect, primary school has a weighty responsibility in delivering fundamental information, talent, behavior and habits to the individual. If we aim to bring up individuals who are equipped with all the requirements they would need for upcoming education levels, we should take some prior steps from the primary school level. This is the prerequisite of the education that will continue forever.

As the studies concerning the improvement of the quality of curriculums are investigated, one observes that these studies are mostly cognitive whereas affective evaluations are less in number. Indeed, many researchers emphasized that affective aims have a significant role in revealing the knowledge and skills of the students (Duit & Treagust, 2003; Lee & Brophy, 1996; Meredith, Fortner, & Mullins, 1997; Thompson & Mintzes, 2002). Affective skills consist of many factors such as interest, attitude, motivation, impetus, believes and self-efficiency. All these factors reflect to the behaviors from the senses of the individuals, can change according to their state of mind and can be affected by several variables which take place in the learning environment (teacher, friend, physical environment etc.). Among the affective skills, motivation is very important for the students to be more active and successful in learning environments (Brophy, 1987; Wolters & Rosenthal, 2000).

Motivation is a mental situation that evokes the behaviors of the students, directs their behaviors during this process and enables them to continue (Glynn & Koballa, 2006). Motivation is also quiet important in gaining interests of students in science, in making more meaningful and permanent learning and in getting success in required level. Learning of a course/lesson effectively and efficiently is related to the motivation and these two concepts affect each other. Therefore, a student who has a low motivation would be unsuccessful by not exposing expected positive behavior and adaptation to learning domain would become difficult for him/her (Yılmaz & Çavaş, 2007).

Studies concerning the effect of motivation on students were mostly carried out in main branches of science. Science with its disciplines (physics-chemistry-biology) is a course that mainly consists of abstract information, based on solving problems and contains high-level cognitive steps. In many countries, the course of science is carried out as an integrated course during the primary education (EURYDİCE, 2011). In Turkey, the disciplinary of science is being taught in the first (4^{th} and 5^{th}grade) and second (6^{th}, 7^{th} and 8^{th} grade) level of primary education as an integrated course under the name of science and technology (science-technology) course. In developing learning periods as in all learning periods, students' approach to the science concepts with the fear of "this course is already difficult, I can't learn it" affects their motivations. This situation rocks them to learn these concepts and causes to turn toward memorizing or learning by heart. Features such as teaching methods and techniques, in-class and out-class activities and in-class applications affect students' attitude towards the course and their motivations. Thus, these features dominate students' success directly. (EURYDICE, 2011). Along with this

situation, students' perceptions about the motivational learning environments of science courses from the primary education to the higher education level become a problem for us to cope with.

Bertels & Bolte (2010) proposed a model (Motivational Learning Environment_MoLE) which is thought to be related with reality that students perceive from the science course and their personal interest towards the course. In this model, students' motivation levels towards 'REAL' and 'IDEAL' conditions were investigated according to the selected individual variables such as developmental tasks, and self and prototype that are used in science courses. The original of the model focuses on three different approaches in perceiving motivational environments concerning the learning of chemistry course. These are as the following; (1) perceptions of the students and general assessments, (2) how should be the motivational learning environments in the science course and what are students' expectations in this aspect, (3) assessments in an experienced private science course and the perceptions of the students (Bolte, 2007). This model not only gives information about the motivations of the students in science/chemistry course but also reveals the science/chemistry course in the imaginations of students (Bolte, 2012). Application of such a model in the learning environment would give us strong information about the expectations of the students concerning the science courses and about the development of the high motivational learning environments. Furthermore, it would also be possible to receive feedbacks about whether the students have interests and expectations for the course and have feedbacks about their level of attendance to the course. With the given explanations here, let us take off with the idea that the key of the success, which is effective in meaningful and permanent learning, is the motivation (Ryan & Deci, 2000). Then we can conclude that the specifying motivational levels of the students in science learning when they start primary school and arranging the appropriate precautions according to their levels are indeed necessities.

According to Belo, Van Driel, & Verloop (2010), participation of the students in science courses is related with intrinsic and extrinsic causes and is associated to the motivation. As a matter of fact, whereas some students have the sense of discovery (intrinsic motivation), which is the focus of the science courses, some others behave with the idea of being in higher levels in terms of socio-economic values (extrinsic motivation). Studies concerning the motivation were mostly focused on the variables as success, gender and grade level which are the factors that affect the motivation toward science learning (Akpınar, Batdı, & Dönder, 2013; Güvercin, Tekkaya, &

Sungur, 2010; Singh, Granville, & Dika, 2002; Velayutham, Aldrıdge, & Fraser, 2012; Yaman & Dede, 2007; Yenice, Saydam, & Telli, 2012; Velayutham, Aldrıdge, & Fraser, 2012; Yaman & Dede, 2007). Güvercin et al., (2010) state in their research that grade level and gender affect the motivation of the students. They revealed in their researches, which were carried out with 6th and 7th grade students of the second level of primary education, that the higher is the grade level; the lower is the motivation of the student. They also observed that the motivation causes differences and these differences are in favor of the girls in means of gender. At this point, analyzing the socio-economic factors affecting the motivation level in science learning along with these variables also seems important.

When the importance of the affective skills in meaningful and permanent learning is considered, specifying the place of the motivation in science learning and to determining the factors affecting the motivation levels are also strongly significant. Therefore, it is possible to reassess the science-technology learning program in the primary education second level and the results of this study may provide data for the possible rearrangements in the program.

Turkey is sensitive to the development of teaching programs; it keeps up with the reforms enacted by the other countries of the world. In this context, significant steps have been taken until now in the field of quality and function of the teaching in the primary education of Turkish National Educational System and some reforms have been enacted in parallel to the developments in science and technology. With the regulation done in 1997, Turkish National Educational System was composed of three levels under the names of primary (1st, 2nd, 3rd, 4th and 5th grade) middle (6th, 7th and 8th grade) and high school (9th, 10th and 11th grade) and these three levels were connected with each other. According to this regulation, primary and secondary levels were consolidated under the roof of primary school. This regulation was rearranged according to the age groups in the year of 2012 and compulsory education time has been extended to 12 years, through this regulation 5th grade students have been included in second stage of the primary school (Ministry of Education, 2012). When it is taken into consideration that behaviors gained by the students in every level of the primary education affect the coming education levels, it is thought that it is extremely important to know the level of students' affective skills on this level.

