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Investigation of primary students' motivation levels towards science learning

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Abstract
The present research was conducted with 518 students enrolled at the 6th, 7th and 8th classes of primary schools. A likert-type scale developed by Tuan, Chin and Shieh (2005) and translzated into Turkish by Yılmaz and Çavaş (2007) was used to examine the motivation levels of students towards science learning. Research findings revealed that gender, academic success and taking private lesson had an effect on students' motivation levels towards science learning. It was found in the study that: the motivation level of female students was higher than male students; academic achievement and taking private course increased the motivation; and laboratory activities, and parents' educational levels did not have an effect on students' motivation.

Keywords: Primary students, science learning, motivation

Introduction
Motivation is a complex psychological concept that attemps to explain behaviour and the effort at different activities (Cavaş, 2011; Watters & Ginns, 2000). It is known that motivation is related to various properties such as curiosity, persistence, learning and performance (Barlia & Beeth, 1999; Vallerand, Pelletier, Blais, Briere, Senecal & Vallieres, 1992). In literature, many definitions are used to explain the concept of motivation. For example, according to Brophy (2004), motivation is a theoretical concept that is used to explain beginning, direction, force and insistence of goal-oriented behaviour. Ainley (2004) makes a definition related to motivation that it is about "energy, direction, the reasons for our behaviours and what we do and why" (p. 2). Başdaş (2007) used motivation in the meaning of mobilizing effort and endeavour. From the educational perspective, Palmer (2005) states that motivation can be applied to any process that activates and maintains learning behavior. In addition, Barlia (1999) states that motivation is a vital educational variable promoting both new learning and performance of previously learned skills, strategies and behaviors. In general, motivation is an effective factor that lead human organism to behave and determines insistence and energy of humans' behaviours (Azizoğlu & Çetin, 2009; Yılmaz & Çavaş, 2007). Motivation can be defined as a factor which leads to behavior starting and determines the direction, force and insistence of it. If learning is expressed as a behavioural change, it can be said that behavioural change requires motivation. On the other hand, Mamlok-Naaman (2011) states that the way students perceive and evaluate their acquaintance with any kind of knowledge is very important in their learning process.

According to self-determination theory, when people are motivated, they intend to accomplish something and undertake goal-oriented behaviour to do so. Behaviours revealed by motivated people may be either self-determined or controlled (Brophy, 2004; Deci, Vallerand, Pelletier & Ryan, 1991). To the extent that behaviours are self-determined, they are experienced as freely chosen and emanating from one's self. In the first part of the self-determination theory, intrinsic motivation refers to doing an activity for itself and to the pleasure and satisfaction derived from participation (Cokley, Bernard, Cunningham & Motoike, 2001; Karsenti & Thibert, 1996; Vallerand, Pelletier, Blais, Briere, Senecal & Vallieres, 1992). In the second part of the self-determination theory, extrinsic motivation focuses on external rewards such as the desire to obtain high grades and complete the program (Watters & Ginns, 2000). However, Miserandino (1996) has defined extrinsic motivation as a behaviour which is made to receive a reward or to avoid punishment. In the third part of the self-determination theory, amotivational syndrome occurs when individuals perceive their behaviours do not result in a certain outcome (Cokley et al., 2001). When individuals are unmotivated, they believe that their behaviours are the results of forces out of their control (Vallerand et al., 1992).
In the literature, there have been many studies exploring the effect of students' motivation on learning and teaching and these show that many factors may affect the motivation (Ames, 1992; Hanrahan, 1998; Palmer, 2005). Self-perceptions of ability, effort, task value, self-efficacy, test anxiety, self-regulated learning, task orientation and learning strategies are some of them (Brophy, 1998; Cavaş, 2011; Garcia 1995, Garcia & Pintrich, 1995; Nolen & Haladyna, 1989; Pintrich & Schunk, 1996). In addition to the studies exploring the effect of motivation in general education, some of the researchers (Yılmaz & Cavas, 2007; Cavas, 2011) believe that it is very important to focus on the effect of the affective components in science education research.

