STUDENTS' INTEREST TO USAGE OF ORGANIC CHEMISTRY IN DAILY LIFE

ÖĞRENCİLERİN GÜNLÜK YAŞAMDA ORGANİK KİMYANIN KULLANIMINA İLGİLERİ

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ABSTRACT

It is known that interest is the most important factor which effect students' achievements and attainment of knowledge. The aim of this study is to explore the high school students' interest towards to usage of organic chemistry in daily life**.** The data for this survey study was collected through a questionnaire containing 27 Likert-type items ranging from 1 (low) to 4 (high). The items were formed by taking the use of organic chemistry in daily life into consideration to determine the levels of students' interest. Participants were 505 ninth, tenth and eleventh grade students, 229 of them were girls and 276 of them were boys. According to results, students have the highest interest in "the mummification techniques used in preserving corpses in Egypt". However the lowest interest rates were shown in "what antifreeze is? and how it acts?". Although the highest interest was found in science major students, there was no statistically significant difference between these students and the other students. The results of the present study can be used in the development of curriculum and/or in the design of the text content.

Keywords: Student's interest, daily life, organic chemistry

ÖZET

İlginin öğrencilerin başarılarını ve bilgi kazanmalarını etkileyen en önemli faktör olduğu bilinmektedir. Bu çalışmanın amacı lise öğrencilerinin organik kimyanın günlük yaşamda kullanımına olan ilgilerini incelemektir. Bu tarama çalışması için gerekli veriler likert türü 27 maddeden oluşan anketten elde edilmiştir. Anket

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maddeleri organik kimyanın günlük yaşamda kullanılmasının göz önünde bulundurulması ile oluşturulmuştur. Çalışmanın örneklemini 8., 9. ve 10. sınıftaki 229 u kız ve 276 sı erkek olan toplam 505 öğrenci oluşturmaktadır. Öğrencilerin cevaplarından elde edilen sonuçlara göre "Mısır da cesetleri korumada kullanılan mumyalama tekniği" ilgi düzeyinin en yüksek olduğu anket maddesidir. Bununla birlikte "antifriz nedir ve nasıl çalışır?" ilgi düzeyinin en düşük olduğu anket maddesidir. Fen bilimleri alanındaki öğrencilerin ilgisinin en yüksek olmasına rağmen bu öğrencilerle diğer öğrenciler arasında istatistiksel olarak anlamlı farklılık yoktur. Mevcut çalışmanın sonuçları program geliştirilmesinde ya da ders kitaplarının oluşturulmasında kullanılabilir.

Anahtar sözcükler: Öğrenci ilgisi, günlük yaşam, organik kimya

1. INTRODUCTION

Interest indicates the annihilation of the distance between the person and the materials and the results of his action. The development of interest begins in childhood with play. As children grow up, they engage in higher levels of activities in which they use materials, tools, rules, and procedures. The development of interest cannot be separated from the children's lives, needs or desires. The interest is subdivided to direct interest and indirect interest. The direct interest originates from the individual or immediate experience, but the indirect interest is mediated by a teacher or parent (Bulunuz, 2007; Dewey, 1913).

The interest has also been classified as individual interest and situational interest (Bulunuz, 2007; Hidi ve Harackiewicz, 2000; Krapp et al., 1992; Renninger, 2008). Individual interest is defined as a long-lasting person-object relationship. However, situational interest refers to a state of interest generated externally or formed as a result of ongoing interactions between a person and the environment. Although, individual and situational interest are different; they seem to interact and influence each other's development. The situational interest can be turned into long lasting individual interest if the individual is exposed to situational interest over a certain period of time (Bulunuz, 2008; Hidi and Harackiewicz, 2000; Krapp et al., 1992).

The interest deals with both cognitive and affective domain; therefore it is an important pre-requisite for learning. It is known that interest is one of the most important factor which effect students' achievement and attainment of knowledge towards school and lessons. The researchers argue that situational interest may have a critical role in learning, especially when

students do not have pre-existing individual interest in particular subject matter (Bulunuz, 2008; Dervişoğlu et al., 2004; Hidi and Harackiewicz, 2000).

It has been suggested that the school subject, the topic or theme of instruction, the learning context, and the type of learning activity are effective in stimulation of student interest in science education (Hansen, 1999). Learning contexts include the types of activities involved in the learning process and the cultural context in which the topic is taught. A number of studies indicate that learning contexts can make science topics meaningful for students (Barker and Millar, 1999; Holman and Pilling, 2004).

