



KİMYA ÖĞRETMEN ADAYLARININ ÖĞRETİM İLE İLGİLİ İNANÇLARI VE PEDAGOJİK BİLGİLERİ

PRE-SERVICE CHEMISTRY TEACHERS' BELIEFS ABOUT TEACHING AND THEIR PEDAGOGICAL CONTENT KNOWLEDGE

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ÖZET: Bu çalışmada kimya öğretmen adaylarının öğretmenlik ile ilgili inançları ve pedagojik bilgileri arasındaki ilişki incelenmiştir. Çalışmanın örneklemini Hacettepe Üniversitesi, Eğitim Fakültesi'ne devam eden 99 öğrenci oluşturmaktadır. Veri toplama aracı olarak "Öğretmenlik İnanç Ölçeği" (ÖİÖ) (Yılmaz-Tüzün, 2008) ve "Pedagojik Bilgi Testi"(PBT) kullanılmıştır. Kimya öğretmen adaylarının öğretmenlik inançlarının cinsiyete göre farklılık gösterip göstermediğini incelemek amacıyla bağımsız örneklem t-testi uygulanmış, ancak kız ve erkek öğretmen adaylarının öğretmenlik inançlarında anlamlı fark saptanamamıştır. Öğretmen adaylarının öğretmenlik inançları ve pedagojik bilgileri arasındaki ilişkiyi incelemek için ise korelasyon analizi uygulanmış, ancak bu iki değişken arasında anlamlı ilişki saptanamamıştır.

Anahtar sözcükler: öğretmenlik ile ilgili inançlar, pedagojik bilgiler, kimya öğretmen adayı eğitimi, cinsiyet.

ABSTRACT: In this study the relationship between pre-service chemistry teachers' beliefs about teaching and their pedagogical content knowledge were investigated. The sample of the study consists of 99 pre-service chemistry teachers attending Hacettepe University, Faculty of Education. As data collection tools the adapted form of "Beliefs About Teaching Scale" (BAT) developed by Yılmaz Tüzün (2008) and the "Pedagogical Content Knowledge Test" (PCK) were used. In order to determine the effect of gender on pre-service chemistry teachers' beliefs, independent sample t-test was conducted and no significant difference was observed between male and female pre-service teachers. And in order to determine the correlation between BAT and PCK scores correlation analysis were conducted and results revealed that the correlation between these two variables is not significant.

Keywords: beliefs about teaching, pedagogical content knowledge, chemistry pre-service teacher education, gender differences.

1. INTRODUCTION

Beliefs are psychological constructions that include understandings, assumptions, images, or propositions that are felt to be true (Kagan, 1992; Richardson, 1996). They drive a person's actions and support decisions and judgments (Goodenough, 1963; Pajares, 1992); have highly variable and uncertain linkages to personal, episodic, and emotional experiences (Nespor, 1987); and although undeniably related to knowledge, differ from knowledge in that beliefs do not require a condition of truth (Dewey, 1933; Richardson, 1996). The connections among clusters of beliefs create an individual's values that guide one's life and ultimately determine behavior (Ajzen, 1985). According to Pintrich (1990), beliefs are one of the most valuable psychological constructs in teacher education (Savran Gencer and Çakıroğlu, 2007), because they play a critical role in shaping teaching applications. Teachers' beliefs are often revealed in the metaphors they use to describe their roles in the classroom (Tobin, 1993).

Many researchers have confirmed that teachers' beliefs about teaching and learning significantly influence their performance in the classroom and their students' learning. (Ball, Lubienski & Mewborn, 2001; Borko & Putnam, 1996; Holt-Reynolds, 1992; NCTM, 1991; Pajares, 1992; Prawat, 1992; Richardson, 1996; Stipek et al., 2001; Thompson, 1984; 1992, Özgün-Koca and Şen, 2006).

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Some researchers argue that beliefs about teaching and learning are well established by the time pre-service teachers enter teacher preparation programs (Kagan, 1992; Pajares, 1992; Richardson, 1996, Savran Gencer and Çakıroğlu, 2007). And these beliefs are shaped during their education at universities.