Motivation towards science learning

"Motivation towards science learning" may be defined as a desire of science learning (Bolat, 2007). This concept is very important because students' motivation plays a crucial role in science learning, such as the conceptual change process, critical thinking process and scientific process skills (Lee & Brophy, 1996). According to Cavas (2011), motivation to learn science promotes student construction of their conceptual understanding of science. In the literature, there have been reported numerous factors affecting students' motivation towards science learning. Many researchers investigated different factors such as gender (Akbaş & Kan, 2007; Azizoğlu & Çetin, 2009; Bolat, 2007; Debacker & Nelson, 2001; Yılmaz & Çavaş, 2007), class level (Akbaş & Kan, 2007; Bolat, 2007; Çakmak et al., 2008), parental education level (Bolat, 2007; Davis-Kean, 2005; Dubow, Boxer & Huesmann, 2009), academic success (Akbaş & Kan, 2007; Altun, 2009; Patrick, Kpanghan & Chibueze, 2007), participating laboratory activities (Gagne & Deci, 2005; Hofstein & Lunetta, 2003), taking private courses (Bolat, 2007) and utilizing the internet (Bassili, 2008; Ng & Gunstone, 2002; Tekinarslan, 2009; Wang & Reeves, 2007). In addition, Akbas and Kaan (2007) examined high school students' motivation and anxiety for chemistry and found that motivation and anxiety were effective on chemistry achievement. Güvercin, Tekkaya and Sungur (2010) investigated the effect of grade level and gender on elementary school students' motivation towards science learning. Results showed that students' motivation towards science learning declined as the grade level increased and girls had a higher motivation towards science learning than boys. Similarly, Cavas (2011) investigated the factors affecting the motivation of Turkish primary students for science learning and found that Turkish primary students' science motivation differed significantly in terms of their gender and grade level. Student's motivational level was found to have a considerable impact on their science attitudes and achievement in science. Karaarslan and Sungur (2011) investigated elementary students' self-

efficacy beliefs in science based on grade level, gender, and socio-economic status. Results of the study showed that there was no significant difference across grade level and gender, positive relationships were found between number of books in home, frequency of buying a daily newspaper, and income as indicators of SES and self-efficacy. Mamlok-Naaman (2011) aimed at finding out what are high school students' reasons for not choosing to major in any of the scientific disciplines, and how is it possible to motivate them to learn science. Based on the data, (s)he attempted to use a historical approach to science teaching, with the belief that it would improve the attitudes and interest of non-science-oriented students (those who did not choose to major in any of the scientific disciplines) towards science and science studies.

Motivation and curriculum approach, which is adopted in science education today, cannot be considered separately. Therefore, it may be said that all factors which may affect motivation may affect science education in the learning environment. In Turkey, a science curricula was prepared by the Ministry of National Education (MNE, 2005) with a constructivist nature and began to be implemented in the 2005-2006 academic year. The main goals of the constructivist curricula in Turkey may be phrased; (1) to provide permanent and desired learning, (2) to eliminate educational deficiencies for the individuals and (3) to enhance individuals' academic and social performance. Students' active participating to lessons plays an important role in constructivist approach. Tuan, Chin & Sheh (2005 reported six important factors for motivation in science learning motivation by integrating constructivist learning and motivation theories. These were: self-efficacy, active learning strategies, science learning value, performance goal, achievement goal, and the learning environment stimulation.

As we know that students' motivation towards learning makes learning effective (Sarıbıyık, Altunçekiç & Yaman, 2004), it is important to determine students' motivation levels and factors affecting students' motivation in science. All of the literature also show us that motivation is very important factor for science learning. There have been used a few motivation scales towards science learning (Glynn, Taasoobshirazi & Brickman, 2009; Tuan, Chin & Shieh, 2005; Yılmaz & Cavas, 2007). But there is not enough research especially about motivation towards science learning in Turkey. In this context, the study tries to determine how primary students' motivation levels towards science learning changes according to a) gender, b) parental education level, c) academic success, d) participating laboratory activities, and e) taking private courses. Gender, parental education level and academic success have been commonly studied in the literature. We believe that participating laboratory activities motivate students positively because students have the chance to make something individually and freely. So, we wanted to investigate the effect of it. In addition, taking private course (both individually and in a private educational environment) is very common in Turkey and students have the chance to devote more time to science concepts. For this reason, we think that taking private course is an important variable to be investigated.

