



EFFECT OF CASE STUDIES ON PRIMARY SCHOOL TEACHING STUDENTS' ATTITUDES TOWARD CHEMISTRY LESSON

SINIF ÖĞRETMENLİĞİ ÖĞRENCİLERİNİN KİMYA DERSİNE YÖNELİK TUTUMLARINDA ÖRNEK OLAY ÇALIŞMALARININ ETKİSİ

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ABSTRACT: The purpose of this study was to investigate the effect of case studies on Primary School Teaching students' attitudes toward chemistry lesson. The study was conducted on 63 freshmen from Department of Primary School Teaching at a university in Turkey. The students were taught using case studies about the subjects of Properties and States of Matter, Elements and Compounds, Solutions and Mixtures, Physical and Chemical Changes, Chemical Reactions, Acids and Bases, Solubility and Precipitation. In the study, one group pre-test and post-test experimental design was used. As the tool of supplying data, Attitude toward Chemistry Lesson Scale was applied to determine students' pre and post attitudes. The results of analyzing the scale showed that chemistry education based on case studies caused significantly positive attitudes toward chemistry lesson.

Keywords: case study method, chemistry lesson, attitude, primary school teaching students

ÖZET: Çalışmanın amacı, sınıf öğretmenliği öğrencilerinin kimya dersine yönelik tutumlarında örnek olay çalışmalarının etkisini araştırmaktır. Çalışma; Türkiye'deki bir üniversitenin Sınıf Öğretmenliği Bölümü'nün 1. sınıfında öğrenim gören 63 öğrenciyle gerçekleştirilmiştir. Maddenin Özellikleri ve Halleri, Elementler ve Bileşikler, Çözeltiler ve Karışımlar, Fiziksel ve Kimyasal Değişimler, Kimyasal Tepkimeler, Asitler ve Bazlar, Çözünürlük ve Çökelme konuları, örnek olay çalışmalarıyla işlenmiştir. Çalışmada tek grup öntest-sontest deneysel desen kullanılmıştır. Veri toplama aracı olarak, öğrencilerin ön ve son tutumlarını belirleme amacıyla Kimya Dersine Yönelik Tutum Ölçeği uygulanmıştır. Ölçeğin analiz sonuçları; örnek olay çalışmalarına dayalı kimya eğitiminin, sınıf öğretmenliği öğrencilerinin kimya dersine yönelik önemli ölçüde olumlu tutumlara sahip olduklarını göstermiştir.

Anahtar sözcükler: örnek olay yöntemi, kimya dersi, tutum, sınıf öğretmenliği öğrencileri

1. INTRODUCTION

The main purpose of science educators is to improve students' achievement. Researchers reported that students' positive attitudes toward science are important in enhancing their science achievement (Bennett, Rollnick, Green, & White, 2001; Freedman, 1997; House, & Prison, 1998; Levin, Sabar, & Libman, 1991; Oliver, & Simpson, 1988; Soyibo, 1985; Weinburgh, 1995; Wilson, 1983). Therefore, the development of a positive attitude toward science, like academic achievement, is an important goal of science education, and determination and effect of attitudes became to be an essential part of educational research (Aiken, 1979; Koballa, 1988).

Students' attitudes toward chemistry lesson are a topic that has long attracted attention of researchers (Barnes, McInerney, & Marsh, 2005; Dhindsa, & Chung, 1999; Harvey, & Stables, 1986; Hofstein, Ben-Zvi, Samuel, & Tamir, 1977; Menis, 1989; Salta, & Tzougraki, 2004; Shannon, Sleet, & Stern, 1982; Steinkamp, & Maehr, 1984). Reports revealed that Primary School Teaching students and primary school teachers have many difficulties about chemistry subjects as part of main science lessons (Can, & Harmandar, 2004; Jurišević, Glažar, Razdevšek Pučko, & Devetak, 2008; Kruger, & Summers, 1989; Özden, 2009; Papageorgiou, & Sakka 2000).