Pre-service teachers who believed that their skills were not adequate to teach science efficiently spent little time teaching science. And they indicated that methods instructors should give importance to pre-service teachers' beliefs about teaching. The factors that affect teachers' beliefs about teaching might be their school experiences, laboratory experiences, and relevant activities in teachers' education programs (Enochs and Riggs (1990) cited in Tsai, 2002, Boz und Uzuntiryaki, 2006). In order to change pre-service teachers' teaching beliefs in a positive manner, the pedagogical content knowledge of the pre-service teachers plays an important role (Yılmaz-Tüzün, 2008). When a teacher knows how to teach specific content effectively and the methods that can be used while teaching, while assessing a student or while solving a specific problem, then he/she forms a positive belief about teaching that content and this affects his/her behavior in the classroom.

Pedagogical content knowledge consists of knowing how to set teaching goals, organizing a sequence of lessons into a coherent course, conducting lessons, introducing particular topics and allocating time for successful treatment of significant concepts (Barnett & Hodson, 2001). In other words, pedagogical content knowledge is the transformation of several types of knowledge, such as subject matter knowledge, pedagogical knowledge (classroom management, educational aims), and knowledge about context (school, students). (Magnusson, Krajcik, & Borko, 1999)

There are many studies which have researched pre-service chemistry teachers' beliefs about teaching (Boz and Uzuntiryaki, 2006; Yılmaz-Tüzün, 2008; Tsai, 2002; Hancock, Gallard, 2004; Samuelowicz, Bain, 2001; Wright, 2005; Dallhause and Dallhause, 2006; Austin, 2001; Lumpe, Haney and Czerniak, 2000). But there are not so many studies examining the relationship between pedagogical content knowledge and teaching beliefs. With this study we examined pre-service chemistry teachers' beliefs about teaching and the relationship between their beliefs about teaching and their pedagogical knowledge.

2. METHOD

2.1. Purpose of the Study

The purpose of this study is to examine pre-service chemistry teachers' beliefs about teaching and the relationship between their beliefs about teaching and their pedagogical knowledge.

1. The research questions addressed in this study are as follows:
2. What do pre-service chemistry teachers believe about teaching?
3. What is the pedagogical content knowledge level of pre-service chemistry teachers?
4. Is there a difference in pre-service chemistry teachers' beliefs related to gender?
5. Is there a relationship between pre-service chemistry teachers' beliefs about teaching and their pedagogical content knowledge level?

2.2. Sample of the Study

The sample of the study consists of 99 students attending Hacettepe University, Faculty of Education. All of the students participating in the study were senior students and all of them had completed their educational courses such as "Classroom Management", "School Experience", "Methods of Science Teaching", "Measurement and Evaluation", etc., except "Practice Teaching".

2.3. Data Collection Tools

The data collection tools used in this study are the "Beliefs about Teaching Scale (BAT)" and the "Pedagogical Content Knowledge Test (PCKT)".

In order to examine the pre-service chemistry students' self-reported comfort level and beliefs with both traditional and reform-based teaching methods, assessment techniques and classroom management techniques Beliefs about Teaching (BAT) scale developed by Yılmaz-Tüzün (2008) was used. There are four subscales in the BAT scale: Teaching methods (including 18 items), assessment techniques (including 12 items), classroom management techniques (including 25 items), and science content (including 20 items). In this study, we just used the first three part of the scale. The items on the scale were assessed using a 5-point Likert-Type scale with the categories: strongly agree, agree, undecided, disagree and strongly disagree. The Cronbach α reliability of the survey was reported as $r=.97$. And for validation and assessment of the reliability of the scale, factor analysis was performed. The maximum score that can be gained from the scale is 275.

