ANALYSIS OF ISSUES RELATED TO EDUCATION OF PRE-SERVICE PHYSICS TEACHERS IN TURKEY

A THESIS SUBMITTED
TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
SECONDARY SCIENCE AND MATHEMATICS EDUCATION

AUGUST 2006

Approval of the Graduate School of Natural and Applied Sciences

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ABSTRACT

ANALYSIS OF ISSUES RELATED TO EDUCATION OF THE PRE-SERVİCE PHYSICS TEACHERS IN TURKEY

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August 2006, 198 pages

The purpose of this survey is to analyse the issues related to education of pre-service physics teachers in Turkey. After reviewing the related literature, the problems were grouped in three categories; (1) Problems occurred before entering Physics Teacher Education Program, (2) Problems occurred during Physics Teacher Education Program, and (3) Problems occurred after graduation from Physics Teacher Education Program. Three questionnaires; Pre-service Physics Teacher Questionnaire-1 (PPTQ-1), Pre-service Physics Teacher Questionnaire-2 (PPTQ-2), and Lecturers Questionnaire (LQ) were developed to get information about opinions of the pre-service physics teachers and the lecturers on problems of physics teacher education. The research was conducted on 245 the pre-service physics teachers in 5 years, 297 the pre-service physics teachers in 4+1.5 years, and 85 lecturers in Physics Teacher Education Programs in 2005-2006 spring semesters.

The data obtained from the administration of the measuring instruments were analysed by using Ms-Excel and SPSS programs. Results of the statistical analyses indicated that the pre-service physics teachers and the lecturers think that; the pre-service physics teachers do not come to 5 years Physics Teacher Education Program willingly and consciously; characteristics which are important and necessary to be a good physics teacher can not be measured with university entrance exam; Physics Teacher Education Programs can not cause the pre-service teachers to gain the efficiencies in physics subject matter knowledge, general pedagogical knowledge, and general knowledge which are determined by Ministry of National Education completely; increasing the period of Physics Teacher Education Program do not supplement better qualified physics teachers in Turkey; quantity and quality of the lecturers in Physics Teacher Education Program are not sufficient; and Public Personnel Selection Exam can not measure whether the pre-service physics teachers have characteristics of a good physics teacher or not.

Keywords: Teacher Education, Physics Education, Physics Teacher, Pre-service Physics Teacher

ÖZ

FİZİK ÖĞRETMENLİĞİ SON SINIF ÖĞRENCİLERİNİN EĞİTİMLE İLGİLİ PROBLEMLERİNİN ANALİZİ

Tam, Mehtap

Yüksek Lisans, Orta Öğretim Fen ve Matematik Alanları Eğitimi Bölümü

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Ağustos 2006, 198 Sayfa

Bu çalışmanın amacı; fizik öğretmenliği son sınıf öğrencilerinin eğitimle ilgili problemlerini analiz etmektir. Literatür taraması yapıldıktan sonra problemler üç kategoride gruplandırıldı; 1) Fizik Öğretmenliği Programı öncesi karşılaşılan problemler, 2) Fizik Öğretmenliği Programı devam ederken karşılaşılan problemler, 3) Fizik Öğretmenliği Programı sonrası karşılaşılan problemler. 5 ve 4+1.5 yıllık Fizik Öğretmenliği Programında okuyan öğretmen adaylarının ve Fizik Öğretmenliği Programında görev alan öğretim elemanlarının fizik öğretmeni eğitimindeki problemlerin neler olduğu ile ilgili düşüncelerini belirlemek için üç anket geliştirildi; Öğretmen Adayı Anketi-1, Öğretmen Adayı Anketi-2, ve Öğretim Elemanı Anketi. Çalışma, 2005-2006 bahar döneminde, 5 yıllık Fizik Öğretmenliği Programında okuyan 245, 4+1.5 yıllık Fizik Öğretmenliği Programında okuyan 297 öğretmen

adayı ve Fizik Öğretmenliği Programında görev alan 85 öğretim elemanı ile yapılmıştır.

Elde edilen veriler Ms-Excel ve SPSS programları kullanılarak değerlendirilmiştir. İstatiksel sonuçlar öğretmen adaylarının ve öğretim elemanlarının; öğretmen adaylarının 5 yıllık Fizik Öğretmenliği Programına bilinçli ve istekli olarak gelmediklerini; iyi bir fizik öğretmeni olabilmek için gerekli olan niteliklerin şuanki üniversite giriş sınavı ile ölçülemediğini; Fizik Öğretmenliği Programının Milli Eğitim Bakanlığı tarafından belirlenen öğretmen yeterliliklerini kazandıramadığını; Fizik Öğretmenliği Programı'nın eğitim süresinin uzatılmasının daha iyi fizik öğretmeni yetiştirmeye katkı sağlamadığını; Fizik Öğretmenliği Programı'nda çalışan öğretim elemanlarının nicelik ve nitelik bakımından yeterli olmadığını; Kamu Personeli Seçme Sınavının öğretmen adaylarının iyi bir fizik öğretmeninin niteliklerine sahip olup olmadığını ölçemediğini düşündüklerini göstermiştir.