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In view of these researches, there is the need to carry out a study which aims to improve students' attitudes toward the chemistry lesson in the Programme of Primary School Teaching. For this purpose, case study method which gives students insight into the real world of organizations was used in this study. Out of traditional education, case study method that acquires on students' positive attitudes toward learning, being aware of the cognitive levels, and aims to develop high-level of learning abilities is one of the active learning methods based on constructivism (Krynock, & Robb 1996; Cliff, & Curtin, 2000). In case study method, the learning happens in the classroom through solving problems encountered into the real life. This method is used to gain a skill, attitude or is used to teach a subject and make the application about that subject. Compared to other methods, the most important feature of case study method is that students face with the responsibility of the decision to solve a real problem in daily life. Case study method is aimed to acquire students' positive attitudes toward learning, become more aware of their cognitive levels, and bring in skills such as scientific literacy by going beyond traditional science education.

Case study method in science education started firstly at the lessons of Conant in 1957 by using scientific stories. Recent years, many educational researchers recommend using case study method. In the study which was investigated the effect of case study discussions on the motivation, Barnett (1998) reported that prospective teachers think about together teaching, their curiosity about the creation of new ideas, incomprehensible parts to increase the understanding and interest in developing them. Jones (1997) stated that students thought and loved case studies which were appropriate to real-life. Arambula-Greenfield (1996) said in their article that students preferred learning based on case study method, this method helped students' personal development and students related among the subjects easily. Herreid (1994), and Cliff, & Curtin (2000) said that the case study method developed ways to approach real life problems by increasing students' level of understanding facts and concepts. Using the case studies in science lessons provides increasing students' interest toward the lesson, developing practical intelligence by bringing different solutions to problems, making easier the daily life applications of information learned in the classroom (Çakır, Berberoğlu, Alparslan, 2001). Furthermore, Krynock, & Robb (1996) examined the effect of learning based on case studies on higher-order thinking skills of students and they found students taking higher notes in the problem-based learning method higher than the traditional method.

2. METHOD

2.1. Purpose of the Research, and Participants

The purpose of this study was to investigate the effect of case studies on Primary School Teaching students' attitudes toward chemistry lesson. The sample of this study was 63 freshmen from Department of Primary School Teaching at a university in Turkey.

2.2. Instruments

Attitude toward Chemistry Lesson Scale: In order to determine students' attitudes toward the chemistry lesson before and after the instruction based on case studies, the 5 point Likert-type Attitude toward Chemistry Lesson Scale (ATCLS) consisting of 25 items was used (Acar, & Tarhan, 2008).

For the preparation of the attitude items, literature related to the attitudes toward chemistry and science had been reviewed (Berberoğlu, & Çalikoğlu, 1992; Freedman, 1997; Hofstein, & Lunetta, 1982; Koballa, 1988; Koballa, Crawley, & Shrigley, 1990; Salta, & Tzougraki, 2004). The items were constructed by considering the attitude scale developed by Salta, & Tzougraki, 2004 (Acar Sesen, & Tarhan, 2011).

For the validity, the scale was reviewed by seven educators in the different universities. After the corrections, the scale was applied to 168 students for the reliability. Cronbach's alpha reliability coefficient of ATCLS is 0.81. The ATCLS has four factors:

- Interest in chemistry lesson
- Understanding and learning chemistry

- The importance of chemistry in real life
- Chemistry and occupational choice

For statistical analysis, students' attitudes about the positive items were assessed through the 5 point Likert-type scale in the form of (5) strongly agree, (4) agree, (3) partly agree, (2) disagree, (1) strongly disagree, and the negative items were assessed through their reverse. The maximum scores which a student can obtain from the ATCLS are 125.

2.3. Procedure

The experimental design chosen for the study was the one group pre-test and post-test design. The Programme of General Chemistry Lesson in Department of Primary School Teaching contains the subjects of Properties and States of Matter, Elements and Compounds, Solutions and Mixtures, Physical and Chemical Changes, Chemical Reactions, Acids and Bases, Solubility and Precipitation. Primary School Teaching students learn General Chemistry Lesson in the spring semester of the first year. The treatments were continued up to spring semester, two class hours per week. Before each subject, a preparatory lesson was conducted by participating all students to remedy students' lack of knowledge and misconceptions about previous subjects, concepts. The students were instructed using case studies which were student centered active learning approach. During the lessons:

- It was provided that students learned why the subject is important by being associated subjects, concepts, and sub-concepts to simple cases and real problems in daily life.
- It was benefited from brainstorming, interactive learning, presentation technique, animation shows, and videos.
- Question and answer technique was used to activate students in participation the lesson.