And in order to examine the pre-service teachers' pedagogical content knowledge, The Pedagogical Content Knowledge Test (PCKT) was used. The test consists of 30 multiple choice questions evaluating the pre-service teachers' knowledge level about teaching methods, assessment techniques and classroom management techniques. Before forming the test, the questions asked in the "educational sciences" section of the KPSS examination between 2006 and 2008 years were searched (www.osym.gov.tr) and 10 questions for each section: teaching methods, assessment techniques and classroom management techniques were chosen. Questions in each section are related with the concepts in the same sections at BAT scale.

2.4. Procedure

In this study pre-service chemistry teachers were asked to take sides on issues related to teaching. Also, teacher beliefs about professional issues were investigated. At the same time, pre-service chemistry students were asked about their pedagogical content knowledge. With this aim, we administered BAT and PCKT to the pre-service chemistry teachers participating in the study.

3. ANALYSIS OF THE DATA

For the analysis of the data, descriptive statistics were compiled and an independent t-test and correlation analysis were conducted using the Statistical Package for Social Sciences (SPSS) version 15 for Windows. Results are given below in tables.

What do pre service chemistry teachers believe about teaching?

What is the pedagogical content knowledge level of pre service chemistry teachers?

Tablo 1: The Results of Descriptive Statistics from the BAT Scale and PCK Test

	N	Min	Max	\bar{x}	ss
BAT Scale	99	183,00	273,00	223,34	21,87
PCK Test	99	3,00	28,00	13,1818	5,47418

When Table 1 is investigated: For BAT scale the maximum score is 273; minimum score is 183 mean score is 223.34; standart deviation is 21.87.

For PCK test, the maximum score is 28; minimum score is 3, mean score is 13.18; standart deviation is 5.47.

In the instructional methodologies part of the BAT scale, 72.7 % of the students stated that they agree that they are able to teach using inquiry, 60.6% of the students stated that they agree that they are able to teach using inquiry demonstration, 60.6% stated that they are able to teach using model building, 61.6% using role playing, 61 % discovery and 58.6% using problem based learning. Only 44% of the students believed that they are able to teach using conceptual change.

Table 2: Percentage of Pre-service Chemistry Teachers' Responses on BAT Scale Items (Assessment)

Assessment	Strongly agree	Agree	Undecided	Disagree
Summative Test	29	61,6	4	3
Formative Test	23	52	20	4
Individual Portfolio	20	47	27	4
Group Portfolio	17	44	24	14
Journals	31	58	9	1
Projects	30	58,6	4	1
Observation	28	50	13	6
Interview	41	46	9	1
Standardized Tests	31	37	23	6
Essay Tests	36	53	8	2
Written Reports	45	49	4	1
Questioning	32	52	13	2

Table 3: Percentage of Pre-service Chemistry Teachers' Responses on BAT Scale Items (Classroom Management)

Classroom Management	Strongly agree	Agree	Undecided	Disagree
Pair/Group Work	29	60,6	8	2
Noise	19	43	30	6
Student Motivation	33	53.5	13.1	
Discipline	29.3	49.5	21.2	
Classroom Testing	38.4	53.5	7.1	1
Students' Progress	34.3	59.6	5.1	1
Learner Differences	32.3	50.5	14.1	3
Cultural Differences Among Students	34.3	40.4	23.2	2
Unfocused Learners	24.2	37.4	33.3	5.1
Classroom Environment Control	24.2	55.6	20.2	
Effective Communication	37.4	53.5	8.1	1
Students in Active and Extended Scientific Studies	28.3	49.5	20.2	2
Off Task Students	23.2	52.5	20.2	4
Students' Interactions	28.3	53.5	18.2	
Students' Curiosity	22.2	44.4	24.2	8
Classroom Physical Arrangements	36.4	52.5	11.1	
Scientific Discussion and Debate Among Students	25.3	58.6	15.2	1
Students' sharing Responsibility For Their Learning	26.3	65.7	7.1	1
Authorative Teaching	23.2	53.5	21.2	1
Facilitative Teaching	25.3	61.6	12.1	1
Students Who Break The Rules	23.2	47.5	27.3	2
Gifted Students	20.2	35.4	35.4	6.1
Disabled Students	20.2	36.4	36.4	4
Parents' Requests	40.4	55.6	3	1
Lesson Preparation	45.2	56	2	2