In this context, assessing the international studies based on different countries seems important. Data would be acquired through the PISA project. This assessment project, which is repeated once every three years, aims to assess and evaluate the

reading skills, mathematics and science. The PISA project also evaluates and the education system of the group of 15 age (8th grade). These data contain students' attitudes towards mathematics, science and reading skills, their motivations in terms of learning, learning strategies, socio-economic backgrounds of students and schools and policies of the education and administration (Ministry of Education, 2010). This project carried out by the 'General Management of Innovation and Education Technologies' which is bounded to Ministry of Education on behalf of Turkey. The latest assessments in the field of science were carried out in 2006. According to the PISA report of the respective year, success average in science, level of competence in science, science literacy and attitudes and motivations of Turkey toward science were enlisted as "under the international standards" (Telli, den Brok, & Çakıroğlu, 2010). In this context, these kind o projects would be useful for countries to make comparisons with the student profiles of other countries.

Developmental differences between cities are common in our country as in all over the world. Development levels of cities in terms of socio-economic situations are investigated to analyze the developmental differences among the regions. To reach this aim in our country, studies continue with the five-year development plan that is prepared by 'State Planning Organization'. Several studies reaching the parallel results with the data of 'State Planning Organization' were carried out and Özceylan & Coşkun (2012) set the most interesting findings of these studies. According to the studies carried out by these researchers, Ankara becomes in the second place and Adana becomes in the eighth place among 81 cities in terms of socio-economic status. Considering that the socio-economic data is directly proportional with the educational levels of the individuals, we can conclude that parental education and level of income is different from each other in these two cities. Therefore, Adana, which has low level of income, business opportunities and economic weakness, was reported to be listed below Ankara in terms of educational level because of these factors (Özceylan & Coşkun, 2012). Furthermore, according to data entitled 'completed educational level condition' developed by Turkish Statistical Institution in April 2013, Ankara has maximum number of high school graduates. Thus, we decide to select two cities of Turkey that expose socio-economic differences to reveal the aim ideally and to represent the findings of the study ideally. The gap in the literature regarding the motivation of students toward science learning is thought to be filled with the analysis of the motivations of the second level students of primary education. Under the light of all this information, we aim to determine the effect of variables such as gender, class, socio-economic status, science and

technology success and science-technology course score on the motivations of students toward science learning.

Purpose

In this study, we aimed to investigate the motivations of second level students of primary education towards science learning according to various factors. In this context, answers were sought for the problems below:

1. How do the total motivational scores (REAL version & IDEAL version) of second level students of primary education toward science learning change according to gender and class variables?

2. How do the total motivational scores (REAL version & IDEAL version) of second level students of primary education toward science learning change according to socio-economic status?

3. How do the total motivational scores (REAL version & IDEAL version) of second level students of primary education toward science learning change according to the success of the students in science-technology course and science-technology course score?

The method of the study

Research design

Survey models are research models in which participants declare their opinions on a subject or an incident. These models determine the features like interest, attitude and skill through huge samples in general (Fraenkel & Wallen, 2006).

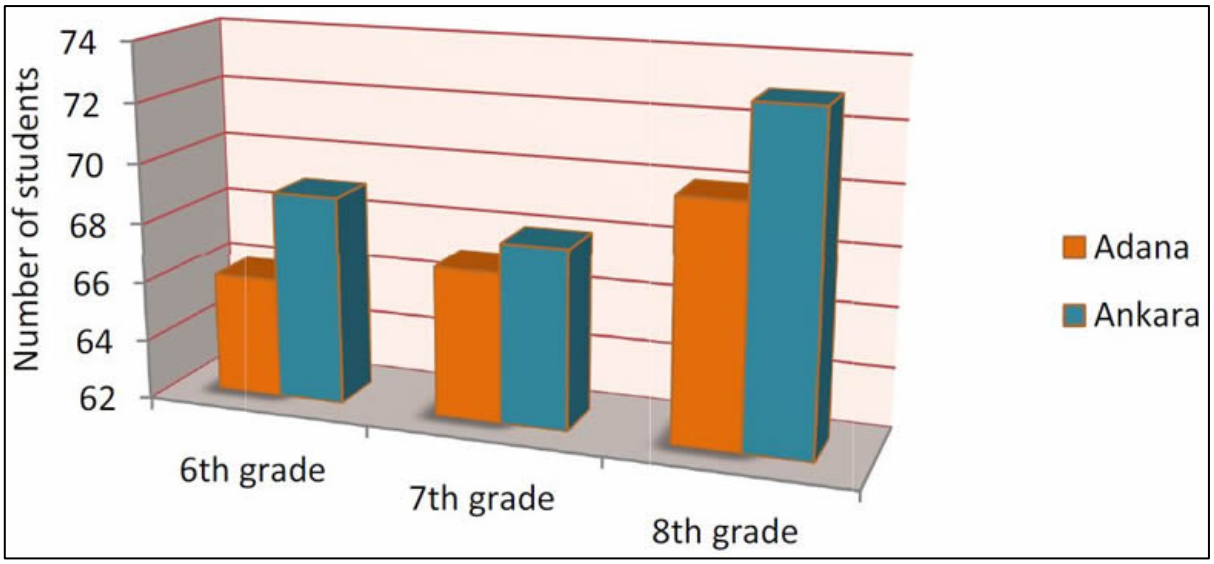
Descriptive analysis method was used in this research. In the descriptive analysis method, one aims to reach a general judgment about the population that is composed of many components. By this means, descriptions on the variables of a unit and a situation occurring in a group or a sample could be taken from the population. (Arlı & Nazik, 2001; Cohen, Manion, & Morrison, 2000). In this research, descriptive analysis method was used to determine the change of primary school second level students' motivations towards science education according to the variables of gender,

class, socio-economic levels, success in science-technology course and science-technology score.

Research group

The sample of the research consists of 413 (12-14 ages) second level students of the public school in the city centre of Ankara and Adana who are selected through a basic random sample during the 2013-2014 education year. In the most general context, basic random sampling means the selection of the sampling units randomly from the population list (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2008). 210 (50.8%) of the students in the research receive education in Ankara whereas 203 (49.2%) of these students receive education in Adana. Students in the sample participate in the research voluntarily. Distribution of students according to the cities and classes they receive education are shown in Figure 1.

Figure 1. Distribution of students according to the cities and classes they receive education



As seen in the Figure 1, 69 (16.7%) of the students who receive education in Ankara continue the 6th grade, 68 (16.5%) of these students continue the 7th grade, 73 (17.7%) of these students continue the 8th grade. On the other hand, 66 (16.0%) of the students who receive education in Adana continue the 6th grade, 67 (16.2%) of these students continue the 7th grade, 70 (16.9%) of these students continue the 8th grade.