During the process, it was determined students interests toward the lesson increased gradually, they participated discussions, and they started to ask more meaningful questions. Before and after the instruction based on case studies of the subjects, ATCLS was applied to determine students' pre-attitudes and post-attitudes.

3. FINDINGS

In order to determine students' pre-attitudes and post-attitudes toward chemistry lesson, ATCLS was used. A paired sample t-test analysis was conducted to compare the attitude scores toward chemistry lesson before and after the instruction. Attitude toward Chemistry Lesson Scale was investigated in four factors as; (1st) Interest in chemistry lessons; (2nd) Understanding and learning of chemistry; (3rd) The importance of chemistry in real-life, and (4th) Chemistry and occupational choice (Acar Sesen, & Tarhan, 2011). As shown in Table 1, the mean score of the students' attitudes for all factors increased significantly after the instruction ($t=16.69$, $p<0.05$).

Table 1: Paired Sample T-Test Results of ATCLS Before and After the Instruction

Pre-Attitudes			Post-Attitudes			<i>t</i>	<i>p</i>
Means (\bar{x})	Standard Deviation (SD)	Standard Error (SE)	Means (\bar{x})	Standard Deviation (SD)	Standard Error (SE)		
64.44	8.43	1.06	77.36	9.81	1.24	16.69	.00

If students' attitudes toward the first factor are analyzed, it is seen that the students require chemistry lessons more often. While 55.55% of the students would like to have fewer chemistry subjects in their chemistry lessons before the instruction, the percentage of those students decreased to 15.87 after the instruction. Similarly with these results, students' positive attitudes toward finding chemistry lessons more interesting and necessary increased significantly (Table 2).

Table 2: The Percentages of Students' Answer to the ATCLS Before and After the Instruction

Factor	Items in the attitudes toward chemistry lesson scale	Frequency (%)	
		Pre	Post
Interest in Chemistry Lesson	I like chemistry lessons.	23.81	50.79
	I would like the teaching period of the chemistry lesson more often.	15.87	33.33
	I think chemistry lessons are unnecessary.	46.03	19.05
	I hate chemistry lessons.	31.75	17.46
	I would like to have fewer chemistry topics in the lessons.	55.55	15.87
	I find chemistry lessons interesting.	26.98	52.38
Understanding and Learning Chemistry	Chemical symbols are unintelligible as a foreign language that I do not know.	61.90	30.16
	I can solve chemistry problems easily.	19.05	79.36
	I think, learning the basic concepts are important for understanding chemistry.	47.62	88.88
	Most of the concepts in chemistry are not concrete.	71.43	39.68
	Chemistry is a sophisticated and palpable lesson.	63.49	42.85
	I make many efforts to understand chemistry.	66.66	49.21
	I find using chemical symbols to be easy.	19.05	79.36
	I believe that some knowledge in chemistry helps us understand the other science lessons more easily.	36.51	80.95
	I can understand chemistry concepts easily.	19.05	77.77
	I have difficulties while using my knowledge in solving chemistry problems.	79.36	39.68
The Importance of Chemistry in Real-Life	I believe that chemical knowledge helps us interpret seriously events in our daily life.	25.40	85.71
	I think developments in chemistry improve the quality of our lives.	33.33	63.49
	I think the level of chemistry technology in a country is an important indicator for development of the country.	23.81	55.55
	I think chemistry has a great role in modern life.	25.40	69.84
	I think chemistry has a great role in solving environmental problems.	23.81	63.49
Chemistry and Occupational Choice	I do not believe that chemistry knowledge will be useless after my graduation.	63.49	26.98
	I believe that I do not need chemistry knowledge for my career.	68.25	23.81
	I do not find the jobs related to chemistry as attractive.	61.90	57.14
	My career could be chemist/chemistry teacher/chemical engineer.	9.52	20.63

Students' answers to the second factor related to attitudes toward understanding and learning chemistry indicated that the students began not to find chemical symbols unintelligible as a foreign language. It was also found that students began to appreciate the value of learning the basic concepts for understanding chemistry. The percentage of students who had positive thoughts about how some knowledge in chemistry helped them understand the other science lessons more easily, increased significantly from 36.51 to 80.95. The percentage of students who thought the concepts in chemistry as abstract decreased significantly from 71.43 to 39.68. Moreover, the percentage of students who solved chemistry problems easily, increased significantly from 19.05 to 79.36. They also began to find the use of chemical symbols and concepts to be easier after the instruction (Table 2).