Table 4: Percentage of Pre-service Chemistry Teachers' Responses on BAT Scale Items (Instructional Methodologies)

Instructional Methodologies	Strongly agree	Agree	Undecided	Disagree
Inquiry	14	72.7	11.1	2
Inquiry Demonstration	18.2	60.6	20.2	1
Inquiry Laboratory	16.2	48.5	31.3	4
Lecturing	50	37.4	6.1	1
Demonstration	34	54	9	2
Conceptual Change	12	44	41	2
Mentoring	28	46	21	3
Laboratory	26	52	20	1
Discussion	28	57	12	2
Learning Cycle	11	51	34	3
Model Building	24	60.6	13	2
Role Playing	19	61.6	17	2
Questioning	40	51	8	
Problem-Based Learning	33	58.6	8	
Cooperative Learning	33	51	14	1
Project-Based Learning	34	56	7	2
Case Dilemma	24	56	15	3
Discovery	28	61	10	

In the assessment part of the BAT scale in Table 2, 61.6% of the students stated that they agree that they are able to assess students' achievement using summative tests, 58.6% of the students stated that they agree that they are able to assess students' achievement using projects, and just 37% of them agreed that they are able to assess students' achievement using standardized tests.

In the classroom management part of the BAT scale in Table 3, 60.6% of the students stated that they agree that they are able to understand, respond and handle the problems related with group work, 65.7% of the students stated that they agree that they are able to understand, respond and handle the problems related with students' sharing responsibility for their learning, 61.6% of the students stated that they agree that they are able to understand, respond and handle the problems related with facilitative teaching, 35.4% of them agreed that they will be able to handle the problems related with disabled students and 36.4% and 37.4% of the students agreed that they will be able to handle the problems concerning gifted students and student motivation, respectively.

In instructional methodologies part of BAT scale in Table 4, 72.7% of the students stated that they are able to use inquiry method in their lectures and 61.6% of the students stated that they are able to use role playing method in their lectures, but just 12 % of them strongly agreed that they are able to use conceptual change method and just 11 % of them strongly agreed that they are able to use learning cycle method in their lectures.

In Instructional methodologies part of PCK Test in Table 5, 89.9% of the pre-service teachers correctly responded to the question related with inquiry, 82.8% correctly responded to the question related with lecturing. But for the question related with inquiry demonstration just 29.3% of the pre-service teachers responded correctly and for the question concerning discovery, just 5.1% of them responded correctly.

In Assessment part of PCK Test in Table 5, 65.7% of the pre-service teachers correctly responded to the questions related with microteaching, 73.7% of them responded correctly to the question concerning questioning. And just 32.3% and 20.2 % of the pre-service teachers responded questions concerning portfolio and formative test correctly.

In classroom management part of PCK Test in Table 5, 65.7% of the pre-service chemistry teachers responded questions related with student interactions correctly. But just 13.1% of them to the questions related with classroom testing, 34.4% of them to the questions related with students' progress, 30.3% of them to the questions related with facilitative teaching, 31.3% of them to the questions related with cultural differences among students and 24.2% of the pre-service chemistry teachers responded to the questions related with classroom environment control correctly.

