EJPCE
Eurasian Journal of Physics and Chemistry Education

Eurasian J. Phys. Chem. Educ., Jan (Special Issue):59-64, 2011

journal homepage: http://www.eurasianjournals.com/index.php/ejpce

Investigating of Relationships between Attitudes towards Physics Laboratories, Motivation and Amotivation for the Class Engagement

Ali ERYILMAZ[1,*], İsmail YILDIZ[2], Sedef AKIN[3]

[1]Ankara Lisesi (Anadolu), Ankara, Turkey
[2]Ayrancı Anadolu Lisesi, Ankara, Turkey
[3]Aydınlıkevler Anadolu Lisesi, Ankara, Turkey

Received 28 October 2010 - Revised 07 December 2010 - Accepted 10 December 2010

Abstract

The aim of this study is to examine the relationships between high school students' attitudes towards physics laboratories, their motivation and amotivation levels for the class engagement. The study was carried out on 114 male and 180 female (total 294) adolescents attending high schools and their age range is 14-17. The data of the study was collected by means of The Attitudes towards Physics Laboratories Scale and Motivation and Amotivation for the Class Engagement Scale. In the analysis of the data, simple regression analysis was used. According to the results of the analysis, it was observed that the students who have negative attitudes towards physics laboratory have lack of motivation for class engagement, and also the students who have positive attitudes towards physics laboratory have motivation for class engagement (R^2=0.14; F=22.31, p<0.00). Findings were discussed in the context of the literature.

Key words: Motivation; Class Engagement; Attitudes towards Physics Laboratory

Introduction

When students learn in laboratories, they can learn hard and abstract subjects easily and permanently, (Ayas, Çepni & Akdeniz, 1994). When students comprehend the relationships in scientific study methods and when they observe things, do experiment and research things, it enables them to determine an appropriate method to gain an attitude towards real life problems and to solve them efficiently. Carrying out more laboratory activities enables students to understand the nature of physics and to form a connection between concepts and real life (Garnett & Garnett, 1995). Laboratory application must be considered more seriously to make learning in physics lessons reach higher degrees than just knowledge and comprehension level. This situation provides students with cognitive, affective and psychomotor developments and besides it makes students gain positive attitudes towards physics (Azizoglu & Uzuntiryaki, 2006; Singer, Hilton & Schweingruber, 2005; Hofstein, 2004; Domin, 1999).

[*]Correspondence Author: Phone:+90 505 6617803; Fax: +90 312 438 33 77, E-mail: erali76@hotmail.com
ISSN: 1306-3049,

An earlier version of this paper was presented at the IX. National Sci & Math Edu Congress in Izmir-Turkey in Sep 2010.

An attitude towards physics laboratory is related to several variables. Motivation for class engagement is one of these variables. As a concept, motivation and amotivation has a significant role in teaching and learning. In the past, students used to be considered as machines whose necessities were supplied. But today, according to motivational perspective, students are considered as individuals who are able to reach a decision by assessing possibilities and consequences that can transfer their aims into life and form meaning. The importance of students' attendance to school and classes was noticed when teachers observed that pupils were bored with academic and social activities at school and they didn't have any motivation (Maehr & Midgley,1991).

If students take active part in class and school activities it means that they take part in the activities that are provided by school. Researchers consider it as a meta structure by combining their different findings about topics such as motivation for class engagement, reference and school atmosphere. In spite of it there is not a common definition or consistency about concepts and terms in studies which are carried out on this topic. Engagement means that the students participation to the activities which are offered by the school (Natriello, 1984). In literature, engagement discussed with two or three factors. First factor is the behavioural dimension which includes characteristics such as exhibiting positive behaviors and efforts. Another factor is the emotional dimension which includes the positive attitudes on the subjects such as interest, identification, learning (Finn, 1993; Newmann, Wehlage & Lamborn, 1992; Willms, 2003). This study is carried out with respect to motivation to class engagement. Motivation to class engagement means that students want to engage the class activities if they have motivation. On the other hand amotivation to calss engagement means that students do not want to engage the class activities if they have amotivation.