Many teachers complain about the lack of students' interest in chemistry subjects. However, teachers also admit that students like to relate chemical principles to everyday things. But the problem is that how general principle can be translated into daily life (Bennet and Holman, 2002; Osborne and Collins, 2001). On the other hand; if chemistry is not a compulsory subject in the curriculum, most students not elect to continue to study it. Moreover, many of those that do elect chemistry to continue to study the subject experience a lack of relevance in it. These students think that chemistry is an instrument for their real subject, rather than because it is worthwhile in itself. For instance, chemistry has become a pre-requisite for the study of something in which they are actually interested, e.g., medicine (Gilbert, 2006).

According to Bennett, Lubben and Hogarth (2007) context-based approaches are approaches adopted in science teaching where contexts and applications of science are used as the starting point for the development of scientific ideas. One of the aims of these approaches is to enhance students' interest in science subjects (Bennett and Lubben, 2006; İlhan, 2010; Nentwig, et al., 2005). In the choice of contexts that will be used in the science curriculum, it is important to know which subjects are most interesting for students.

Organic chemistry is the chemistry of carbon-containing compounds. Every living organism, plant and animal, is composed of organic compounds. Anyone with an interest in life and living things needs to have a basic understanding of organic chemistry. It has grown into the confident basis of vast multinational industries that feed, clothe, and cure millions of people without their even being aware of the role of chemistry in their lives. Chemists cooperate with physicists and mathematicians to understand how molecules behave and with biologists to understand how molecules deter-

mine life processes. Articles continue to appear in newspapers and magazines describing the development of new medicines and diagnostic tests. These new products and technologies are results of a better understanding of the structure and function of DNA, proteins, and other organic biological molecules. These are clear indications how organic chemistry play important role in our daily life. In addition, understanding of the basic principles of organic chemistry can enhance our appreciation for the wonders of natural worlds (Beaver, 1999; Bloch, 2006). The relations between the understanding of chemistry by students and their interest to chemistry course and the daily usage of chemistry has been subject of various studies (Qian, 2004; Bennett et al., 2007; Nieswandt, 2007).

Therefore, the aim of the present study was to explore the high school students' interest to the usage of organic chemistry in daily life. Related to our goals, we had three major research questions:

Are there gender differences in students' interests in the use of organic chemistry in daily life?

Are there differences between students with the type of field they selected in their interests in the use of organic chemistry in daily life?

Which items are highly scored and which items are low scored in students' interests in the use of organic chemistry in daily life?

2. METHOD

The research design used in the present study was a survey research. Survey researches are used to learn about people's attitudes, beliefs, values, demographics, behaviors, opinions, habits, desires, ideas, and other types of information. They are used frequently in psychology, education and sociology. Survey research is very popular in education research because of versatility, efficiency and generalization (McMillan and Schumacher, 2006).

2.1. Data Instrument and Data Analysis

In order to determine high school students' interest towards to the use of organic chemistry in daily life, a Likert-type questionnaire contains 27 items ranging from 1 (low) to 4 (high) was developed and used. 1 indicates no interest at all and 4 indicates highest interest. We accepted that if the mean of the items' response falls below 2.5, this indicates that majority of the pupils were not interested in the subject matter and in contrast, when the mean is above 2.5, the majority of the pupils were interested (Lavonen,

Byman, Juuti, Meisalo, and Uitto, 2005). Items that are related with daily life and might interest students are involved in the questionnaire. The items are mainly about hydrocarbons, alcohols, ethers, esters, and polymers.

In the development of the questionnaire, interviews were carried out with 5 lecturers in the chemistry department, 5 chemistry teachers and 12 chemistry teacher candidates. During these interviews the same question was asked: what are the most interesting organic chemistry-related phenomena that affect your daily life? Interviews were carried out by taking notes. The questionnaire was formed in the light of these interview data.

Content validity of each item was determined by requesting opinions of 5 experts in the field of chemistry education. A pilot study was performed with 52 students. Croncbach's alpha reliability coefficient was calculated as 0.866 for the results obtained from pilot study. Descriptive statistics and inferential statistics methods were used in the analyzing of quantitative data. For the analysis of the data SPSS for windows and MS Office Excel were used.