Students' answers to the third factor related to attitudes toward the importance of chemistry in real-life indicated that most of the students (85.71 % of all students) began to believe that chemical knowledge helps them interpret seriously events in their daily life. The percentage of students who thought that chemistry has a great role in the modern life, increased significantly from 25.40 to 69.84. It was also increased the percentage of students who thought that chemistry has a great role in solving environmental problems. The percentage of students who thought that the level of chemistry technology in a country is an important indicator for development of the country and developments in chemistry improve the quality of our lives, also increased significantly (Table 2).

According to the students' answers to the fourth factor related to chemistry and occupational choice, while the percentage of students who did not think the jobs related to chemistry as attractive decreased from 61.90 to 57.14, their thoughts about choices of jobs related to chemistry were not changed significantly. The highest increases toward students' positive attitudes in this factor were found in the items about believing chemistry knowledge will be useless after graduation and needing chemistry knowledge for their career (Table 2).

4. DISCUSSION AND RESULTS

Research in science education has focused on studies which ensure the effective construction of knowledge for students commonly find chemistry to be a difficult, abstract, and problematic subject. The teacher-centered educational approach is used in most chemistry classrooms around the world but this teaching approach does not provide an active learning environment for students. Furthermore, it has been important to develop students' positive attitudes toward science lessons since researchers confirmed that attitudes were linked with academic achievement.

In an active-learning environment, in contrast to teacher-centered instruction, a teacher acts as a facilitator, and engages active participation of students in the learning process (Marx, et al. 2004; National Research Council 2005; Singer, Marx, Krajcik, & Chambers, 2000). When students are actively involved in the learning task, they learn more than when they are passive recipients of instruction. Active-learning includes experimental activities, brain-storming, video presentations, demonstrations, computer animations, and learning together activities that engage active participation of students in the learning process. One of the other active learning methods based on constructivism is case study method.

In this study, the effect of case studies on the Primary School Teaching students' attitudes toward chemistry lesson was investigated. According to the results of this study, it was found that instruction based on case studies positively affected students' attitudes as mentioned in previous researches (Çakır, et al. 2001; Gabel, 1999; Greenfield, 1996; Krynock, & Robb, 1996).

In this study, the increases in the percentage of Primary School Teaching students, who like chemistry and want chemistry lessons more often, showed that case studies positively affected students' interest in chemistry lessons (first factor of ATCLS). The studies by Hewson, & Hewson (1983), Stavy (1991), Sanger (2000) indicated that the difficulties of chemical concepts cause negative attitudes about these concepts. The results of ATCLS indicated that if students learned these concepts with simple cases and real problems in daily life, their negative attitudes would decrease. Students' attitudes toward the second factor titled understanding and learning chemistry, also increased significantly. The students began to think learning the basic concepts are important for understanding

chemistry and to find the use of chemical symbols and concepts easily. According to the results, the percentage of students who indicated that they began to understand chemistry concepts easily increased to 77.77%, and those who used chemical symbols and solved chemistry problems easily increased to 79.36%. This significant increase also shows that case studies helped students learn chemistry in a meaningful way. Students' answers to items related to the attitudes toward the importance of chemistry in real-life indicated that the students began to realize the importance of chemistry. The similar results were revealed also in the research of Acar Sesen, & Tarhan (2011). These results especially showed that case studies derived from daily life attract students' interests and help them integrate chemistry in their life.

In the light of these results, it was found that instruction based on case studies improves Primary School Teaching students' attitudes toward chemistry lesson. This situation shows the power of case studies for improving students' attitudes toward the lesson. Therefore, case studies should be constructed and used widely in chemistry and the other science lessons.

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Genişletilmiş Özet

Fen eğitimi araştırmalarının temel hedefi, öğrencilerin öğrenme başarılarının artırılmasıdır. Öğrencilerin fen derslerine yönelik başarılarını destekleyebilmek için en önemli faktör, tutumları hakkında bilgi sahibi olmaktır. Pek çok araştırmada; öğrencilerin fen derslerine yönelik olumlu tutumlarının, fen başarılarıyla doğrudan ilişkili olduğu belirlenmiştir. Bu nedenle fen derslerine yönelik olumlu tutum geliştirme, tıpkı başarı gibi fen eğitiminin önemli çıktıları arasında yer almaktadır. Öğrencilerin kimya dersine yönelik tutumları, uzun yıllardır araştırmacıların ilgisini çekmekte ve alanyazında İlköğretim Sınıf Öğretmenliği öğrencilerinin temel bilim derslerinden biri olan kimya dersi konularına yönelik pek çok öğrenme zorluğu yaşadıkları ve başarılarının düşük olduğu belirlenmiştir.