On the other hand, motivation in education has been taken into consideration in Turkey recently. In accordance with it, some studies have been carried out such as self regulation strategies and the degree of the motivational necessities regression effect in mathematical success (Üredi & Üredi, 2005), the reliability and validity study of motivation for science learning scale (Yılmaz & Huyugüzel-Çavuş, 2007) and improving academic motivation scale (Bozanoglu, 2004). When the studies carried out in Turkey are scanned, there are a few studies on participation in classes. On this point, Eryılmaz (2009) has carried out a qualitative study to determine the factors which increase pupils' positive emotional states, their competence in class, their preparations before classes and their positive relationships with teachers increase their participation. Eryılmaz (2010) has improved two scales with four dimensions which are about students' motivation and amotivation for the class engagement.

The most significant problem that teachers confront in physics lessons is that abstract or concrete subjects cannot be comprehended by pupils correctly or efficiently. A lot of techniques and methods are used to handle this situation. We can apply any technique or method but students' attitudes towards the lesson and their knowledge that they gain previously are mainly effective in learning by doing and their knowledge that they gain previously are mainly effective in learning. Learning by doing and forming knowledge has been outstanding among these methods recently (Azizoglu & Uzuntiryaki, 2006; Singer, Hilton & Schweingruber, 2005). This method involves students' being active in learning process and doing instead of being passive. If we want students to gain permanent knowledge and form a connection between knowledge and real life, it is possible by making students take an active part in experimental laboratory based activities.

The studies which are done about the class engagement reveal that when the students are open to learning, they show more competence in terms of academic and they use more strategies to learn (Pintrich & Maehr, 2004). Also, when they participate in the lesson, they are connected to the subject and they are undaunted by the difficulties and they are happy

about the studies they did. As a result, students class engagement affect students' will, needs and meanwhile the success of learning (Bomia et al., 1997). If the students do not have motivation to participate in the lesson, in this case many of them get bored, they cannot focus their attention on the subject, and they cannot establish any connection with the studies done in the school and real life. As a result of the students' being bored and reduction of their lesson attention, we see that the students dropout (Pintrich & Maehr, 2004).

One of the most important factors which affect students' academic success is their attitudes towards school, lessons and academic success. Pintrich and Maehr (2004) classifies students in three groups such as the ones who avoid failure, the ones who would like to satisfy their curiosity and the ones who want to get high marks. He remarks that students in classes, their motivation degrees and strategies are different. When students have positive attitudes, they show positive behaviors and they fulfill their academic necessities. In consideration of this knowledge and the findings, in this study it was aimed to examine the relationships between attitudes towards physics laboratories, motivation and amotivation for class engagement.

In this study, it is aimed to examine the relationships between attitudes towards physics laboratory and motivation-amotivation for class engagement.

Method

Descriptive research model is chosen as the method of the research. The data have been analyzed by simple regression analysis in this study. The dependent variable of this research was attitudes towards physics laboratory, and also the independent variables of this research were motivation and amotivation for class engagement.

Study Group

The study was conducted on 294 adolescences (180 girls and 114 boys) who are high school students between the ages of 14-17 in Keçioren-Ankara. 157 adolescents who involved in the study are at age 15 (%53.4), 117 adolescents are at age 16 (%39.8), 15 adolescents are at age 17 (%5.1), 5 adolescents are at age 14 (%1.7). 278 adolescents who involved in this study live with their parents (%94.6), parents of 12 adolescents are divorced (%4.1) and mother or father of 4 adolescents are died (%1.3).

Instruments Used in the Study

Data of the study were collected through the use of three scales: Scale of Attitude Towards Physics Laboratory (Nuhoglu & Yalcin, 2004) and Scales of Motivation-Amotivation for Class Engagement (Eryılmaz, 2010). The detailed information about these tools are given below.

Scale of Attitude Towards Physics Laboratory: This scale was developed by Nuhoglu and Yalcin (2004). Scale of Attitude Towards Physics Laboratory is one-dimensional. The scale has 36 items. To get a high score at the scale means to have positive attitudes about related subject. Internal consistency value of the scale is 0.89.