Anahtar Kelimeler: Öğretmen Eğitimi, Fizik Eğitimi, Fizik Öğretmeni, Fizik Aday Öğretmeni

To My Parents

ACKNOWLEDGEMENT

I would like to thank my supervisor Assist. Prof. Dr. Ali ERYILMAZ for his valuable guidance and help throughout the study.

I am grateful to my parents who provided valuable support throughout my life and this study. Thank you for your encouragement and patience.

Special thanks go to my brother Metin, my sister Melike, close friends Ertuğrul and Esma, for their valuable contributions and support to this study.

I also want to thank to administrators, the Pre-service physics teachers, and lecturers who gave their time and helped by participating in the study.

I wish to thank the all people again who generously shared their time with me, and support to overcome the number of intellectual and psychological challenges during the completion of this thesis.

This thesis was financially supported by BAP-2006- 05-01-02. I would like to emphasize my appreciation for this financial support.

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LIST OF SYMBOLS

SYMBOL

PPTQ-1 : Pre-service Physics Teacher Questionnaire-1

PPTQ-2 : Pre-service Physics Teacher Questionnaire-2

LQ : Lecturer Questionnaire

CHAPTER 1

INTRODUCTION

Science and technology have a significant impact in our daily lives. We can not think of technological development without science education. Over the years, efforts have been made to understand and motivate interest in science education in children. There are a lot of factors which affect the science achievement of children, such as; teacher quality, school quality, difficulty with mathematics, gender, socioeconomic level of family, etc.

The teacher is one of the most important factors in teaching process at all classroom levels. Therefore, one way to improve science teaching is to improve the preparation of science teachers (Trumbull & Kerr, 1993).

Teacher education generally falls into three categories in the world (Cobb, 1999): (1) Certificate or diploma programs, (2) Bachelor's degree programs, (3) Master's degree and/or 5 years programs. In Turkey, teacher education falls into two categories: (1) Diploma programs (4 years) and (2) Master's degree programs (4+1.5 or 5 years).

In Turkey, physics teacher education was upgraded to master degree in 1998-99 semesters. This program was put into practice in two types; 5 years (3.5+1.5) and (4+1.5) years Physics Teacher Education Programs.

Profession of teaching is very difficult and only desirous people can be successful teachers. Demircioğlu, Bulut, and Yıldırım (1997) stated that teaching

profession has to be chosen consciously and willingly or the students have to be attained education faculties by selection to prevent the moral and material losses. However, in our country, attaining of students to education faculties is unwillingly because of wrong choice at university entrance exam. They emphasized that unwilling and incapable teachers train unsuccessful students who do not love lesson and school. Türkmen (2000) stated that one of the main purposes of science education is to develop positive attitudes toward science and scientists. As a result, many teacher preparation programs emphasize changing of their pre-service science teachers' attitudes positively toward science and science teaching.

Demirel (1995) stated that a better educated and more experienced teacher is a necessary component of better 'quality of education'. Teacher education should be accepted as a multidimensional training; therefore, great experiences are needed in teacher education to enable teachers to cope with the demands of today's classroom (Bulut & Demircioğlu, 2000).

Cobb (1999) described quality of teachers as having some combination of the following attributes; subject area content knowledge, pedagogical knowledge, skills and attitudes necessary for effective teaching, strong understanding of human growth and child development, effective communication skills, strong sense of ethics, and capacity for renewal and ongoing learning.

In the Ministry of Education press (Milli Eğitim Bakanlığı Tebliğler Dergisi, 1992), to be an ideal teacher one should know;

1. teacher missions
    - teaching missions
    - management and administration mission

- good subject-matter knowledge
- supervision mission

2. daily, yearly and lesson planning
3. teaching and teaching methods
4. measurement and evaluating
5. how to manage teacher-student relations
6. school process and society mission
    - school rules
    - good relations with other teachers
    - join the school activities.

Czerniok and Chiarelott (1990) stated that science education suffered from teachers' inadequate preparation and negative attitudes. To prevent this issue today's teachers need to have well background knowledge. Knowledge of pre-service teachers should be investigated under three headings: 1) Subject matter knowledge, 2) General pedagogical knowledge, and 3) General knowledge.