Data Collection Tools

1. Motivational Learning Environment (MoLE) Questionnaire

In this study "Motivational Learning Environment (MoLE)" was used which is developed by Bolte (2006). The theoretical framework of the MoLE was explained in a study carried out by Bolte (1995; 2006). The MoLE questionnaire consists of two parts: The MoLE_REAL version and The MoLE_IDEAL version. The purpose of this questionnaire is to analyze the real and ideal learning environments (Bolte, 2012). REAL version focuses on how the students perceive their actual science lessons. On the other hand, IDEAL version focuses on how the students expect their science lessons to be (Bolte, 2006). The MoLE model consists of seven dimensions. Every dimension of the questionnaire contains only two items, which were evaluated by using a seven-point rating scale. The statements that correspond to our ideas about a "good" science lesson are coded with high numerical values ("7" to "5"), negative statements receive low numerical values (between "1" and "3"), while the scale value "4" corresponds to a "neither-nor estimation" (Bolte, 2006; Ferk Savec & Devetak, 2013). There are 14 questions in each version of the scale and in total there are 28 questions and minimum score that can be get from each version of the scale is 14 and maximum score is 98.

Although the statements in the original scale were prepared according to the chemistry, they could be easily applied to the science courses in primary education (Albertus, Bolte, & Bertels, 2012; Bolte, 2012). The statements that took place in the original of the scale consist of general judgments stating the opinions of the students about the "present condition of the chemistry courses (REAL) and how they should be (IDEAL)". Thanks to this feature of the scale, one can easily use it in science courses of primary education as it was used in other disciplines of science. As a matter of fact, Albertus et al., (2012) assessed the results by applying the MoLE scale in the science classes in some parts of their researches in which they study about middle high school students' motivations towards motivational learning environment in science/chemistry classes.

In this context, validity-reliability analysis was carried out for the scale to be conducted to the second grade Turkish students of primary education.

The Turkish translation of the scale, which was done by DEU-PROFILES Working Group (2011), contributed to the language validity of this study. The steps below were followed respectively in order to realize the language and content validity analysis of each version of the scale.

i. Two experts in the field of science translated the scale into Turkish and these translations were controlled by three philologists and joint sentences were formed for the statements that differ.
ii. Two philologists translated draft Turkish form into English again after these steps. The original English version of the scale and the version that was translated into English again were analyzed and co-decision is completed to determine whether there were any differences between them.
iii. After the adaptation of the scale to Turkish and validity of context of the scale is provided by three assistant professor experts in science education, conformity in terms of translation was accepted.
iv. Lastly, to determine the clarity of the items, the scale was conducted to the student groups comprising fifteen people attending to 6^{th}, $7^{th}$and 8^{th} grade. According to the answers given, the items were decided to be clear enough.

After the language and content validity of the scale were provided, the next step to follow is to realize the construct validity of the scale with the steps given below. We reached 245 primary education students to carry out these analyses.

i. Item-total correlation was calculated to assess the distinctiveness of the items in two versions in determining students' motivations toward science learning. For example, although the item-total correlation of all the items in MoLE_REAL version of the scale varies between .566 and .680, the item-total correlation of all the items MoLE_IDEAL version varies between .564 and .795. Minimum value for the item-total correlation of the scale should be .20. The items of which item-total correlation was .20 and higher was well fit in distancing the individuals and the items under this correlation value should be removed from the test (Büyüköztürk, 2007). The item-total correlation values in both versions of the MoLE scale indicated that items in each version were distinctive in measuring the motivation level of the students in science learning.
ii. In order to interpret the factor analysis values of construct validity of both versions of the scale, we first carried out KMO (Kaiser-Meyer-Olkin) value to ensure whether the sample size was enough. We also performed Barlett Test (Barlett Test of Sphericity) to define whether there was a correlation between variables. The results were named as perfect if the value of KMO test tended to 1, and called unacceptable as the values became under 0.50 (Pallant, 2001; Tavşancıl, 2002). As the result of the analyses, KMO value and Bartlett test result of MoLE-REAL were found to be 0.92 and 1345.008 ($p<0.01$)

respectively. For MoLE-IDEAL version, these values were as 0.94 and 1345.008 ($p<0.01$) respectively. These findings ensured us that both versions of the scale were appropriate for the factor analysis of the data. The factor analysis revealed that MoLE-REAL version's explanation rate of the total variance for single factor was 44.795% and factor loading was varied between 35% and 50%. For MoLE-IDEAL version, explanation rate of the total variance for single factor was 53.277% and factor loading was varied between 34% and 67%. 30% and above explanation rate of variance was accepted as standard in scale developing and adaptation (Comrey & Lee, 1992). Thus, according to the findings here, the construct validity of the scale was satisfied since the factor loadings of the statements of both versions of the scale were above 30%.

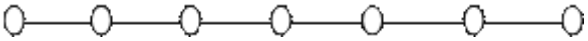
iii. To calculate the reliability of each version of the scale Cronbach Alpha method, which is one of the internal consistency methods, was employed. For this reason, the scale is conducted to 245 6^{th}, 7^{th}, and 8^{th} grade students in total from Ankara who were selected randomly and who attained the secondary stage of primary school. Cronbach Alpha coefficient in terms of the total of the items in two versions of the scale, which was analyzed in the SPSS-11.5 program, was calculated as .76 for the MoLE_REAL version of the scale and as .77 for the MoLE_IDEAL version. These values could be said to be enough in terms of the reliability level, which is necessary for the use of measurement tools (Büyüköztürk, 2007).

As a result of these analyses, we are ensured that MoLE scale which was adapted to Turkish is valid and reliable enough in determining the motivations of students in science learning.

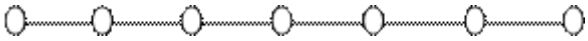
Although many motivation scales were used in the studies in Turkey, these scales measure the general motivation conditions of the students. This scale, which was developed by Bolte (2006) is different from the other scales in terms of determining how the motivation of the students consisting their general perception of science learning and how the motivation that is the part of the key of success should be in science courses. For this reason, the investigation of primary school students' motivation toward science course in real and how it should be, would close a gap present in the related subject in Turkey.

Samples from the MoLE scale:

For REAL version: The topics in science-technology class are..... my everyday life.

very important to me  very unimportant to me

For IDEAL version: To me it is…

very important  completely unimportant

the topics which we talk about in science-technology lessons are useful for me (for my everyday life).