Tüm araştırmalar ışığında; Sınıf Öğretmenliği Programında yer alan Genel Kimya dersine yönelik, öğrencilerin olumlu tutumlarını geliştirmeyi amaçlayan bir araştırma gerçekleştirmeye ihtiyaç duyulmuştur. Bu amaç doğrultusunda çalışmada; geleneksel öğretimin dışına çıkılarak, öğrencilerde öğrenmeye karşı olumlu tutumlar edinmeyi, bilişsel düzeylerinin farkında olmayı ve üst düzey öğrenme yeteneklerini geliştirmeyi hedefleyen ve yapılandırmacı aktif öğrenme yöntemlerinden biri olan örnek olay yöntemi kullanılmıştır.

Örnek olay yönteminde öğrenme; gerçek hayatta karşılaşılan problemlerin sınıf ortamında çözülmesi yoluyla gerçekleşir. Bu yöntem öğrencilere bir konuyu ya da bir beceriyi kazandırmak ve o konuda uygulama yaptırmak amacıyla kullanılır. Örnek olay yönteminin diğer yöntemlere kıyasla en önemli özelliği, öğrencileri günlük hayattaki gerçek bir problemin çözümüne yönelik karar verme sorumluluğuyla karşı karşıya getirmesidir.

Fen eğitiminde örnek olay yöntemi ilk olarak Conant'ın kendi derslerinde bilimsel hikâyeler kullanması ile 1957 yılında başlamış olup son yıllarda birçok fen eğitimi araştırmacısı öğrencilerin akademik başarılarını arttırmada bu yöntemi önermektedir. Barnet (1998) örnek olay tartışmalarının motivasyona yönelik etkisini araştırdığı çalışmasında; örnek olaya dayalı öğrenme yönteminin; öğretmen adaylarının birlikte düşünmeleri, merak etmeleri, yeni fikirler oluşturmaları ve zihinsel gelişim sürecinde önemli rol oynayan merak duygusunu arttırdığını belirtmiştir. Jones (1997) yaptığı çalışma sonunda, öğrencilerin örnek olayların gerçek hayata uygun olduğunu düşündüklerini ve bu nedenle ilgilerini çektiklerini belirtmiştir. Arambula-Greenfield (1996) araştırmasında; örnek olay yönteminin öğrencilerin kişisel gelişimlerinde yardımcı olduğunu ve yeni öğrenilen konular ile öncekiler arasında kolaylıkla ilişki kurabildiklerini bulmuştur. Herreid (1994), Cliff ve Curtin (2000) çalışmalarında örnek olaya dayalı öğretimin, öğrencilerin ilgili konuya yönelik kavramları anlama düzeylerini arttırarak günlük hayattaki problemlerin çözümünde alternatif yollar geliştirmelerinde yardımcı olduğu sonucuna ulaşmıştır. Krynock ve Robb (1996); örnek olaya dayalı öğrenmenin, öğrencilerin üst düzey düşünme yeteneklerine etkisini incelemiş ve probleme dayalı öğrenme yöntemi uygulanan öğrencilerin geleneksel yöntem uygulanan öğrencilerden daha yüksek notlar aldığını belirlemişlerdir. Ayrıca günlük hayattan alınan problemlerin öğrencileri sıkmadığı; problemlerin açık uçlu olmasının, öğrencilerin çözerken kendilerini rahat hissetmelerine neden olduğu ve üst düzey düşünme becerilerini geliştirdiği sonuçlarına ulaşmışlardır.