Scales of Motivation or Amotivation about Class Engagement: Scales of Motivation or Amotivation about Class Engagement was developed by Eryılmaz (2010). Scale for motivation for class engagement has four dimensions. To get a high score at the scale means to have motivation for class engagement. The explained variance of the Scale for motivation for class engagement is 64.60 %. Internal consistency value of the scale is 0.91. Scale for amotivation for class engagement has also four dimensions. To get a high score at the scale

means to have amotivation for class engagement. The explained variance of the Scale for amotivation for class engagement is 64.28 %. Internal consistency value of the scale is 0.86.

Results

In this section of the study, findings have been addressed under two headings: firstly, descriptive statics between variables; secondly, the results of regression analysis.

Descriptive Statistics

At this stage, variables are evaluated in terms of descriptive point of view. Descriptive statistics for the research variables are showed in following Table 1.

Table 1. Descriptive Statistics

	Statistical Values	
Variables	***Means***	***Standard Deviation***
Attitude Towards Physics Laboratory	136.20	20.64
Motivation of Class Engagement	64.45	10.98
Amotivation of Class Engagement	39.86	8.51

The Results of Regression Analysis

In this study, relations among variables have been analyzed by simple regression analysis. Results of analysis are showed in the following Table 2.

Table 2. Results of Simple Regression Analysis

	Statistical Values			
	β	Beta	p-value	t-value
Motivation of Class Engagement	0.44	0.23	0.00	4.37
Amotivation of Class Engagement	-0.70	-0.29	0.00	-5.32

When examining the table, it has been seen the results of simple regression analysis. Motivation and amotivation of class engagement significantly explains attitudes towards physics laboratory (R=0.37, R^2=0.14, F=22.31, p<0.00). When the relationships between variable and attitudes towards physics laboratories are taken into consideration one by one,in regression equation,the amotivation for class engagement has the most negative relationship (β= -0.29; p= 0,00) and then motivation towards the class engagement has the most positive and meaningful relationship (β=0.23; p=,00) with the attitudes towards physics laboratories. According to this conclusion, the relating variables explain 14% of the variance of attitudes towards physics laboratories.

Diccussion and Conclusion

In this study, it is examined the relationship between attitudes of high school students towards physics laboratory and being motivated for class engagement or not. It is concluded that students who have high-level motivation for class engagement have also positive attitudes towards physics laboratory. In contrast with this conclusion, students who have low-level motivation for class engagement have negative attitudes towards physics laboratory. In this section of the study, findings have been discussed within the scope of the relevant literature.

In the literature, the relationship between attitudes towards physics laboratory and many variables have been examined. However, in the mentioned studies, the relation between the attitudes towards physics laboratory and motivation-amotivation for for class engagement has not been adequately examined. This study provides an important contribution to the literature, examining the above mentioned relation.

The subject of motivation is important especially in student's learning and in their academically successful life. Studies, which have been carried out, reveal that more motivated individuals learn a subject better (Pintrich and Maehr, 2004). Moreover, it is concluded that individuals who have high-level motivation provide positive contributions to the school and class (Eccles, Wigfield & Schiefele, 1998). The findings of this study also describe the importance of motivation for the issue of attitudes towards physics laboratory. Therefore, this study justifies the importance of this topic in the literature once again.

On the basis of these results, it is possible to develop some suggestions. First of all, it is necessary that teachers of physics course have students motivate participating in class for positive attitudes towards physics laboratory. Secondly, not only teachers but also students need to minimize their conditions, which they have no motivation. When these conditions are met, students' attitudes towards physics laboratory will be more positive. Hence, both the aim of curriculum will be reached and academic achievement of students will improve. In the next studies, this relation between students who are motivated to join the course and their attitudes towards physics laboratory can be examined; for example, the strategies to increase motivation can be introduced.

Finally, it is explained that, in this study, to have more positive attitudes towards physics laboratory is required that students should be motivated to participate in their classes. Then, studies with various measuring tools in different groups can be important contribution to the literature.