Demirel (1995) stated that a well-qualified teacher should know his or her own subject-matter field very well. For this reason subject matter courses are very important in pre-service teacher education curricula. McDermott (1990) also emphasized that the effectiveness of a pre-college teacher should be determined by the number and rigor of courses taken in the discipline. However, study results of Tekkaya, Çakıroğlu, and Özkan (2002) showed that both pre-service and in-service teachers frequently hold misconceptions about a variety of science concepts and they are most probably unaware of the misconceptions they held.

Inconsistency between the university physics curriculum and high school physics curriculum is an important problem. Çepni and Akdeniz (1996) emphasized that the existing curriculum of the faculties does not have courses with adequate contents to equip the teacher candidates with the knowledge and skills needed in teaching- learning process of physics at the secondary level. Furthermore, Eryılmaz and İlaslan (1999) emphasized that pre-service physics teachers take physics courses related to the high school physics contents in first two years of their university education. However, while they are studying advanced physics courses, they forget the details of the freshman physics.

Yager, Hidayat, and Penick (1988) reported that a strong science content background is necessary but it is not sufficient for effective teaching. Lock and Soares (1998) emphasized that good science teachers need to have good teaching competence and classroom management skills, as do effective teachers in any subject area. Lederman, Gess-Newsome, and Latz (1994) stated that if we desire highly interconnected subject matter structures in our pre-service teachers, subject-specific pedagogy courses must be integrated as well as subject matter courses.

Etkina (2005) stated the sequence of physics teaching methods courses combined with clinical practice offers students an opportunity. Moreover, a lot of studies showed that school experiences have an important affect on pre-service teachers obtaining knowledge and skills. Therefore, it was stated that school experiences constitute the most important part of the teacher education by Book, Byers, Freeman, Kitchers, Sands, and Özçelik (as cited in Kete, Özdemir, Yıldırım, & Durmuş, 2002).

Education which is given before service to teachers is more theoretical and importance is not given to practice studies. As a result, pre-service teachers meet some problems at school experiences. Saka (as cited in Karamustafaoğlu & Akdeniz, 2002) emphasized that these problems arise from insufficient and unplanned organization of the high school experiences; insufficiency of the lecturers at guidance; numerical, functional and technological insufficiency of teaching equipments and materials.

General knowledge is an important dimension of teacher education that supports and develops content field knowledge and general education knowledge qualities of pre-service teachers (Öğretmen Yetiştirme ve Eğitimi Genel Müdürlüğü, 2006). However, Okçabol (2005) stated there are not sufficient courses to improve students' culture in teacher education programs.

Beside insufficiency of teaching program, Baskan (2001) emphasized that Education Faculties have important problems such as; quality and quantity insufficiency of the lecturers and excessive of the lectures' lessons. Eryılmaz (1999) stated that types of instruction plays important role on the achievement of pre-service physics teachers in physics. Moreover, Alkan (1993) stated that inadequacies in physical conditions of the universities also affect the achievement of pre-service teachers.

The science branches into two groups; the life sciences and the physical sciences. Life sciences cover the areas such as Biology, Zoology, and Botany. Physical sciences are divided such areas as Astronomy, Chemistry, and Physics. Unlike Biology, Chemistry, and Mathematics, the achievement of students in Physics is very low. Eryılmaz (1999) stated a wide variety of factors which might be related

to the declining achievement in physics: the nature of the physics content; scarcity of qualified teachers; severity of physics teachers' grading practices; dissatisfaction developed while taking high school physics courses; characteristics and attitudes of physics teachers; political, economic, and intellectual factors; and shortage of teachers adequately prepared to teach physics.

The primary goal of this study was to analyze the issues related to education of pre-service physics teachers in Turkey.

1.1 The Main Problem and Sub-problems

1.1.1 The Main Problem

The main problem of this study was:

What are the issues related to education of pre-service physics teachers in Turkey?

1.1.2 The Sub-problems

The following sub-problems (SP) were investigated on the main problem:

1.1.2.1 The sub-problems occurred before entering Physics Teacher Education Program

What are the opinions of the pre-service physics teachers and the lecturers about;

i) whether institutions (high schools, private establishments preparing students for exams, newspapers) make adequate efforts to orient high school students to education faculties?

ii) which qualities the students chosen to education faculties should have?

iii) how these qualities should be measured?

iv) whether the quota of Physics Teacher Education Program should be decreased?

1.1.2.2 The sub-problems occurred during Physics Teacher Education Program

1.1.2.2.1 The sub-problems related to Physics Teacher Education Program

What are the opinions of the pre-service physics teachers and the lecturers about;

i) whether the existing curriculum of the faculties of physics teacher education has enough must courses for pre-service physics teachers?

ii) whether the pre-service physics teachers have enough physics subject knowledge?

iii) whether the pre-service physics teachers have enough general pedagogical knowledge?

iv) whether the pre-service physics teachers have enough general knowledge?

v) whether the existing curriculum of the faculties of physics education has courses with adequate contents to physics at the high school level?

vi) whether the existing curriculum of the faculties of physics education has enough elective courses for pre-service physics teachers?

vii) whether the different teaching methods are used in the lessons?

viii) whether the different measurement and evaluation techniques are used in the lessons?

ix) whether there are any differences between 5 years Physics Teacher Education Program and 4+1.5 years Physics Teacher Education Program?