Table 5: Percentage of Pre-service Chemistry Teachers' Responses on PCK Test Items

Related concept	Correct Answer	Wrong Answer
I. Instructional Methodologies		
Model Building	33.3	66.7
Project Based Learning	32.3	67.7
Concept Mapping	62.6	37.4
Inquiry Demonstration	29.3	70.7
Inquiry	89.9	10.1
Concept Mapping	60.6	39.4
Analogy	32.3	67.7
Discovery	5.1	94.9
Lecturing	82.8	17.2
Discussion	47.5	52.5
II. Assessments		
Questioning	50.5	49.5
Microteaching	65.7	34.3
Standardized Tests	52.5	47.5
Summative Test	55.6	44.4
Essay Tests	58.6	41.4
Portfolio	32.3	67.7
Written Exams	52.5	47.5
Formative Tests	20.2	79.8
Questioning	73.7	26.3
Classroom Assessment	45.5	54.5
III. Classroom Management		
Students' Interactions	34.3	65.7
Unfocused Learners	45.5	54.5
Effective Communication	40.4	59.6
Classroom Testing	13.1	86.9
Students' Progress	34.4	65.7
Facilitative Teaching	30.3	69.7
Classroom Environment Control	24.2	75.8
Discipline	35.4	64.6
Cultural Differences among Students	31.3	68.7
Student Motivation	46.5	53.5

Is there a difference in pre-service chemistry teachers' beliefs related to gender?

Table 6: Independent Samples t-Test Results for the BAT Scale in Terms of Gender

BAT Scale	N	\bar{x}	ss	t	p
Female	63	226,71	19,58	2.04	0,11
Male	35	217,40	24,93		

There is no significant difference between female and male students' beliefs about teaching ($\bar{x}_{\text{Female}}=226.71$; $\bar{x}_{\text{Male}}=217,40$ $p>0.05$).

Is there a relationship between pre-service chemistry teachers' beliefs about teaching and their pedagogical content knowledge level?

Table 7: Correlation Results for Pre-service Chemistry Teachers' Beliefs about Teaching and their Pedagogical Content Knowledge

	N	r	p
BAT(Instructional Methodologies Subscale)	99	0.89	0.38
PCK(Instructional Methodologies Subscale)			
BAT(Assessments Subscale)	99	0.90	0.37
PCK(Assessments Subscale)			
BAT(Classroom Management)	99	0.80	0.43
PCK(Classroom Management)			

The correlation between students' total scores obtained from the BAT subscales and the total scores obtained from the subscales of PCK test is not significant at the $p<0.05$ level.

4. FINDINGS

After the analysis of the data, the descriptive analysis for the BAT scale indicates that, in terms of instructional methodologies, most of the pre-service chemistry teachers believe that they are able to teach using inquiry demonstration, model building, role playing and problem based learning. In terms of assessment techniques, most of the pre-service chemistry teachers believe that they are able to assess students' achievement using summative tests and projects. In terms of classroom management, most of the students stated that they agree that they are able to understand, respond and handle the problems related with group work, students' sharing responsibility for their learning and facilitative teaching.

When percentage of pre-service chemistry teachers' responses on BAT Scale items are investigated, it is observed that pre-service chemistry teachers have high level of knowledge related with the pedagogical concepts: inquiry, lecturing, microteaching, questioning, interactions and they have a lack of knowledge related with pedagogical concepts: discovery, inquiry demonstration, portfolio, formative test, classroom testing and students' progress.

According to these results, it can be concluded that when students are familiar with the methods or the techniques mentioned, or when their teachers use these methods in lectures at university, students believe that they will be successful while using these methods or techniques.

An independent samples t-test was conducted to determine the difference between male and female pre-service teachers regarding teaching beliefs. However, results revealed no significant difference between male and female pre-service chemistry teachers.

Although the pre-service chemistry teachers' scores from both the BAT scale and the PCK test were above average, the correlation between these two variables is not significant. The reason for this result might be that these pre-service chemistry teachers did not complete their "Practice Teaching" course and therefore lacked practice in the classroom. In their study, Simmons et al. (1999) stated that beginning teachers' beliefs are shaped during their first years of teaching, as they integrate their pedagogical knowledge with their classroom experiences and adapt to the culture of the school.

5. RESULTS AND DISCUSSION

In this study, we once more confirmed the importance of pre-service chemistry teachers' teaching beliefs and the role that teacher education programs play while shaping these beliefs.