Araştırmanın amacı; Sınıf Öğretmenliği öğrencilerinin kimya dersine yönelik tutumlarında örnek olay çalışmalarının etkisini araştırmaktır. Tek grup öntest-sontest deneysel deseninin kullanıldığı araştırma; Türkiye'deki bir yükseköğretim kurumunun İlköğretim Sınıf Öğretmenliği Bölümü 1. Sınıfında öğrenim gören 63 öğrenciyle gerçekleştirilmiştir. Araştırmada; İlköğretim Sınıf Öğretmenliği Bölümü 1. Sınıf Genel Kimya Programında yer alan Maddenin Özellikleri ve Halleri, Elementler ve Bileşikler, Çözeltiler ve Karışımlar, Fiziksel ve Kimyasal Değişimler, Kimyasal Tepkimeler, Asitler ve Bazlar, Çözünürlük ve Çökme konuları, öğrencinin merkeze alındığı aktif öğrenme yöntemlerinden biri olan örnek olay çalışmalarıyla işlenmiştir. Her bir konunun öğrenilmesi öncesinde, tüm sınıfın ortak katılımıyla soru-cevap şeklinde hazırlık dersleri yapılmış ve öğrencilerin o ders öğrenilecek konuya temel oluşturan alt konu ve kavramlarla ilgili bilgi eksiklikleri ve kavram yanlışlarının giderilmesi amacıyla çalışmalar yapılmıştır. Örnek olay çalışmalarına dayanan dersler

süresince; ders konuları günlük hayattaki basit olaylar ve gerçek problemlerle ilişkilendirilerek öğrencilerin, öğrendikleri bilgilerin neden önemli olduğunu öğrenmeleri sağlandı; beyin fırtınası, interaktif öğrenme, sunum tekniği, animasyon ve video gösterimlerinden yararlanıldı; öğrenciler soru-cevap tekniğiyle aktif tutuldular.

Çalışma; İlköğretim Sınıf Öğretmenliği Programı Genel Kimya Dersi için ayrılan haftada iki saat olmak üzere bir yarıyılık süreçte tamamlanmıştır. Programdaki konuların, örnek olay çalışmalarına dayalı öğretiminden önce ve sonra öğrencilerin ön-tutum ve son-tutumlarını belirlemek amacıyla Kimya Dersine Yönelik Tutum Ölçeği uygulanmıştır. Başlangıçta ilgisiz olarak tanımlanan öğrencilerin; derse olan ilgilerinin süreç boyunca giderek arttığı, tartışma ortamlarına katılarak daha anlamlı sorular yönelttikleri belirlenmiştir.

5'li likert tipi Kimya Dersine Yönelik Tutum Ölçeği'nin değerlendirilmesi amacıyla olumlu cümleler için "Tamamen katılıyorum", "Katılıyorum", "Kısmen katılıyorum", "Katılmıyorum", "Kesinlikle katılmıyorum" ifadeleri sırasıyla 5, 4, 3, 2 ve 1 şeklinde puanlandırılırken olumsuz cümleler ters sırada puanlandırılmıştır. 25 maddeden oluşan tutum ölçeklerinden öğrencilerin alabileceği en yüksek puan 125 olarak belirlenmiştir. "Kimya Dersine Yönelik Tutum Ölçeği"nde yer alan 25 maddenin istatistiksel değerlendirilmesi; (1) Kimya Dersine Olan İlgiye Yönelik Tutumlar, (2) Kimyayı Anlama ve Öğrenmeye Yönelik Tutumlar, (3) Kimyanın Yaşamdaki Önemine Yönelik Tutumlar ve (4) Kimya ve Meslek Seçimine Yönelik Tutumlar olmak üzere dört alt tutum başlığında ele alınmıştır.

Gerçekleştirilen çalışmadan elde edilen sonuçlar; öğrencilerin kimya dersine yönelik uygulama öncesi ($\bar{x}=64.44$) ve uygulama sonrası ($\bar{x}=77.36$) ortalama tutum puanları arasında anlamlı farklılık olduğunu göstermiştir ($t=16.69$, $p<0.05$). Ölçeğin her bir alt tutumu ele alındığında da genel olarak olumlu yönde anlamlı farklılıklar hesaplanmıştır. Sonuçlar; Sınıf Öğretmenliği öğrencilerinin kimya dersine yönelik tutumlarında, günlük hayattaki gerçek problemlerle ilişkilendirilen örnek olay çalışmalarının etkililiğini ortaya koymaktadır. Bu nedenle örnek olay çalışmalarının gerek kimya konuları gerekse diğer fen derslerinde yaygınlaştırılmasının; öğrencilerin ilgili derse yönelik tutumlarına ve dolayısıyla öğrenme başarılarına önemli katkılar sağlayacağı açıktır.