1.1.2.2.2 The sub-problems related to the lecturers in Physics Teacher Education Program

What are the opinions of the pre-service physics teachers and the lecturers about;

i) whether quantity of the lecturers in Physics Teacher Education Program is sufficient?

ii) whether quality of the lecturers in Physics Teacher Education Program is sufficient?

iii) whether universities provide opportunities that the lecturers need for academic development?

1.1.2.2.3 The sub-problems related to physical conditions of education faculties

What are the opinions of the pre-service physics teachers and the lecturers about;

i) whether universities provide opportunities for individual development of the pre-service physics teachers?

ii) whether universities provide opportunities for academic development of the pre-service physics teachers?

1.1.2.2.4 The sub-problems related to communication and cooperation between the institutions

What are the opinions of the pre-service physics teachers and the lecturers about;

i) whether communication and cooperation between Ministry of National Education, Turkish Council of Higher Education and Education Faculties are sufficient?

1.1.2.3 The sub-problems occurred after graduation from Physics Teacher Education Program

What are the opinions of the pre-service physics teachers and the lecturers about;

i) whether Public Personnel Selection Exam (KPSS) measures the qualities of good physics teachers?

ii) whether pre-service physics teachers believe that they will find a job?

1.2 Definition of Important Terms

This section presents the some important definitions related to this study.

Pre-service Teacher: The student who is the last class in Education Faculty.

Pre-service Physics Teacher: The student who is the last class at Physics Teacher Education Program in Education Faculty.

Physics Subject Matter Knowledge: Knowledge of physics concepts, relationships among them and methods of acquiring knowledge (Etkina, 2005).

General Pedagogical Knowledge: It is knowledge concerning the methods and theory of teaching.

General Knowledge: It is knowledge about many different things, rather than about one particular subject.

The lecturer: A the lecturer is a teacher at a university or college.

1.3 Significance of the Study

Science education is very important to follow technological developments and to reach the level of developed countries. In our country and in the world, physics which is one of the important areas of science is a very difficult area for students. There are a lot of factors affecting the physics achievement of students but quality of physics teachers is the most important. Therefore, physics teachers' education is very important for Turkey.

In this study, physics teacher education in Turkey and in development countries (United States of America, Japan, Germany, and England) was investigated. Moreover, physics teacher education programs in 12 Turkish universities were compared from the point of the number of the pre-service teachers,

number of the lecturers, total credit, must courses, and elective courses. The issues related to education of pre-service physics teachers in Turkey were investigated and determined under three headings: 1) Problems occurred before entering Physics Teacher Education Program, 2) Problems occurred during Physics Teacher Education Program, 3) Problems occurred after graduation from Physics Teacher Education Program.

The data gathered in this study will help Ministry of National Education, Turkish Council of Higher Education Institution, and Education Faculties to answer the question 'Why do not we train qualitative physics teachers?' and to make changes in Physics Teacher Education Program. This study is a general look for the problems of pre-service physics teachers. Therefore, each problem can be investigated by the researchers in the future to update the Physics Teacher Education Programs.

CHAPTER 2

REVIEW OF LITERATURE

In this section firstly high school teacher education in developed countries were investigated. Then, history of high school teacher education in Turkey was explored. Finally, implementation of Physics Teacher Education Program was reviewed.

2.1 General Summary of High School Teacher Education Programs in Developed Countries

Teaching profession, the importance of the teacher education, and the roles of teachers are important concepts which become current issue almost in every society (Baskan, 2001). Teacher education generally falls into three categories in the world (Cobb, 1999). (1) Certificate or diploma programs housed in normal colleges, normal schools, and colleges of education established solely for the purpose of training teachers. These programs are usually for elementary teachers and emphasize pedagogical preparation more than subject area preparation. In most cases these are 2 to 4 years programs. (2) Bachelor's degree programs housed at general, multipurpose universities. These programs tend to entail greater subject matter preparation and relatively less pedagogical preparation. These are generally 3 to 4 years programs, with the teacher preparation portion lasting one to two years. (3) Master's degree and/or 5^{th}-year programs. These programs are open to candidates who have

completed a bachelor's degree and lead to a master's degree or postgraduate diploma in education. The duration of these programs ranges from one to two years.