All teacher education programs should give importance to the determination and development of the beliefs of their students, because all of the students enter these programs with an existing belief system, and the only place to change the wrong beliefs is in their university education program.

If pre-service teachers are well educated with relevant pedagogical content knowledge, their self confidence level will increase and they will be able to easily use in their own classes all the techniques and methods they learned at university. An important factor affecting beliefs that should be taken into consideration is the teaching of pre-service teachers. Further research can be conducted with the sample of this study when they complete their "Teaching Practices" courses.

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GENİŞLETİLMİŞ ÖZET

İnançlar, bireyin yaşamda karşılaştığı her türden olay, olgu, kişi ya da nesneyi nasıl algıladığını, anlamlandırıldığını ve ona karşı nasıl davrandığını belirleyen, birey tarafından kuşku duymaksızın doğru olduğu varsayılan içsel kabuller ya da önermeler olarak algılanmaktadır. Bununla birlikte inancın ne olduğunun tek ve açık bir tanımını yapmak oldukça zordur. Ancak, bu yöndeki bir çaba eninde sonunda inançla, bilgi arasındaki ayırımı gelip dayanmak durumundadır (Deryakulu, 2004). Öğretmenlerin inançları genellikle sınıf ortamında sergiledikleri rollerle ortaya çıkmaktadır (Tobin, 1993). Pek çok araştırmacı öğretmenlerin öğretim ve öğrenme ile ilgili inançlarının sınıftaki performanslarını ve öğrencilerinin öğrenmelerini etkilediğini tespit etmişlerdir (Ball, Lubienski & Mewborn, 2001; Borko & Putnam, 1996; Holt-Reynolds, 1992; NCTM, 1991; Pajares, 1992; Prawat, 1992; Richardson, 1996; Stipek et al., 2001; Thompson, 1984; 1992, Özgün-Koca and Şen, 2006). Enochs ve Riggs (1990) fen öğretimi ile ilgili yeteneklerinin yeterli olmadığına inanan öğretmen adaylarının fen öğretimine çok az zaman ayırdıklarını tespit etmiştir. Üniversitelerde “özel öğretim yöntemleri” dersini veren öğretim elemanlarının öğretmen adaylarının inançlarına önem vermeleri gerektiğini belirtmişlerdir. Öğretmenlerin okul deneyimleri, laboratuvar deneyimleri, öğretmen eğitimi programlarında yaptıkları çeşitli aktiviteler onların öğretim ile ilgili inançlarını etkileyen faktörler olabilir (Tsai, 2002). Öğretmen adaylarının öğretim ile ilgili inançlarının pozitif yönde değiştirilmesinde pedagojik bilgiler önemli rol oynamaktadır (Yılmaz-Tüzün, 2008). Pedagojik bilgi, öğretim hedeflerinin belirlenmesi, bir dersin işlenişinin organize edilmesi derslerin yürütülmesi ve belirli bir sürede çeşitli öğretim yöntem ve metotları kullanılarak konuların öğrencilere aktarılmasını içermektedir (Barnett ve Hudson, 2001).

Bu çalışmanın amacı kimya öğretmen adaylarının öğretim ile ilgili inançlarının belirlenmesi ve kimya öğretmen adaylarının öğretim ile ilgili inançları ile pedagojik bilgileri arasındaki ilişkinin belirlenmesidir.

Çalışmada ele alınan araştırma soruları:

Kimya öğretmen adaylarının;

1. Öğretim ile ilgili inançları ne düzeydedir?
2. Pedagojik bilgileri ne düzeydedir?
3. Öğretim ile ilgili inançları cinsiyete göre farklılık göstermekte midir?
4. Öğretim ile ilgili inançları ve pedagojik bilgi seviyeleri arasında bir ilişki var mıdır?