Methodology

Research design and sample

A survey was used to collect data. The sample of the study consists of primary students enrolled at 6th, 7th and 8th classes in three different schools which are located in the centre of Trabzon, which is a city in the Black Sea region of Turkey. The socio-economical level of the schools is similar. The reason for choosing these schools is to reduce statistical differences based on socio-economical level. Schools in the study were coded as A, B and C. Students in the sample were chosen randomly. A total of 518 students participated in the study. The mean

values of male and female students' ages are 13 and 12, respectively. Distribution of the students in the schools and grade levels is given in Table 1.

Table 1. Distribution of the students to the schools and grade levels

	School A	School B	School C	TOTAL
Grade 6	29	30	56	115
Grade 7	87	72	100	259
Grade 8	46	28	70	144
TOTAL	162	130	226	518

When parental education level is examined, it could be said that mothers have primary education level and fathers have secondary education level. While the number of mothers graduated from university is 68, the number of fathers who graduated from university is 149.

Instruments

In the research, a likert-type "Students' Motivation toward Science Learning" (SMTSL) scale developed by Tuan, Chin & Shieh (2005) was used to collect data. The original language of the scale is English and consists of six factors including 35 items (26 positive, 9 negative). This scale was translated into Turkish by Yılmaz & Çavaş (2007) and validiy and reliability of it was calculated. The Turkish form of the scale consists of the same six factors as the original form, but includes 33 items (25 positive, 8 negative). One negative an one positive item were extracted from the scale because they were not suitable for the study. The six factors used in the scale are; 'self-efficacy, active learning strategies, science learning value, performance goal, achievement goal and learning environment stimulation. The 'Self-efficacy' factor comprises the beliefs that students hold about their individual competence in accomplishing tasks related to science. It is related to intrinsic motivation.

The 'Active learning strategies' factor is related to feel intrinsic motivation when taking an active role in using a variety of strategies to construct students' new knowledge based on their previous understanding. The 'Science learning value' factor is related to students' acquiring problem-solving competency, experience the inquiry activity, stimulate their own thinking, and find the relevance of science with daily life. It is related to intrinsic motivation. The 'Performance goal' factor expresses that the student's goals in science learning are devoted to competing with the other students and attracting the attention of teacher. It is related to extrinsic motivation. The 'Achievement goal' factor is related to students' specific goals which they should have for increasing their skills and success in science learning process. Also, it is related to extrinsic motivation. The 'Learning environment stimulation' factor is related to the effect of learning environment components like curriculum, teachers' teaching methods and student's interaction on motivation. Also, it is related to extrinsic motivation. Six factors explain 56,49% of total variance. Cronbach alpha reliability coefficient of SMTSL scale including 33 items was calculated 0.87. This value is good for the scale to use. The whole scale used in the study is provided in the appendix.

Data analysis

Data were analyzed by using a statistical package programme. Answer options of the scale items are; "strongly agree, agree, no opinion, disagree, and strongly disagree". In the analysis, 5-point was given for 'Strongly agree' option while 1-point was given for 'Strongly disagree' option for positive items. On the other hand, 1-point was given for 'strongly agree' option while 5-point wase given for 'strongly disagree' option for negative items. Scores obtained

from SMTSL scale changes between 33 and 165 points. Two-way ANOVA was used to search the concurrent effect of parental education level variables on motivation. Mann Whitney test was used to determine how students' motivation levels towards science learning change according to gender, making laboratory activities, and taking private course. Also, Kruskal Wallis test was used to determine the significance of students' motivation level towards science learning according to academic success. Test results were evaluated at α=0,05 significance level.

Results and discussion

The data obtained from the motivation scale are given separately and discussed below.

Relationship between motivation level towards science learning and gender

The findings about how students' motivation levels towards science learning change according to gender are given in Table 2.