In this part high school teacher education in developed countries, Japan, Germany, United States of America, and England and Wales, was investigated. In Japan, pre-service education of teachers takes place at the universities and colleges. They are authorized by Monbusho first as institutions of higher learning and secondly as teacher training institutions. All teachers, in both public and private schools, must have teaching certificates which are classified by school type (kindergarten, elementary, middle, high school and special school), by subject matter in the case of middle and high schools and by particular specialty of special education in the case of special education teachers. Certificates are also classified into three levels as second class, first class and advanced class (Ministry of Education, Culture, Sports, Science, and Technology, 2004). Second class certificates are given to graduates of 2 or 3-year colleges, first class certificates are given to graduates of 4-year universities. Advanced certificates are for those who have master's degree (Kobayashi, 1993). Promotion to a higher class can be obtained through additional schooling in universities or institutions set up by the prefectural boards of education. In order to receive teacher certificates, students must earn required credits from accredited higher educational institutions in teaching, in subjects related to teaching, and for those seeking certification in special education, in subjects related to that arena (Moriyoshi, 2004). The curriculum for teachers includes subjects for general education which occupy about one third of the total requirements for graduation. The latter is again divided into two elements: one in education and the other relating to the subject matter taught. The education courses

include such subjects as principles of education, educational psychology, teaching methods, practice teaching, moral education, school management, educational technology, student guidance, extracurricular activities in school. Students teaching, known as practical training or field experience is an important part of the teacher education curriculum. Students are required to visit schools in order to practice and learn in real settings. The mentor teachers are responsible for guiding, instructing, and providing feedback to student teachers. Evaluations are made for each student teacher and are reflected in the course grade. The minimum period of practice teaching is set at 2 weeks for middle and high school teachers (Kobayashi, 1993).

Teacher training in Germany is the responsibility of the individual states (Lander), operating under guidelines set by the Standing Conference of the Ministers of Education and Cultural Affairs (KMK) (Structural Aspects of Teacher-Education in Germany). In each state teacher training consists of two phases: university study and student teaching (Handle & Nitsch, 1993). At the university, students pursue academic studies in their major subjects—the subjects they will teach—and in educational and social sciences. Students also receive training in didactics specific to their major subject areas and have the opportunity to apply their theoretical knowledge during several practices. The duration of university training depends on the level of school at which the student wants to teach, such as elementary or secondary. University studies for elementary and middle schools require at least 3.5 years, while studies for Gymnasium or vocational schools require at least 4.5 years (Professional Teacher Training, 2004). University training is completed with a comprehensive exit examination called the First State Examination. Passing the First State Examination is synonymous with attaining a university degree and is the

prerequisite for entrance into the second phase of teacher training, directed student teaching (Pritchard, 1993). The content of the First State Examination is as follows (Professional Teacher Training); (1) a written thesis in one of the student's two major subjects of study or in general education, (2) written and oral examinations in all of the student's major subjects of study, including pedagogy or general education, (3) oral examinations in some subjects, (4) a practical examination, which consists of a performance for students concentrating in art, music, physical education, or other technical fields. The second phase of teacher training, directed student teaching, lasts for 2 years, during which the student teaches in a school under the supervision of a mentor and participates in accompanying seminars on issues related to teaching. While university teacher education programs vary greatly from state to state, directed student teaching is similar in every state. Training takes place both in seminars and in schools. (Professional Teacher Training, 2004). They teach and discuss pedagogical, methodological, and subject-related aspects pertinent to the particular school level, such as assessment procedures and standards. The 2-year, hands-on student teaching experience consists of four parts: (1) Introductory phase of 3 months' duration (total 10 hours per week): observation or assisted teaching; (2) Differentiation phase of 6 months' duration (total 12 hours per week): includes observation and 4 or 8 hours a week of teaching with or without assistance; (3) Intensive phase of 12 months' duration (12 or 14 hours per week), including 4 hours a week of observation and/or assisted teaching, and 8 or 10 hours a week of teaching without assistance; (4) Preparation for the Second State Examination, lasting 3 months (10 hours per week): includes observation, assisted teaching, and teaching without assistance. Student teachers complete the second and final stage of their training with the Second State

Examination. The examination committee consists of six members and is chaired by a representative or "school inspector" from the state education ministry. The examination committee's final evaluation is based on the following four items (Professional Teacher Training): (1) Pre-examination grade: The head of the seminar, the subject experts of the seminar, the head teacher, and the mentors of the participating school write reports on the student teacher's general performance; (2) Thesis grade: The student teacher writes a thesis on lessons and units he or she has taught. Two subject experts evaluate the thesis. Each of them writes an evaluation of the student teacher's written work and assigns the student a grade; (3) Oral examination grade: Students must answer questions on pedagogical, methodological, and subject-related issues, as well as questions about school laws and school organization; (4) Grades for lesson plans and observed lessons in two subjects: Prior to the day of observation and evaluation of the student's teaching performance, the student teacher distributes copies of lesson plans or units that he or she will teach to examination committee members. After observing the student teaching, the committee meets with the student to discuss his or her performance.