2.2. Sampling

The present study was carried out in 2006-2007 term and simple random sampling method was used. The aim of the selection was to obtain a representative sample of secondary schools students in Erzurum city, Turkey. Four secondary schools were randomly chosen from 24 secondary schools present in the city. The participants of this study were also randomly chosen among these four schools' students. The participants list is given Table 1.

3. RESULTS

The goal of this study is to explore the high school students' interest towards to the usage of organic chemistry in daily life. It was also aimed to find out the subjects that may interest the students.

From the evaluation of the students' responses it is appeared that first 5 highest scored items were as follow (Figure 1).

I. The mummification techniques used in preserving corpses in ancient Egypt (26th item; mean score is 3.26).
II. Why ducks are not getting wet in the lakes or rivers? (20th item; mean score is 3. 06).

III. Why counterfeit alcoholic drinks may cause blindness or death? (9th item; mean score is 2.99).
IV. How traffic police measure the alcohol level from breath by using alcohol meter? (21st item; mean score is 2.91).
V. Visiting a particular chemical plant (15th item; mean score is 2.89).

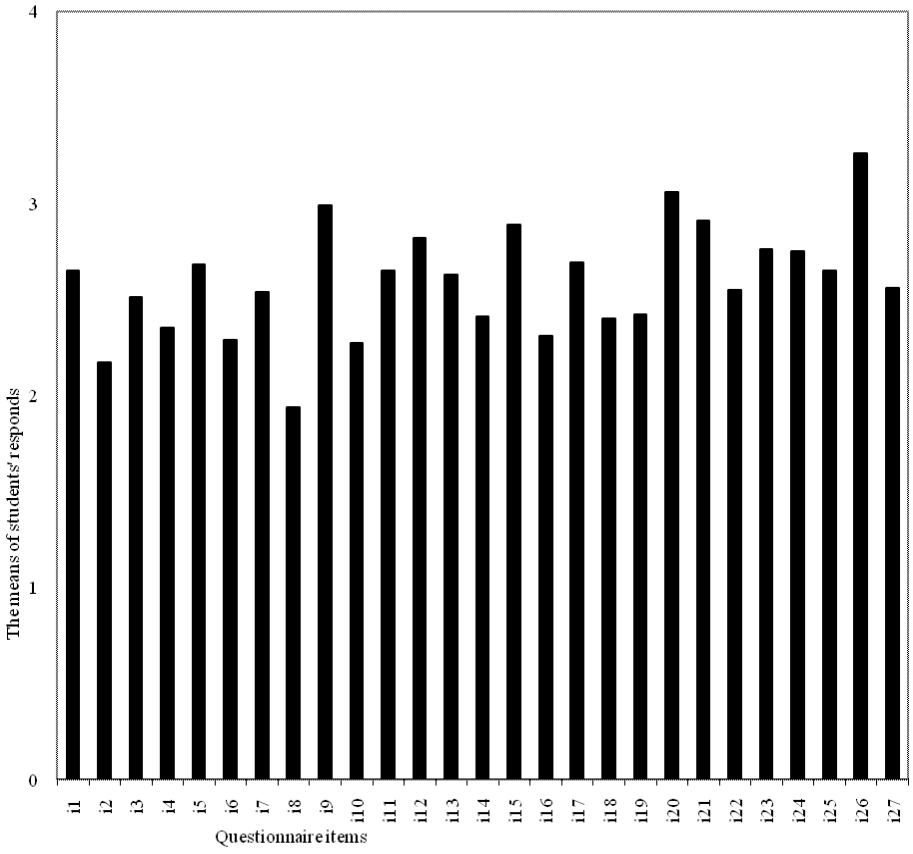

Figure 1. The means of students' response to items present in the questionnaire.

Table 1. The participants list

	Grade						
	9th		10th		11th		Total
	Girls	**Boys**	**Girls**	**Boys**	**Girls**	**Boys**	
Science field students			26	33	37	32	128
Social science field students			24	37	0	41	102
Equal weigh field students			10	5	36	11	62
Students did not yet select field	96	117					213
Total	96	117	60	75	73	84	505

However, the lowest scored 3 items were as:

I. The effect of the octane proportion in the fuels, what is the mean of 95 octane (8th item; mean score is 1.94).

II. The structure and properties of cholesterol (2nd item; mean score is 2.17).

III. What is antifreeze and how its act? (10th item; mean score is 2.27).

In Turkish Education system, general high school students have chance to choose the subject to study after the first year (grade 9). General high school students have to select science majors, social science majors or equal weigh field at the end of first year of the high school.