Table 2. Results of Mann Whitney test on motivation level by gender

Gender	N	Mean Rank	Sum of Ranks	U	p
Female	273	272.86	74492.00	29794.00	0.032*
Male	245	244.61	59929.00		

As can be seen from the Table 2, gender has a significant effect on students' motivations towards science learning ($p<.05$). When 'mean rank' scores are examined, it is observed that female students' motivation level towards science learning is higher than male students' one. But, there is not a significant difference between scores obtained from "self-efficacy" (U=32825,00, p=0.716), "active learning strategies" (U=30248,00, p=0.059), "science learning value" (U=30115,00, p=0.05) and "learning environment stimulation" (U=32852,50, p=0.728) subfactors of the SMTSL scale according to gender ($p>.05$). On the other hand, there is a significant difference between scores obtained from "performance goal" (U=27832,00, p=0.001) and "achievement goal" (U=28418,00, p=0.003) subfactors of the SMTSL scale according to gender, in favour of female students ($p<.05$). It is observed that female students' performance and achievement goals are higher than male students' ones. The environments where students were born, grow, perform social interaction and the families' perceptions about their children according to gender are different. Families' perceptions about their female and male children could have been effective in the formation of motivational differences. Namely, families' beliefs, attitude and expectations have negative or positive effect on students' motivations. This result is supported by Brady (2008).

In the literature, there have been different results related to male and female students' motivation level towards science learning. For example, Yılmaz and Çavaş (2007) determined that female students have higher motivation levels than male students on "active learning strategies", "performance goal", and "achievement goal" subfactors of SMTSL scale. Also, Brady (2008) has mentioned that gender plays a major role on students' motivations and achievements, and female students' have higher motivation level. On that basis, the finding of present research supports Yılmaz and Çavaş (2007) and Brady (2008). On the other hand, Pintrich and De Groot (1990) determined that male students had higher motivation levels than female students at the primary level and they tried to explain this in terms of anxiety. According to them, male students who have high self-efficacy have low anxiety; female students who have low self-efficacy have high anxiety. In contrast, some of the studies

conducted with primary students by Azizoğlu and Çetin (2009), Bolat (2007), Liu (2005) and Meece and Jones (1996) determined that students' motivation levels towards science learning does not change according to gender.

Relationship between motivation level towards science learning and parental education level

The significance of students' motivation levels towards science learning change according to mother and father education level was determined with two-way ANOVA. The results obtained from the test were given in Table 3.

Table 3. Results of two-way ANOVA test on motivation level by parental education level

Variance Source	Sum of Squares	sd	Mean Square	F	p
Mother	48.905	2	24.452	0.119	0.888
Father	657.657	2	328.828	1.601	0.203
MotherX**F**ather	1408.766	4	352.191	1.715	0.145
Error	104535.751	509	205.375		
Total	9217769.000	518			

As seen from the Table 3, mother's and father's education level does not have a significant effect on students' motivations towards science learning ($p>.05$). Also, a significant difference was not observed between scores obtained from "self-efficacy" ($F(4, 509)=1.625$, $p>.05$), "active learning strategies" ($F(4, 509)=1.221$, $p>.05$), "science learning value" ($F4, 509)=0.808$, $p>.05$), "performance goal" ($F(4, 509)=1.275$, $p>.05$), "achievement goal" ($F(4, 509)=0.832$, $p>.05$) and "learning environment stimulation" ($F(4, 509)=1.443$, $p>.05$) subfactors of SMTSL scale according to parental education level. Some studies from the literature support these results. For example, Bolat (2007) has determined that parental education levels affected students' motivation levels. As a consequence of this study, it has been determined that students' motivation levels concerning teacher qualifications, classroom organization, classroom interaction and classroom climate increase as long as mothers' level of education rise. In this study, it has been also determined that students' motivation levels concerning teacher qualifications, classroom organization and classroom interaction increase, but their motivation levels concerning classroom climate do not change as long as fathers' level of education rise. And also, it has been mentioned that mothers and fathers with higher level of education become more interested in their children, they help children about their lessons and and they become more sensitive and conscious about preparing an environment which provide high motivation level to them.