References

Ayas, A., Çepni, S. & Akdeniz, A.R. (1994). Fen bilimleri eğitiminde laboratuarın yeri ve önemi (II): Laboratuvar uygulamalarında amaçlar ve yaklaşımlar, *Çağdaş Eğitim*, 19, 7-12.

Azizoglu, N. & Uzuntiryaki, E. (2006). Kimya Laboratuvarı Endişe Ölçeği, *H.Ü. Eğitim Fakültesi Dergisi,* 30, 55-62.

Bomia, L., Beluzo, L., Demeester, D., Elander, K., Johnson, M. & Sheldon, B. (1997). *The impact of teaching strategies on intrinsic motivation.* Champaign, IL: ERIC Clearinghouse on Elementary and Early Childhood Education. (ED 418 925).

Bozanoğlu, İ. (2004). Akademik güdülenme ölçeği: Geliştirmesi, geçerliği, güvenirliği, *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 37(2): 83-98.

Domin, D.S. (1999). A Content Analysis of General Chemistry Laboratory Manuals for Evidence of Higher-Order Cognitive Tasks, *Journal of Chemical Education,* 76(1), *109-111*.

Eccles, J., Wigfield, A. & Schiefele, U. (1998). Motivation to succeed. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), Handbook of child psychology: Vol. 3. Social, emotional, and personality development (5th ed., pp. 1017-1095). New York: Wiley.

Eryılmaz, A. (2009). Okulda motivasyon ve amotivasyon: Planlı çalışma. *X. Psikolojik Danışma ve Rehberlik Kongresi.* Çukurova Üniversitesi, Adana.

Eryılmaz, A. (2010). Okulda motivasyon ve amotivasyon ölçeklerinin geliştirilmesi. *XVI. Ulusal Psikoloji Kongresi*. Mersin Üniversitesi, Mersin.

Finn, J. (1993). *School engagement and students at risk*. Wasginhton DC: NCES Publication.

Garnett, P.J. & Garnett, P.J. (1995). Refocussing the chemistrylab.: A case for laboratory based investigations, *Australian Secience Teachers Journal*, 41(2), 26-33.

Hofstein, A. (2004). The Laboratory in Chemistry Education: Thirty Years of Experience With 13. Developments, Implementation, and Research, Chemıstry *Education: Research And Practice* 5(3), *247-264*.

Maehr, M. & Midgley, C. (1991). Enhancing student motivation: A school-wide approach. *Educational Psychologist*, 26 (3&4), 399-428.

Natriello, G. (1984). Problems in the evaluation of students and student from secondary schools. *Journal of Research and Development in Education,* 17, 14 – 24.

Newmann, F.M., Wehlage, G.G. & Lamborn, S.D. (1992). The significance and sources of student engagement. In F.M. Newmann (Ed*.), Student engagement and achievement in American secondary schools* (pp. 11 – 39). NewYork: Teachers College Press.

Nuhoğlu, H. & Yalçın, N. (2004). Fizik Laboratuvarına Yönelik Bir Tutum Ölçeğinin Geliştirilmesi ve Öğretmen Adaylarının Fizik Laboratuvarına Yönelik Tutumlarının Değerlendirilmesi. *KEFAD*, 5, (2), 317-327.

Pintrich, P.R. & Maehr, M.L. (Eds.). (2004). Advances in motivation and achievement: *Motivating students, improving schools* (Vol. 13). Oxford, England: JAI, An Imprint of Elsevier Science.

Singer, S., Hilton, M. & Schweingruber, H. (2005). Needing a New Approach to Science Labs. *The Science Teacher,* 72(7), 10.

Üredi, I. & Üredi, L. (2005). ilköğretim 8. Snııf öğrencilerinin öz-düzenleme stratejileri ve motivasyonel inançlarının matematik başarısını yordama gücü. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 1 (2) 250-260.

Yılmaz, H., & Huyugüzel-Çavuş, P. (2007). Fen öğrenimine yönelik motivasyon ölçeğinin geçerlik ve güvenirlik çalışması. *İlköğretim Online,* 6(3) 430-440.

Willms, J.D. (2003). *Student engagement at school: A sense of belonging and participation.* Paris: Organisation for Economic Co-Operation and Development.