Çalışmanın örneklemini Hacettepe Üniversitesi Eğitim Fakültesi kimya öğretmenliğine devam eden 99 son sınıf öğrencisi oluşturmaktadır. Çalışmada Tüzün (2008) tarafından geliştirilen “Öğretim İle İlgili İnanç Ölçeği” (ÖİÖ) kullanılmıştır. Ölçek Kimya öğretmen adaylarının öğretim metotları, ölçme değerlendirme teknikleri ve sınıf yönetimi konularındaki inançlarını belirlemek amacıyla geliştirilmiştir. ÖİÖ dört alt bölümden oluşmaktadır: Öğretim metotları (18 Madde), ölçme değerlendirme teknikleri (12 Madde), sınıf yönetimi (25 Madde) ve fen alanı ile ilgili konular (20 Madde). Bu çalışmada ölçeğin ilk üç bölümü kullanılmıştır. Ölçekteki maddeler 5’li Likert tipi skala kullanılarak “tamamen katılıyorum”, “katılıyorum”, “kararsızım”, “katılmıyorum”, “tamamen katılmıyorum” kategorileri ile değerlendirilmiştir. Ölçeğin Cronbach α güvenilirlik katsayısı $r=.97$ olarak belirlenmiştir. Geçerlilik ve güvenilirlik değerlendirmeleri için faktör analizi yapılmıştır. Ölçekten alınabilecek en yüksek puan 275’tir.

Kimya öğretmen adaylarının pedagojik bilgilerini tespit etmek için “Pedagojik Bilgi Testi”(PBT) kullanılmıştır. Test öğretmen adaylarının öğretim metotları, ölçme değerlendirme teknikleri ve sınıf yönetimi ile ilgili bilgilerini ölçen 30 çoktan seçmeli sorudan oluşmaktadır. PBT ye ilişkin sorular hazırlanırken 2006–2008 yılları arasında Kamu Personeli Seçme Sınavı (KPSS), Eğitim Bilimleri bölümünde sorulan sorulardan seçilmiş ve her bir bölüm için 10 soru sorulmuştur.

Verilerin analizi, SPSS–15 paket programı kullanılarak betimsel istatistik, bağımsız örneklem t-testi ve korelasyon analizi yöntemleri ile yapılmıştır. Verilerin analizi sonucunda betimsel istatistik sonuçlarına göre: öğretim metotları alt boyutunda kimya öğretmen adaylarının büyük bir bölümü, sorgulamaya dayalı demonstrasyon, model oluşturma, rol oynama ve probleme dayalı öğretim yöntemlerini sınıflarında konuların öğretiminde rahatlıkla kullanabileceklerine inanmaktadırlar. Değerlendirme teknikleri alt boyutunda, kimya öğretmen adaylarının çoğunluğu öğrencilerinin başarılarını testler ve projeler kullanarak değerlendirebileceklerine inanmaktadırlar. Sınıf yönetimi alt boyutunda ise öğretmen adaylarının büyük bir bölümü grup çalışması ile ilgili yaşanabilecek sorunları çözmede başarılı olabileceklerine, öğrencilerin öğrenmeleri ile ilgili sorumluluk almalarının sağlanması ve öğrenmenin kolaylaştırılması gibi konuların ele alınmasında yeterli olabileceklerine inanmaktadırlar.

PBT sonuçları yüzde olarak incelendiğinde, kimya öğretmen adaylarının sorgulama, düz anlatım, mikro öğretim ve soru sorma konularında pedagojik bilgilerinin yüksek olduğu; ancak sorgulamaya dayalı demonstrasyon, portfolyo gibi konularda eksik bilgiye sahip oldukları saptanmıştır.

Kimya öğretmen adaylarının öğretmenlik inançlarının cinsiyete göre farklılık gösterip göstermediğini belirlemek amacıyla bağımsız örneklem t testi uygulanmış kız ve erkek öğretmen adaylarının öğretmenlik ile ilgili inançları arasında anlamlı fark saptanmamıştır. Ayrıca PBT ve ÖİÖ’den elde edilen puanların korelasyon analizi sonucunda kimya öğretmen adaylarının pedagojik bilgileri ile öğretim inançları arasında anlamlı ilişki saptanmamıştır.