In present science curricula, students have to conduct performance projects involving a certain process. In these performance projects, parents are at the top of the resources which students use when they ask for information. However, with the effect of technological developments, students have begun to benefit more from the Internet in the field of science.

Relationship between motivation level towards science learning and academic success

The findings about how students' motivation levels towards science learning change according to academic success are given in Table 4.

Table 4. Results of Kruskal Wallis test on motivation level by academic success

Level of Academic Success	N	Mean Rank	Sd	χ^2	p
Passing Grade	35	158.60	3	48.502	.000*
Middle	106	195.78			
Good	183	279.55			
Perfect	194	293.61			

As can be seen from the Table 4, academic success has a significant effect on students' motivations towards science learning (p*<.05). And also, a significant difference has been observed between scores obtained from "self-efficacy" (χ2(3)=92.508, p=0.000), "active learning strategies" (χ2(3)=17.496, p=0.001), "science learning value" (χ2(3)=23.673, p=0.000), "achievement goal" (χ2(3)=21.948, p=0.000) and "learning environment stimulation" (χ2(3)=8.897, p=0.031) subfactors of SMTSL scale according to academic success (p<.05). On the other hand, there is no significant difference between scores obtained from "performance goal" (χ2(3)=7.171, p=0.067) subfactor of the SMTSL scale according to academic success (p>.05). For whole scale and most of the subfactors, it has been observed that the motivation level of a student who has "perfect" success is higher than the motivation level of a student who has "good" and "middle" success in science lesson. As a result, students' academic success affects their motivation levels.

When the studies which researched the relationship between academic success and motivation are examined, it is observed that the results of these studies supported the findings of the research reported in this paper. For example, Altun (2009) has mentioned that students' lack of motivation brings failure. According to Bolat (2007), decreasing of students' academic success reveals that there are motivational deficiencies about themselves. And also, students who have high academic success have high motivation level towards science learning. In another study, Patrick, Kpangban & Chibueze (2007) ascertained how motivation in science affect students' academic success and they determined that students who had high motivation levels were more successful than students who had low motivation levels. Similarly, Shih and Gamon (2001) and Singh, Granville and Dike (2002) have mentioned that students' motivation levels affect their academic success positively. All of these studies reveal that students' academic success increase as when their motivation levels increase.

Relationship between motivation level towards science learning and making laboratory activities

The findings about how students' motivation levels towards science learning change according to taking part in laboratory activities are given in Table 5.

Table 5. Results of Mann Whitney test on motivation level by making laboratory activities

MLA	N	Mean Rank	Sum of Ranks	U	p
Yes	455	262.63	119496.00	12909.00	.201
No	63	236.90	14925.00		

As seen from the Table 5, taking part in laboratory activities does not have a significant effect on students' motivations towards science learning (p>.05). Also, it was not determined a significant difference between scores obtained from "self-efficacy" (U=13605.50, p=0.513), "science learning value" (U=13939.00, p=0.722), "performance goal" (U=13127.50, p=0.276), "achievement goal" (U=13893.00, p=0.689) and "learning environment

stimulation" (U=13386.50, p=0.394) subfactors of SMTSL scale according to participating in laboratory activities (p>.05). It has been observed that there is only a significant difference between scores which are obtained from "active learning strategies" (U=12002.00, p=0.036) subfactor of the SMTSL scale (p<.05). It is observed that students who take part in laboratory activities have higher motivation levels towards science learning than students who do not take part in laboratory activities in terms of "active learning strategies".

In all of the relevant studies, it has been mentioned that laboratory activities increase students' motivation levels. For example, in a study conducted by Alı (1980) to research the effect of laboratory on students' motivation, Alı determined that laboratory activities were very motivating for students and laboratories give opportunity for students to solve and analyze practical problems and to form higher hierarchies of learning. Similarly, in the studies conducted by Deci, Koestner and Ryan (1999), Gagne and Deci (2005), and Hofstein and Lunetta (2003), it has been determined that laboratory activities increase students' motivation. According to Hofstein and Lunetta (2003), the environment in a school laboratory is less formal than the classroom environment. Students are more free being away from teachers' authority. Therefore, laboratories offer opportunities for students to generate and collaborate interactively and increase students' motivation.