2. Personal Information Form

Moreover, "Personal Information Form" was used to reveal the socio-economic profiles of the students. In the personal information form, there exist variables like residential area/settlement, gender, grade level, educational level of parent, level of income, success in the course of science-technology and the last course score that the students get in science-technology course. Numerals were used for the description of the factors of each variant to help the analysis of some variables in the form. These are as the following;

- For the educational level of the parents; 1:illiterate, 2:literate, 3:primary school (1^{th}-2^{th}-3^{th}-4^{th}-5^{th}), 4:secondary school (6^{th}-7^{th}-8^{th}), 5:high school (9^{th}-10^{th}-11^{th}), 6:undergraduate, 7:graduate.
- For level of income; 1:500-1000TL, 2:1000-1500TL, 3:1500-2000TL, 4:2000-2500TL, 5:>2500TL.
- For the success in the course of science-technology; 1:I am successful (over achievement), 2:I am neither too successful nor too unsuccessful (middle achievement), 3:I am less successful from my classmates (low achievement).
- Last score of science-technology course; 1:0-44, 2:45-54, 3:55-69, 4:70-84, 5:85-100.

Analysis of data

The points that students receive from the both version of the scale were taken into consideration for the analysis of the data acquired from the scale of "Motivational Learning Environment (MoLE)". 11.5-SPSS program was used in the analysis of

data. From the descriptive statistics frequency (f)-percent (%), t-Test of independent groups and one-way variance (ANOVA) were benefited in the analysis of the data. In the analysis of the sub-problems of the study, total scores gained from both versions of the scale were considered. "N" that took place in the chart stands for the total number of students. Furthermore, in order to test the validity-reliability of the Turkish form of the scale, exploratory factor analysis and item analysis were performed and Cronbach Alpha coefficient was calculated.

Findings

1. How do the total motivation scores (REAL version & IDEAL version) of second level students of primary education toward science learning change according to gender and class variables?

Descriptive statistical distribution of the variables of gender and class according to the residential area of the second level students of primary school were shown in Table 1. Moreover, t-Test of independent groups was performed to compare whether the total motivation scores of the students in science learning is meaningful and One-Way ANOVA was performed to compare if it is meaningful in terms of grade level. Results were given in Table 2 and Table 3 respectively.

Table 1. Results of descriptive statistics in terms of gender and class variant (N:413**)**

Gender	Settlement	6th Grade		7th Grade		8th Grade		Total	
		N	%	N	%	N	%	N	%
Female	Adana	30	14.8	35	17.2	38	18.7	103	50.7
	Ankara	31	14.8	40	19.0	34	16.2	105	50.0
	X (total)	61	14.8	75	18.2	72	17.4	208	50.4
Male	Adana	36	17.7	32	15.8	32	15.8	100	49.3
	Ankara	38	18.1	28	13.3	39	18.6	105	50.0
	X (total)	74	17.9	60	14.5	71	17.2	205	49.6

According to Table 1, 208 of the second level students of primary education that were participated in the research were females whereas 205 of these students were males. On the other hand, distribution of the students according to settlement in terms of gender was close to each other.

Table 2. The results of t-Test and One Way ANOVA in terms of gender and class variables of students' total motivational scores in science learning of second level students of primary education (REAL version)

	Motivational scores in science learning (REAL version)					
Gender	N	X	S	sd	F	*p
Female	208	62.95	16.416	411	5.526	.000
Male	205	54.90	12.978			
Grade level						
6th grade	135	63.73	15.244	2	37.348	.000
7th grade	135	62.92	12.910			(6th grade-8th grade,
8th grade	143	50.71	14.152			7th grade-8th grade)

*p<.05

When Table 2 was analyzed, we observe that total motivational scores of female and male students (REAL version) in science learning were different from each other [X_{female}=62.95, X_{male}=54.90]. A difference of .05 between the motivational scores in science learning of female and male students was revealed with the test this difference was meaningful and was in favor of female students [$F_{(208-205)}$=5.526, p<.05]. On the other hand, a statistically meaningful difference between the points according to grade level that the students get from the scale [$F_{(413)}$=37.348, p<.05] was observed and this difference was seen to be in favor of the students of the 6th and 7th grade. Consequently, we observed that the total motivations of the students of 6th and 7th grade toward science learning were higher than the motivations of the students of 8thgrade.

Table 3. The results of t-Test and One Way ANOVA in terms of gender and class variables of students' total motivational scores in science learning of second level students of primary education (IDEAL version)

	Motivationalal scores in science learning (IDEAL version)					
Gender	N	X	S	Sd	F	*p
Female	208	64.86	14.303	411	7.155	.000
Male	205	55.62	11.804			
Grade level						
6th grade	135	66.35	13.37	2	46.306	.000
7th grade	135	62.59	12.15			(6th grade-8th grade,
8th grade	143	52.36	12.21			7th grade-8th grade)

*p<.05

As one analyzes Table 3, total motivational scores of female and male students (IDEAL version) in science learning were seen to be different from each other [X_{female}=64.86, X_{male}=55.62]. The difference of .05 between the motivational scores in science learning of female and male students were revealed with the test and this difference was meaningful and was in favor of female students [$F_{(208-205)}$=7.155, p<.05]. On the other hand, there was a statistically meaningful difference between the points according to grade level that the students got from the scale [$F_{(413)}$=46.306, p<.05] and it was also revealed that this difference was in favor of the students of the 6th and 7th grade. Consequently, we can conclude that the total motivations of the students of 6th and 7th grade toward science learning were higher than the motivations of the students of 8th grade.

2. How do the total motivational scores (REAL version & IDEAL version) of second level students of primary education toward science learning change according to socio-economic status?

Frequency-percentage distribution of socio-economic status educational levels of parents, level of income of second level students of primary education who participate in the research were performed and statistical values in terms of these variables were given in Table 4, Table 5 and Table 6. Along with this, independent t-Test and One-Way ANOVA were carried out to reveal the values, in terms of the change of total motivation scores (REAL version & IDEAL version) in terms of science learning according to socio-economic status and results were given in Table 7.