The preparation of teachers in the United States of America varies from state to state and from institution to institution, with no national consensus on a central body of knowledge or skills that a teacher needs to enter the classroom. Historically, education in the United States has been the province of the states, and, accordingly, standards for teacher education and licensing are set at the state level. These standards may be reviewed and influenced by professional associations and a national accrediting agency but are not controlled by them. Accreditation of teacher

education programs is largely voluntary (unless the state mandates otherwise) (Professional Teacher Training, 2004)

Corrigan and Haberman (as cited in Professional Teacher Training, 2004) emphasized that today approximately 1340 teacher education programs exist in the United States in both public and private institutions. These programs differ widely in size, institutional mission, and range of students served. The primary path for teacher training in the United States is through a 4-year college degree, which usually consists of 2 years of general liberal arts courses followed by admission to an education program for coursework and field experiences in the schools. At some institutions—generally smaller, private colleges—students may be admitted to the education program even earlier in their undergraduate careers, thereby truncating their discipline-based coursework. Teacher training also exists at the graduate level, where there are two major categories of program: 5-year integrated or extended programs and postbaccalaureate programs. In the integrated or extended programs, students usually pursue a major in a field other than education and are gradually introduced to the education profession through coursework and field experiences. The fifth (and sometimes sixth) year involves concentrated professional preparation. Models vary widely, with some 5-year programs offering both a bachelor's and a master's degree (M.Ed. or M.A.T.), and others offering a bachelor's degree and graduate credit hours. In postbaccalaureate programs, students who already have bachelor's degrees in subject areas receive a year or more of professional preparation for teaching. Graduates may receive a M.Ed. or M.A.T, or graduate credits but no degree, or may simply be eligible for teacher certification as a result of the training (Professional Teacher Training, 2004).

Another route to the classroom is through an alternative certification program, which provides on-the-job training to college graduates who are placed in teaching jobs and given the concurrent coursework and supervision necessary for certification. Classes are held in the evenings, on weekends, and during the summer. These programs often draw a more diverse population than the 4-year degree programs, attracting more members of minority groups and older individuals seeking a career change (Professional Teacher Training, 2004).

To teach in England and Wales, you must first complete a programme of initial teacher training (ITT) and achieve qualified teacher status (QTS) (gtrr/England, 2006). ITT comes in all shapes and sizes, providing options to suit everyone. Different ways into teaching can be chosen to follow: (1) Undergraduate options: Train to be a teacher while completing a degree. These are Bachelor of education courses and Bachelor of arts or science with QTS. (2) Postgraduate options: a) Train to be a teacher in 1-2 years. These are Postgraduate certificate of education, School-centered initial teacher training, and Teacher First programme. b) Train and qualify as a teacher while working in a school. These are Graduate teacher programme, Registered teacher programme, and Overseas trained teacher programme. (3) QTS assessment-only options. If the person has substantial teaching experience but does not hold QTS in the United Kingdom.

The Standards for QTS are a rigorous a set of statements formally setting out what a trainee teacher is expected to know, understand and be able do in order to be awarded qualified teacher status and ultimately work as an effective teacher (TDA-Training and Development Agency for Schools, 2006). Standards are organised

under three inter-related headings: (1) Professional values and practice: Outline the attitudes and commitment expected of anyone qualifying to be a teacher - eg treating pupils and students consistently; communicating sensitively and effectively with parents and carers. (2) Knowledge and understanding: Require newly qualified teachers to be confident and authoritative in the subjects they teach, and to have a clear understanding of how all pupils should progress and what teachers should expect them to achieve. (3) Teaching: Relate to the skills involved in actually delivering lessons - eg planning, monitoring, assessment and class management. They are underpinned by the values and knowledge covered in the first two sections. To achieve the QTS Standards, skills tests innumeracy, literacy, and information and communications technology have to be passed. These tests are computerized and take place at more than 40 test centres throughout England.

2.2 History of High School Teacher Education in Turkey

Türkmen (1999) stated that Turkey, like other developing countries, pays great attention to education and a majority of Turkish people believe that to reach the level of developed countries can only be accomplished through education, specially science education. In this sense, teacher education and preparation has a special meaning for Turkey.

The opinion of teaching is a profession and teachers have to be educated with special programs in the special institutions was put into practice in 1848 (Oktay, 1998). Duman (1998) also emphasized that our nation has a wealthy teacher education experience which goes to 150 years past. Turkish governments who

benefit from these experiences have deal with teacher education as founding national and contemporary education system and have realized successful applications.