Laboratories are environments in which students' pleasure towards science learning is increased and students also gain some competences such as behaviour changing, effective performance, searching and discovering ability. The reason for significant difference on students' motivation levels according to the "active learning strategies" subfactor may be students' desire for self-study and formations of their own learning paths with self-study. These findings are supported by the works/research of Hofstein and Lunetta (2003) on students' desire about self-study and the work/research of Alı (1980) about formations of students' own learning paths.

Relationship between motivation level towards science learning and taking private course

The findings about how students' motivation levels towards learning change according to taking private course are given in Table 6.

Table 6. Results of Mann Whitney test on motivation level by taking private course

SEC	N	Mean Rank	Sum of Ranks	U	p
Yes	401	270.24	108367.50	19150.50	.002*
No	117	222.68	26053.50		

When Table 6 is examined, it is observed that taking private courses has a significant effect on students' motivation towards science learning (p*<.05). But, it was not determined a significant difference between scores which are obtained from "science learning value" (U=20998.00, p=0.082), "performance goal" (U=21293.00, p=0.126) and "learning environment stimulation" (U=22031.00, p=0.315) subfactors of SMTSL scale according to taking private course (p>.05). However, it has been observed that there is a significant difference between scores which are obtained from "self-efficacy" (U=16382.50, p=0.000), "active learning strategies" (U=19995.50, p=0.015) and "achievement goal" (U=20534.00, p=0.037) subfactors of SMTSL scale according to taking private course (p<.05).

Different social environments like private courses affect students' beliefs about science learning. Also, students can systematize their information about science due to social interaction in these environments. Because of these reasons, a significant difference may be observed on motivation levels of students who take private courses. This result is supported by the work/research of Ames (1990), Blumenfeld (1992), Bolat (2007), and Talib, Luan, Azhar & Abdullah (2009)'s studies which revealed that social interaction may affect students' motivation levels. There are a limited number of studies about this topic in the literature. In one of these studies, Bolat (2007) has studied grade 6 and grade 7 students. As a result of the research, Bolat found that there was a significant difference between scores obtained from "teacher competences" a subfactor of the scale according to condition of taking private course from private tutors or other types. According to him/her, the difference arises from teachers' qualifications. It has also been mentioned that students' motivation levels may increase if teachers are excited and affable, good models for students, and have emphatic approach.

Conclusions and Implications

In the research presented in this paper, students' motivation levels towards science learning were examined according to different variables. It was determined that there was a significant difference on students' motivation levels towards science learning according to gender, academic success and taking private courses.

In the research, in terms of the 'self-efficacy' subfactor, a significant difference has been determined on students' motivation levels towards science learning according to variables such as "academic success and taking private lesson". From this, it can be said that factors which affect students' beliefs about their individual competence are closely related to success. Different researchers have reported a direct positive relationship between academic self-efficacy and academic success (Bandura, Barbaranelli, Caprara & Pastorelli, 1996; Greene, Miller, Crowson, Duke & Akey, 2004; Pintrich & De Groot, 1990).

In terms of the 'active learning strategies' subfactor, a significant difference has been determined in students' motivation levels towards science learning according to variables like "academic success, taking private lesson and participating laboratory activities". From this point of view, it can be said that factors which affect students' activeness are success, self-study and interaction.

The 'Performance goal' subfactor has affected students' motivation levels towards science learning as being related to variables like gender. In the context of this subfactor, it can be said that factors which make science learning desirable especially in female students, are related to the behaviours like competition and getting attention. Researchers have pointed out a direct relationship between performance goal and behaviours like competition and getting attention (Ames, 1992; Linnenbrink & Pintrich, 2002; Tuan, Chin & Shieh, 2005).

The 'Achievement goal' subfactor has affected students' motivation levels towards science learning and is related to variables like gender, academic success and taking private courses. In terms of the 'learning environment stimulation' subfactor, a difference has been determined on students' motivation levels according to only the academic achievement variable. Tuan, Chin and Shieh (2005) have also pointed out a relationship between learning environment and interaction.