Table 4. Descriptive values of second level students of primary education in terms of the educational level of their mothers

Grade levels	Settlement	Mother's level of education														Total	
		Illiterate		Literate		Primary school		Secondary school		High school		Under graduate		Graduate			
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
6th grade	Adana	3	2.2	4	3.0	23	17.0	16	11.9	18	13.3	2	1.5	0	0	66	48.9
	Ankara	0	0	0	0	5	3.7	14	10.4	32	23.7	17	12.6	1	0.7	69	51.1
	Total	3	2.2	4	3.0	28	20.7	30	22.2	**50**	**37.0**	19	14.1	1	0.7	135	100
7th grade	Adana	6	4.4	6	4.4	20	14.8	13	9.6	18	13.3	4	3.0	0	0	67	49.6
	Ankara	0	0	0	0	3	2.2	17	12.6	34	25.2	12	8.9	2	1.5	68	50.4
	Total	6	4.4	6	4.4	23	17.0	30	22.2	**52**	**38.5**	16	11.9	2	1.5	135	100
8th grade	Adana	1	0.7	8	5.6	23	16.1	16	11.2	21	14.7	1	0.7	0	0	70	49.0
	Ankara	0	0	0	0	6	4.2	8	5.6	36	25.2	20	14.0	3	2.1	73	51.0
	Total	1	0.7	8	5.6	29	20.3	24	16.8	**57**	**39.9**	21	14.7	3	2.1	143	100

According to Table 4, when the educational levels of mothers of second level students of primary education were analyzed, it was observed that mothers of many of each grade students *(37.0%, 38.5%, 39.9%)* were high school graduate. On the

other hand, when the distribution of educational levels of mothers was analyzed according to grade level of students, we see that mothers of 20.7% of 6th grade students were primary school graduate, 22.2% of them were secondary school graduate and 37.0% of them were high school graduate. In addition, mothers of 17.0% of 7thgrade students were primary school graduate, 22.2% of them were secondary school graduate and 38.5% of them were high school graduate. For the mothers of 8th grade students, 20.3% of them were primary school graduate, 16.8% of them were secondary school graduate, 39.9% of them were high school graduate and finally 14.7% of them were university graduate.

Table 5. Descriptive values of second level students of primary education in terms of the educational level of their fathers

Grade levels	Settlement	Father's level of education												Total	
		Literate		Primary school		Secondary school		High school		Undergraduate		Graduate			
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
6thgrade	Adana	3	2.2	7	5.2	23	17.0	26	19.3	6	4.4	1	0.7	66	48.9
	Ankara	0	0	0	0	3	2.2	18	13.3	46	34.1	2	1.5	69	51.1
	Total	3	2.2	7	5.2	26	19.2	44	32.6	**52**	**38.5**	3	2.2	135	100
7thgrade	Adana	3	2.2	13	9.6	20	14.8	24	17.8	7	5.2	0	0	67	49.6
	Ankara	0	0	0	0	0	0	10	7.4	49	36.3	9	6.7	68	50.4
	Total	3	2.2	13	9.6	20	14.8	34	25.2	**56**	**41.5**	9	6.7	135	100
8thgrade	Adana	0	0	0	0	22	15.4	28	19.6	1	0.7	0	0	70	49.0
	Ankara	0	0	0	0	0	0	7	4.9	56	39.2	10	7.0	73	51.0
	Total	0	0	0	0	22	15.4	35	24.5	**57**	**39.9**	10	7.0	143	100

According to Table 5, as the educational levels of fathers of second level students of primary education were analyzed, we observe that fathers of many of each grade students *(38.5%, 41.5%, 39.9%)* had an undergraduate degree. On the other hand, we observe that fathers of 19.2% of 6th grade students were secondary school graduate, 32.6% of them were high school graduate and 38.5% of them were university graduate. Furthermore, fathers of 14.8% of 7th grade students were secondary school graduate, 25.2% of them were high school graduate and 41.5% of them were university graduate. Fathers of 15.4% of 8th grade students were secondary school graduate, 24.5% of them were high school graduate and 39.9% of them were university graduate.

Table 6. Descriptive values of second level students of primary education according to level of income

Grade levels	Settlement	Level of income										Total	
		500-1000 TL		1000-1500 TL		1500-2000 TL		2000-2500 TL		>2500 TL			
		N	%	N	%	N	%	N	%	N	%	N	%
6th grade	Adana	5	3.7	19	14.1	33	24.4	7	5.2	2	1.5	66	48.9
	Ankara	0	0	2	1.5	10	7.4	30	22.2	27	20.0	69	51.1
	Total	5	3.7	21	15.6	**43**	**31.8**	37	27.4	29	21.5	135	100
7th grade	Adana	0	0	31	23.0	28	20.7	4	3.0	4	3.0	67	49.6
	Ankara	0	0	0	0	3	2.2	28	20.7	37	27.4	68	50.4
	Total	0	0	31	23.0	31	22.9	32	23.7	**41**	**30.4**	135	100
8th grade	Adana	2	1.4	24	16.8	32	22.4	11	7.7	1	0.7	70	49.0
	Ankara	0	0	0	0	0	0	26	18.2	47	32.9	73	51.0
	Total	2	1.4	24	16.8	32	22.4	37	25.9	**48**	**33.6**	143	100

Table 6 shows the variation of the second level primary education students according to the levels of income of students. Level of income of 31.8% of 6th grade students was 1500-2000 Turkish Lira (TL) whereas level of income of 30.4% of 7th grade students and 33.6% of 8th grade students was >2500 Turkish Lira (TL).

Table 7. Results of t-Test and One Way ANOVA of total motivational scores of second level students of primary education in science learning in terms of socio-economic status

Total motivational scores in science learning	Socio-economic status	Source of the variance	N	X	sd	F	*p	Scheffe
REAL version	Education of mother	Between-groups	413	58.95	6	8.122	.000	2-5, 2-6 3-5, 3-6
		Within-groups			406			
	Education of father	Between-groups			5	23.805	.000	3-5, 3-6 3-7, 4-5, 4-6, 4-7, 5-6
		Within-groups			407			
	Income	Between-groups			4	19.241	.000	2-4, 2-5, 3-4, 3-5
		Within-groups			408			
IDEAL version	Education of mother	Between-groups	413	60.27	6	6.418	.000	2-5, 2-6 3-5, 3-6
		Within-groups			406			
	Education of father	Between-groups			5	15.959	.000	3-5, 3-6 3-7, 4-5, 4-6, 4-7, 5-6
		Within-groups			407			
	Income	Between-groups			4	14.694	.000	2-4, 2-5, 3-4, 3-5
		Within-groups			408			

*p<.05

According to Table 7, although the average of the total motivation scores (REAL version) of second level students of primary education in science learning was found to be 58.95, point average (IDEAL version) was 60.27. On the other hand, there was a statistical difference between the points they got from the REAL version of the scale in terms of mother's level of education [$F_{(6-406)}$=8.122, p<.05], father's level of education [$F_{(5-407)}$=23.805, p<.05], monthly income [$F_{(4-408)}$=19.241, p<.05]. For the IDEAL version of the scale, the results were as [$F_{(6-406)}$=6.418, p<.05] for mother's level of education, [$F_{(5-407)}$=15.959, p<.05] for father's level of education, [$F_{(4-408)}$=14.694, p<.05] for monthly income. According to the results of Scheffe test which was performed to find the level of difference between the socio-economic status, the students whose mothers are literate (2) and primary school graduate (3) and whose fathers are primary school (3) and secondary school graduate (4) had low level of motivation towards science learning compared to the other educational levels. On the other hand, motivational level in science learning of the students whose income was between 1000-1500 TL (2) and 1500-2000 TL (3) had low level of motivation when compared to the other levels of income.