The means of the students' interest were calculated from the obtained data. The highest interest was found in science major students, means was 2.65. This was followed by 9th level students who have not yet selected the field and equal weigh field students with 2.62 and 2.58, respectively. The lowest means was found in social science majors students with 2.52 means.

The means of the students' interest were compared in terms of the type of field they selected by using one-way analysis of variance [$F_{(3, 501)}$ = 1.300; p>.05]. Obtained results from ANOVA did not indicate statistically significant differences

When we compared the girls' interest with the boys' interest, we found that girls' interest was higher than boys, 2.67 and 2.54 respectively. To determine whether the difference between girls and boys is significant,

independent sample t test was applied. This shows that this difference is statistically significant (Table 2).

Table 2. The results of the independent samples t-test according to gender

Gender	N	Mean	T	p
Girls	229	2.6680	2.896	0.04
Boys	276	2.5374		

4. DISCUSSION

Interests can increases learning. Promoting interest in the classroom increases students' motivation to learn. It has been suggested that there are three ways to increase students' interest. These are offering meaningful choices to students, selecting well-organized texts that promote interest, and providing the background knowledge needed to fully understand a topic (Schraw, Flowerday, and Lehman, 2001).

In the present study it was aimed to find out the subjects that may interest students. It was assumed that if the mean of the items' response is above 2.5, this show that the majority of the pupils were interested in subject. 18 of 27 items response were higher than 2.5.

The items used in the questionnaire are about the use of the organic chemistry in daily life. In the light of the students' response to this questionnaire, one can have an idea about the level of the student interest. This may help to teacher to increase student interest towards the subject taught or to all science subjects. This information may also be used in the curriculum design.

If students realize that chemistry plays an important role in the real world and can improve our lives, they may be more interested in the subject (Qian, 2004; Nieswandt, 2007).

If daily life usage of the science matters involved in curriculum or an instruction design, this may convert situational interest to individual interest. This may also lead to increase in the student motivation and hence student success. In fact recently there are various reports about that how daily life usage of the science subjects may be involved in the curriculum or instruction design. This approach has been called as context based approach

(Bennett et al., 2005; Coenders et al., 2010; Gutwill-Wise, 2001; Holman and Pilling, 2004; Ramsden, 1997).

There is only one type primary school in Turkey. In contrast to primary school, there are various types of high schools. These are science high schools, social science high schools, Anatolian high schools, Anatolian teacher high schools, vocational high schools, and general high schools. Students get in these schools according to their performance in the exam that take place at the end of primary schools. The type of high schools that students get in also affects the student future choice for the university. The students that are attending to Anatolian teacher high schools, Anatolian high schools or general high schools have to select science majors, social science majors or equal weigh field at the end of first year of the high school (namely 9^{th} level). This choice may be influenced by the student interests and as well as their success. However, there is no this sort of selection at the end of first year of vocational high schools.

If students select science majors, they will take more science course in high school. If these students want to go to science related area at the university, they will have advantage. For social science majors students the similar advantage applied, if they choice social science related subject at the university. One can expect that science majors students interest towards to chemistry may higher than social science majors or equal weigh students. In fact, this is the case for the present study. However, this difference was not statistically significant.

It has previously been reported that many teachers complain about the lack of students' interest in chemistry subjects. However, teachers also admit that students like to relate chemical principles to everyday things (Bennet and Holman, 2002; Osborne and Collins, 2001). It is known that interest is the most important factor which effect students' achievement and attainment of knowledge towards school and lessons (Bulunuz, 2008; Dervişoğlu, Yaman, and Soran, 2004; Hidi and Harackiewicz, 2000).

To be able to make sure that more student choice the science majors at the end of their first year in high school, it is important to know student interests and increase it. One way of increasing student interest may be using contexts and daily life applications of science in science education.

Commonly it is believed that girls have less interest towards to science subjects than boys. However, in the present study, we found that it is vice versa. The reasons behind this may be subject of the future studies.

Acknowledgment

• The authors wish to thanks Doç. Dr. Mustafa Sözbilir (Atatürk University) for his comment and suggestions.

• This work was partly presented on 9th European Conference on Research in Chemical Education, 6-9 July 2008, Istanbul/Turkey.

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