Some important results of this study are listed below:

• According to the gender variable, female students' motivations towards science and technology courses are higher than male students'. Female and male students are in social interaction with their families. But, the behaviors like success, competition and getting attention are observed more with female students. The reason for this situation is families' different perceptions about their female and male children.
• Students' educational expectations and needs are quite consistent with learning environments and activities.
• According to the participating in laboratory activities variable, a significant difference has not been observed on students' motivation levels towards science learning. As a result, common learning environments allow students to form their own learning paths.
• According to the taking private course variable, a significant difference has been observed on students' motivation levels towards science learning. As a result, individuals can digest knowledge to daily practises, processes and procedures in socially interactive and special learning environments.
• Environments which increase students' motivations towards science learning, provide students with an opportunity to carry out self-study, form their own learning strategies, and control their own learning processes should be organized in laboratories.

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APPENDIX

MOTIVATION SCALE TOWARDS SCIENCE LEARNING

Dear students,
This scale is prepared for measuring motivation level towards science learning. It consists of 33 items. The response time is almost 30 minutes. Please read every item and choose the most suitable choice for you. Thanks for your participating.

Gender : ☐ FEMALE ☐ MALE
Class Level : ☐ 6th CLASS ☐ 7th CLASS ☐ 8th CLASS

Mother Education Level:
☐ NOT LITERATE ☐ LITERATE ☐ PRIMARY ☐ SECONDARY
☐ UNIVERSITY

Father Education Level:
☐ NOT LITERATE ☐ LITERATE ☐ PRIMARY ☐ SECONDARY
☐ UNIVERSITY

First Term Science Lesson Grade: ☐ ☐ ☐ ☐ ☐
(1) (2) (3) (4) (5)

Do you make science activities at laboratories?
☐ YES ☐ NO
Do you participate in private courses?
☐ YES ☐ NO
Do you have Internet Access in your home?
☐ YES ☐ NO

	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1. Whether the science content is difficult or easy, I am sure that I can understand it.					
2. I am not confident about understanding difficult science concepts.					
3. I am sure that I can do well on science tests.					
4. No matter how much effort I put in, I cannot learn science.					
5. When science activities are too difficult, I give up or only do the easy parts.					
6. During science activities, I prefer to ask other people for the answer rather than think for myself.					
7. When I find the science content difficult, I do not try to learn it.					
8. When learning new science concepts, I attempt to understand them.					
9. When learning new science concepts, I connect them to my previous experiences.					

10. When I do not understand a science concept, I find relevant resources that will help me.					
11. When I do not understand a science concept, I would discuss with the teacher or other students to clarify my understanding.					
12. During the learning processes, I attempt to make connections between the concepts that I learn.					
13. When I make a mistake, I try to find out why.					
14. When I meet science concepts that I do not understand, I still try to learn them.					
15. I think that learning science is important because I can use it in my daily life.					
16. I think that learning science is important because it stimulates my thinking.					
17. In science, I think that it is important to learn to solve problems.					
18. In science, I think it is important to participate in inquiry activities.					
19. It is important to have the opportunity to satisfy my own curiosity when learning science.					
20. I participate in science courses to perform better than other students.					
21. I participate in science courses so that other students think that I'm smart.					
22. I participate in science courses so that the teacher pays attention to me.					
23. During a science course, I feel most fulfilled when I attain a good score in a test.					
24. I feel most fulfilled when I feel confident about the content in a science course.					
25. During a science course, I feel most fulfilled when I am able to solve a difficult problem.					
26. During a science course, I feel most fulfilled when the teacher accepts my ideas.					
27. During a science course, I feel most fulfilled when other students accept my ideas.					
28. I am willing to participate in this science course because the content is exciting and changeable.					
29. I am willing to participate in this science course because the teacher uses a variety of teaching methods.					
30. I am willing to participate in this science course because the teacher does not put a lot of pressure on me.					
31. I am willing to participate in this science course because the teacher pays attention to me.					
32. I am willing to participate in this science course because it is challenging.					
33. I am willing to participate in this science course because the students are involved in discussions.					