Teacher education in Turkey was started by Atatürk (Öğretmen Yetiştirme ve Eğitimi Genel Müdürlüğü, 1999). As soon as finishing Turkish War of Independence to train teachers who will provide real independence of country, Atatürk ensured beginning to operate 15 teacher training schools in 15 different regions in Turkey. Teaching became a profession with 439 numbered law 'Orta Tedrisat Muallimleri Kanunu' on 13 March 1924.

In republic period Education Instuitions, Teacher High Training Schools, Art and Science Faculties, and Education Faculties trained high school teachers (YÖK, 2004).

In 1924, education period was increased to 4 years at Teacher Training Schools, first three years subject content lessons and last year pedagogical lessons were trained. In 1940, education instution name was given these schools and new schools were opened in Ankara, İzmir, Balıkesir, Bursa, and İstanbul. The education period was between 2 and 4 years according to sections. In 1967-68 semesters education period was 3 years in all sections. In 1978-79 semesters, education period was increased to 4 years and name was changed to Teacher Training High School. Until the end of 1970s teacher need of the schools could not meet and to solve this problem some incorrect methods were used. Assistant teacher, representative teacher, reserve officer teacher, teacher training with letter, accelerated teacher training, appointment of different faculty graduates as a teacher were typical examples. In 1982 high school teachers were began to train at education faculties in universities

(Duman, 1998). Art and science faculties also contributed high school teacher training with teaching certificate programs (YÖK, 2004).

Oktay (1998) emphasized that establishment of education faculties gather teacher education under the framework of the university and add academic and scientific dimension to teacher education. However, expected results could not be reached because of some insufficiencies. These insufficiencies were enumerated as academic structure at education faculties, cooperation between education faculties, dialogue between Turkish Council of Higher Education and Education Faculties, dialogue between Ministry of National Education and Education Faculties, following of education faculty graduates on the field, and prestige of education faculty at own university.

Duman (1998) also stated the problems meet at the beginning of teacher education at universities as being unprepared of universities for teachers education; not having adequate experience of universities on teacher education; not getting continual and institutional collaboration between Ministry of National Education and universities; becoming less important of teacher education because of academic structure and atmosphere of the universities; neglecting of some group teacher education such as elementary science, social studies because of high specialization; and not training of teachers at sub-field.

Önsoy (1998) stated that universities were not ready and willing to train teacher. The first reason was that the duty of university is to train elite for country, to make research studies and to publish them, but training teachers is more different activity. The second reason was that financial difficulties will go up because of getting portion of education faculties from limited budget. Afterwards it was seen

that expecting searching and development studies were not made and necessity teachers of Turkey were not trained at education faculties. Because staffs which were taken over from Teacher High Training Schools were given to academics that could not get staff from Art and Science Faculty or other faculties; most of the deans and other directors were appointed from other faculties; although being crowded, education faculties benefited from university budget and investments insufficiently; a healthy and good staff was not realized because of not training of education faculties own staff members; most of the lessons were given by the lecturers who did not have teaching experience.

In 1998-99 semesters a new teacher training program was put into practice to solve these problems. It was seen that Education Faculties came face to face with some problems as wrong structuring and came to have little in common with basics aims, and they did not have enough qualities and quantities for teacher training. As a result, Turkish Council of Higher Education and Ministry of National Education co-operated in establishing the needs of pre-service teachers in 1996. The reasons of the preparation of new teacher training program were declared by Turkish Council of Higher Education (Reconstruction of the Teacher Training Program at Education Faculties, 2004):

1. Education Faculties have trained more secondary school teachers (physics, chemistry, biology, mathematics, history, geography, etc.) than primary school teachers and elementary school teachers (science, social sciences, elementary mathematics, etc.). As a result, the numbers of primary school teachers and elementary school teachers were under the levels of the needs.

New teacher training program aimed to increase in the numbers of primary school teachers and elementary school teachers.

2. Ministry of National Education appointed high school teachers at elementary school, such as; physics teachers as science teachers and history teachers as social sciences teachers. As a result, these teachers faced a lot of problems and they did not want to work as an elementary school teacher. Furthermore, undergraduate minor program was repealed and the teachers were only trained on one subject. However, they were appointed to village schools and had to teach a lot of lessons because of the inadequacy in number of teachers. New teacher training program aimed to train teachers at two subjects, such as science and mathematics, Turkish and social sciences.
3. Master and doctorate studies were made mostly on the nature science by the orientation of the university the lecturers at the education faculties. Studies for increasing the quality of teacher training were ignored. New teacher training program aimed to orient master and doctorate studies to teacher training and education subjects, and master and doctorate studies on nature science will be oriented to Art and Science Faculties.
4. Duplication was begun at the programs of Education Faculties and Art and Science Faculties, especially on the training of branch teachers programs. Both Education Faculties and Art and Science Faculties opened the same lessons in each their programs and they felt the need for the same laboratories As a result, the distribution and use of materials and equipments were caused to unproductive. New teacher training program aimed to train subject

knowledge at Art and Science Faculty and pedagogical knowledge at Education Faculty.