3. How do the total motivation scores (REAL version & IDEAL version) of second level students of primary education toward science learning change according to the success of the students in science-technology course and science-technology course score?

Table 8. Results of descriptive statistics according to success in science-technology course and science-technology course score

Success in science-technology course	Settlement	Science-technology course score										Total	
		0-44		45-54		55-69		70-84		85-100			
		N	%	N	%	N	%	N	%	N	%	N	%
Over achievement	Adana	0	0	1	0.5	6	3.0	11	5.4	11	5.4	29	14.6
	Ankara	0	0	3	1.4	16	7.6	30	14.3	39	18.6	88	42.0
	$X_{(total)}$	0	0	4	1.0	22	5.3	41	9.9	**50**	**12.1**	117	**28.3**
Middle level achievement	Adana	2	1.0	15	7.4	37	18.2	39	19.2	13	6.4	106	52.2
	Ankara	0	0	2	1.0	19	9.0	29	13.8	56	26.7	106	50.5
	$X_{(total)}$	2	0.5	17	4.1	56	13.6	**68**	**16.5**	**69**	**16.7**	212	**51.4**
Low achievement	Adana	4	2.0	2	0.5	19	9.4	6	3.0	8	3.9	39	18.9
	Ankara	0	0	29	13.8	1	0.5	5	2.4	10	4.8	45	21.7
	$X_{(total)}$	4	1.0	**31**	**7.1**	20	4.8	11	2.7	18	4.4	84	**20.3**

Descriptive statistical distribution of the success of the second level students in science-technology course and science-technology course score is shown in Table 8. Moreover, one-way ANOVA was performed to compare whether the total motivation scores (REAL version & IDEAL version) of the students in science learning were meaningful in terms of success in science-technology course and

science-technology course score. The results were given in Table 9 and Table 10 respectively.

According to Table 8, it was seen that 28.3% of the students who participated in the research qualified themselves as "overachiever", 51.4% of them as "middle level achiever" and 20.3% of them as "underachiever". On the other hand, there was a difference between the achievements of students in science-technology course and distribution of scores in the course. For example, among the students who qualified themselves as overachiever, score of 12.1% of them in the course was "85-100", 16.7 and 16.5% of the students who qualified themselves as middle level achiever had the scores "85-100" "70-84" and 7.1% of the students qualifying themselves as the underachiever had the scores between "45-54" in science-technology course. Consequently, the majority of the students (51.4%) got the middle level achievement in the course and we observed that the scores of these students in science-technology course varied mainly between "75-84" and "85-100".

Table 9. The results of One-Way ANOVA in terms of success in science-technology course and science-technology course score variables concerning second level students' total motivational scores (REAL version) in science learning

	Total motivation score in science learning (REAL version)					
Success in science-technology course	N	X	S	sd	F	*p
Over achievement	117	65.11	14.844	2	16.716	.000 (high-middle high-low)
Middle level achievement	212	57.74	14.975			
Low achievement	84	53.44	14.166			
Total	413	58.95	15.331			
Science-technology course score	N	X	S	sd	F	*p
0-44	6	37.50	6.442	4	10.436	.000 (1-3, 1-4, 1-5 2-4, 2-5)
45-54	52	47.84	13.657			
55-69	98	56.82	14.104			
70-84	120	60.93	15.463			
85-100	137	62.08	14.629			
Total	413	58.95	15.331			

*p<.05

When Table 9 was analyzed, one observes that total motivational scores of students (REAL version) in science learning in terms of success in science-technology course were different from each other. According to this observation, arithmetic mean of students who qualified themselves as "overachiever" was X=65.11 whereas arithmetic mean of students who qualified themselves as "middle level achiever" was X=57.74. Along with this, arithmetic mean of the students who qualified themselves as "underachiever" was X=53.44. We also see that the difference of .05

between the motivational scores in science learning of students in terms of success in science-technology course was revealed with the test and this difference was meaningful and in favor of "overachiever" students [$F_{(208-205)}$=16.716, p<.05]. On the other hand, there was a statistically meaningful difference between the scores according to science-technology course score that the students got from the scale [$F_{(413)}$=10.436, p<.05] and it was also revealed that this difference was in favor of the students whose course score was between "85-100". Students, whose course score were between "0-44" and "45-54" average of motivational score in science learning (X=37.50, X=47.84) were different from the other students with other course scores. Consequently, we could conclude that the motivations of the students with "85-100" points in science learning were higher than the motivations of the students with the other course scores.

Table 10. The results of One-Way ANOVA in terms of success in science-technology course and science-technology course score variables concerning second level students' total motivational scores (IDEAL version) in science learning

	Total motivational score in science learning (IDEAL version)					
Success in science-technology course	N	X	S	sd	F	*p
Over achievement	117	64.43	13.463	2	7.823	.000
Middle level achievement	212	59.01	14.097			(high-middle
Low achievement	84	57.67	12.854			high-low)
Total	413	60.27	13.899			
Science-technology course score	N	X	S	sd	F	*p
0-44	6	44.17	8.495	4	4.502	.001
45-54	52	53.56	10.604			(5-1, 5-2)
55-69	98	60.39	12.788			
70-84	120	61.01	14.346			
85-100	137	61.77	14.324			
Total	413	60.27	13.899			

*p<.05

When Table 10 was analyzed, it was observed that the total motivational scores of students (IDEAL version) in science learning in terms of success in science-technology course were different from each other. According to this, arithmetic mean of students who qualified themselves as "overachiever" was X=64.43 whereas arithmetic mean of students who qualified themselves as "middle level achiever" was X=59.01. Furthermore, arithmetic mean of the students who qualified themselves as "underachiever" was X=57.67. The difference of .05 between the motivational scores in science learning of students in terms of success in science-technology course was revealed with the test and this difference was meaningful and in favor of "overachiever" students [$F_{(208-205)}$=7.823, p<.05]. On the

other hand, there was a statistically meaningful difference between the points according to science-technology course point that students got from the scale [$F_{(413)}$=4.502, p<.05] and it was also revealed that this difference was in favor of the students whose course score was between "85-100. Students, whose course score were between "0-44" and "45-54" average of motivation score in science learning (X=44.17, X=53.56) were different from the other students with the other course scores. Hence, it could be deduced that motivations of the students with "85-100" points in science learning were higher than the motivations of the students with the other course scores.

Discussion and conclusion

In this research, the variation of second level students' motivations toward science learning according to the factors as gender, class, socio-economic (education and income of mother, father) levels, success in science-technology course and science-technology course score were analyzed. As the result of the research had shown us, total points of the second level primary education students, which were taken from the REAL and IDEAL version of the scale, were different from each other. We concluded that the total points of two versions were meaningful in terms of gender and this difference was in favor of the female students. These findings are parallel to the results of many studies in the literature (Akpınar et al., 2013; Britner & Pajares, 2001; Güvercin et al., 2010; Pintrich & Zusho, 2002; Yaman & Dede, 2007). As one examines the results of the related studies, it could be concluded that there are differences between the veridicality (REAL) of motivations toward science learning and how they should be (IDEAL). This difference is directly proportional with the learning experience, which was in the mind of the students. Therefore, the motivations of the students in the science course in reality are away from the science courses in their minds. To prevent this event and to reach profiles of high motivational-students, one needs to adapt either the learning experience in the class or the learning experience out of the class to the conditions in the minds of the students. Most frequently, science classes do not fit to students' expectations. Students are not always satisfied about science lessons. However, teachers get an important aid when they compare the expectations of the students with their real life perceptions (Bolte, 2012).

The differences between the genders in the science learning studies would exist generally in the choice of science courses, career plans in science and success in science. Consequently, these differences would be concluded with different results

in the point of driving students to science learning (Velayutham et al., 2012). For this study, there could be many reasons for the motivations of female students toward science learning became in higher levels from the levels of male students. Some of these were: female students' participated in lessons more than the male students, interests of the male students in the technical aspect of the science courses were more than the female and so passing over the other aspects of the course and the interests and curiosities of female students in the course were higher than the male. In the results of ROSE (Relevance of Science Education), which was an international research, it was stated that the male students were interested in the technical, mechanical and electrical fields of the science course and that the female students mainly focused on the health, human body, aesthetic field of the science course (ROSE, 2010). In this context, research team of ROSE suggested that the gender differences regarding interest and motivation should be taken into consideration in science learning. Lightbody, Sienn, Stocks, & Walsh (1996) confirmed in their studies that female students revealed their determination and effort in learning environment by their persistent behaviors in the explanation of their studies. To explain the difference of the motivational levels of science learning according to genders, we need to reach a general judgment by associating what the motivation means and what are the conditions that affect the motivation with the daily life. Factors as teacher efficiency, contact between teacher-student, concrete present (getting good scores, receiving a present); teaching techniques and methods affect the direction of motivational change (Yenice et al., 2012). Whereas a small gift can increase the motivation of the students, this gift can also be ineffective for another student. This case is related with the type of the motivation of the student.

Another result of the research was that the higher the grade level was, the lower the motivation of students toward science learning was. There are studies parallel to this result in the literature (Akpınar et al., 2013; Freedman-Doan, Wigfield, Eccles, Blumenfeld, Arbreton, & Harold, 2000; Güngören, 2009; Güvercin et al., 2010; Yenice et al., 2012). The reason of this could be that the students became more excited and shifted their interests towards different directions because of being in the adolescence period from the 6^{th} grade to the 8^{th} grade. In fact, this was not an expected result. Because, the most important characteristic of the students with high motivation is, being diligent, willing, interested, curious and persistent in learning (Wolters & Rosenthal, 2000). So, when we considered that the difficulty of the 8^{th} grade students in adapting to extrinsic factors was lower compared to the 6^{th} and 7^{th} grade students, the motivations of 8^{th} grade students towards the course should be higher. However, many studies performed in this field observed that the higher the

grade level was, the lower the motivation was. For example, Güvercin et al., (2010) fond out in their studies that, 6th and 8th grade students' motivations toward science learning decreased more and more as the grade level was increased. This result was not a surprise according to the results of the other studies and the condition in Turkey. Furthermore, it was possible to come across the similar results in the analyses carried out towards the sub-levels of the motivation. For example Güngören (2009) stated in his study that, self-efficiency and interest in science of 6th grade students were higher than the students of the other levels (7th and 8thgrade). Şenler & Sungur (2009) stated that the variables of self-efficiency and duty concerning science of 4th and 5th grade students were higher than those of 6th-7th-8th grade students. Increasing the difficulty level of topics in science and mathematics in upper classes, would cause the abstract concepts to gain weight and boost of the preparations for the central exams were shown to be the reason for this situation (Yaman & Dede, 2007).

The accuracy of this explanation is thought to be acceptable, but insufficient. The motivation is a multidimensional concept. So, in the analysis of this concept, several factors that affect the individual in the learning environment should be taken into consideration. Thousands of students start the elementary school willingly, in a positive attitude and with high motivation. However, this situation makes us consider that they are more optimistic at small ages. However, as the grade level increases, failures in their confidences and skills will be formed. Hence, they would become motivated negatively (Freedman-Doan et al., 2000). For this reason, studying on the motivations of the students in science learning in every grade level as it is in all other fields is crucial.

The explanations given above mainly exposed the importance of learning-teaching environment in increasing students' motivations toward science learning. Another factor which is effective on students' motivation is the socio-economic status of students. Education level of parents, level of income and place of registry could be accepted among the components of socio-economic status of the students. In this study, students' motivations toward science learning were investigated in terms of education level of parents and level of income. When the results of the study were analyzed, one observes that the most of the students' mothers were "high school" graduate (Table 4), whereas their fathers had an undergraduate degree (Table 5). These values were distributed similarly in every grade level. On the other hand, although the level of income of most of the 6th grade students was (1500-2000 TL), level of income of most of 7th and 8thgrade students was higher than 2500 TL (Table 6). This result was an indicator showing that the higher the grade level is, the higher

the level of income is. On the other hand, the motivation scores of students in terms of socio-economic levels were different and average motivation scores that students got from the IDEAL version of the scale were higher than the scores they got from the REAL version of the scale. [X_{ideal}=60.27, X_{real}=58.95]. So we can conclude that the level of education and incomes of students' parents directly affect their motivations toward science learning. This means that, motivation of students toward science learning is affected by both socio-economic status of parents and their expectations in the motivational learning environments. Ideal motivational learning environments in the minds of the students are far from the environments in reality. So, students' expectations in this way are high. Along with this information, when the results of total motivation scores for science learning according to differences in socio-economic levels were investigated, the total scores from both version of the scale differed meaningfully on the socio-economic level. According to this, motivation toward science learning of students whose mothers were literate (2) and primary school graduate (3) and whose fathers were primary school graduate (3) and secondary school graduate (4) was lower when it was compared to the other learning levels. These findings revealed that the students' motivations are affected by the education level of parents. Low motivations of the students whose parents' level of education was low call to mind that this could affect success of the students in the courses negatively. On the other hand, the total motivation scores of the students with the level of income between 1000-1500 TL (2) and 1500-2000 TL (3) were lower in the both versions of the scale compared to the other levels of income (Table 7). This value was a general result of the sample and also evidence showing that their level of income was associated with their level of motivation. When the effect of the income grade level variables on the motivation toward science learning was investigated, we saw that the average of total motivation scores [X_{real}=63.73, X_{ideal}=66.35] of 6th grade students (31.8%) with midlevel of income (1500-2000 TL) for science learning was higher than the average of total motivation scores of 7th and 8th grade students (30.4%, 33.6%) with high level of income (>2500 TL) (Table 2, Table 3 and Table 6). So that the level of motivation of students with high level of income towards the course was low and this especially affected the motivations of 8th grade students. As one checks the literature, it was seen that there is no study investigating the relationship between the motivation toward science learning of second level students of primary education and their socio-economic level. However, Üredi & Erden (2009) have studies in this subject with the 8th grade students of primary school belonging to medium socio-economic status. They have studies concerning how the attitudes of parents predict the self-regulation strategies and

motivational beliefs of the students similar to the variable of mother-father education level. They ascertain that attitudes of parents perceived by students have the effect in the motivational beliefs other than their exam anxiety. On this point, Gonzalez-DeHass, Willems, & Horbein (2005) stated that parents had a significant role in increasing the motivations of the students and so the success of the students who were supported by their families was higher. In the light of these explanations, we can deduce that the level of education and income of parents as well as the attitudes of them are effective in the change of their motivations and so in their success.

The motivation that is qualified as a motive power undergoes change with respect to the effects of intrinsic and extrinsic factors (Hilker, 1993). To enable these factors to work in accord with each other, it is significant to know the source of the conditions, events that form the behavior of students. Along with the educational level of parents, some motive powers based on many extrinsic factors such as, their interests and attitudes towards their children, buying something they want to get (award) should be available in this point. It is possible to come across a profile of student whose school life is productive and who is successful in his/her lessons with high motivation s/he raises in such an environment.

Participation of the individual voluntarily in a certain activity without getting any award (note, money, gift) and the intuitive motivation which reflects his/her pleasure in the work s/he does is an effective factor in learning (Hilker, 1993). According to Jacobsen, Eggen & Kauchak (2002) the intuitive motivation which is created by the interest and expectation of the student shows more efficient performance in getting through a problem/work when compared to the extrinsic motivation and students with intuitive motivation show higher performance. Students who are intuitive-motivated toward science learning (with high feeling of success in science) can be very successful without being extrinsic-motivated (getting high scores in science course) (Yenice et al., 2012). In this study, the question "how is your success in science-technology course when you are compared to your classmates?" that took place in the personal information form of the scale, was asked to the second level students of primary education. In this question, we aimed to reveal the intuitive motivation status of students in the course. The answers of the students were; "I am successful (high success), I am not too successful or too unsuccessful (midlevel of success), I am less successful then my classmates (low success). In this context, their feeling of success in science-technology course (intuitive motivation) was compared with the last exam score they got in the course (extrinsic motivation) (Table 8).

When the results were analyzed on the basis of percentages which represent most of the sample, the sample was revealed to be;

i. 12.1% of them considered to be high successful and the last exam score of this sample was between "85-100" ,
ii. 16.7%+16.5%=33.2% of them with close distribution considered to have midlevel of success and the last exam score of this sample was between "70-84" and "85-100" ,
iii. 7.1% considered having low success and the last exam score of this sample was between "45-54".

These results reinforce the possibility that students being intuitive motivated in different levels are associated with the science-technology course score, students who consider themselves as being much successful come to the learning environment as being already motivated, which is predicated on their early life and that these students do not need any concrete award such as getting high scores in science-technology course. On the other hand, low course scores of the students who considered themselves to have low success in the course showed that these students need to be supported with some concrete awards to enable their motivations in the course to increase. Lastly, there were meaningful differences between the motivation scores of students in science learning in terms of success in science-technology course and science-technology course score and that total motivation scores students got from the IDEAL version of the scale were higher than those they got from the REAL version of the scale [X_{real}=58.95, X_{ideal}=60.27]. This result could be evaluated positively for the students who considered themselves as not successful enough in the course and whose course score was low. Because, there might be so many reasons for this group of low-motivated students to have different expectations about science learning in their imagination compared to real life. These are the practice in the course, lack of interest and curiosity, lack of associations with daily life, intuitive and extrinsic factors. On the other hand, this result can be evaluated positively for the high-motivated students towards the course. Because their actual level of motivation toward science learning is in the required level. The ideal learning life being higher than the values in real life indicates that they are motivated enough in the course. Along with this information, when the results of differences of motivation scores in science learning in terms of success in science-technology course and science-technology course score, the scores students got in both versions of the scale were in favor of the students with who were "much successful" and whose exam scores were between "85-100". It was not a surprise to observe that

science-technology course score of students who were intuitively motivated was high. In this context, we can conclude that students who are high motivated in the learning environment are more willing in the in-class, out-of-class activities, perform higher participation and are more diligent in learning when compared to the students with low level of motivation. In the context of results of the research, suggestions for future researches are presented below:

1. This research is a quantitative research, which is intended to determine the change of the motivations toward science learning of second level students of primary education in terms of various factors. So, another quantitative research concerning some other factors affecting students' motivations toward science learning could also be carried out.
2. This research was carried out with the second level students of primary education. In another research, motivation levels of students who attend other grades of education (high school, undergraduate, graduate) in the field of physics, chemistry and biology could be investigated.
3. The effect of second level students' motivation toward science learning in the attitude toward science course and success in science course could be investigated.

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