5. The teacher certificate given to graduates from Art and Science Faculty were not adequate from the point of view of content and time. New teacher training program ended this teacher certificate program and 1.5 years graduate without thesis program was became necessary for Art Science Faculties graduates to be a teacher.
6. In field teacher graduate program, such as physics teacher graduate program, advanced subject lessons were much more than the needed. In Education Faculties, pedagogical content knowledge and teacher practice in high school were ignored. As a result, the pre-service teachers became knowing the subject well but not knowing how to teach the subject content. New teacher training program aimed to give more importance to pedagogical content knowledge lessons and teacher practicing in high school. The pre-service teachers will gain teaching skills by living in the class and school.
7. The pedagogical content lessons were constructed again by the new teacher training program. Instructional planning and evaluation of education, classroom management, instructional technology and material development, methods of subject teaching, school experiences in schools were became more important in this new teacher training program.
8. Pre-service teachers graduate programs, such as; curriculum development, education management, measurement and evaluation, public education, were not appointed to teacher. Most of these graduates had to work on different fields. As a result, Education Faculties' important capacity of the lecturers

was used unproductively. These programs were closed at undergraduate level and opened at master and doctoral levels by the new teacher training program.

9. In our country, the number of the lecturers in education faculties was not enough. As a result, an important part of the scholarships which were given by the Turkish Council of Higher Education and Ministry of National Education were given to the lecturers who research on pedagogical field education subjects at doctoral level. After 4-5 years, there will be a lot of the lecturers at education faculties.

In new teacher training program, high school teacher education was upgraded to master (without-thesis master) degree. This program was put into practice in two types; 3.5+1.5 years program and 4+1.5 years program. In 3.5+1.5 years program, the students who complete all lessons in first seven semesters at graduate level start to get pedagogical lessons from education faculty at eight semesters. In 4+1.5 years program, the students who graduate Art and Science Faculty and get licence diploma are chosen to education master program covering 1.5 years and are trained.

At present, 5-years Physics Teacher Education Program is taken place in 12 universities in Turkey. These universities were searched by using Internet. Web pages of Atatürk University, Dicle University, and Yüzüncü Yıl University were preparing. Therefore, necessary information could not be reached for these universities. The other universities' 5-years Physics Teacher Education Programs were compared from the points of total credits, must courses, elective courses, and the quota. The results are given in Table 2.1.

Table 2.1 Five years Physics Teacher Education Programs in Turkish Universities

Universities	Quota of Physics Teacher Education Programs	Total Credits	Must Courses			Electıve Courses
			Phys	Gen. Ped. Knw.	Gen. Knw.	
Balıkesir University	30	195	98	39	46	12
Boğaziçi University	30	166	38	50	39	39
Dokuz Eylül University	40	186	93	39	40	14
Gazi University	40	182	84	39	44	15
Hacettepe University	30	175	64	39	66	6
Karadeniz Technical University	40	207	80	39	64	24
Marmara University	40	171	95	39	31	6
Middle East Technical University	30	164	56	39	42	27
Selçuk University	50	202	100	39	47	16

In order to learn which must courses and elective courses are given in each universities' Physics Teacher Education Program, three tables were prepared. Physics Subject Matter Knowledge must courses and elective courses are shown in Table 2.2. General Pedagogical Knowledge must courses and elective courses are shown in Table 2.3. General Knowledge must courses and elective courses are shown in Table 2.4.

Table 2.2 Physics Subject Matter Knowledge Must Courses and Elective Courses

Physics Courses	Balıkesir Uni.	Boğaziçi Uni.	Dokuz Eylül Uni.	Gazi Uni.	Hacettepe Uni	Karadeniz Technical Uni.	Marmara University	Middle East Technical Uni.	Selçuk Uni.
Physics 1 (Mechanic1)		X		X	X		X		X
Physics 1 (Mechanics)	X		X			X		X	
Physics 2(Mechanic 2)		X		X	X		X		X
Physics 2 (Electric and Magnetism)	X		X			X		X	
Physics 3 (Electric)		X		X			X		X
Physics 4 (Electromagnetism)		X		X					X
Physics Laboratory 1 (Mechanic1)				X			X		X
Physics Laboratory 1 (Mechanics)	X		X			X		X	
Physics Laboratory 2(Mechanic 2)				X			X		X
Physics Lab. 2 (Elec. and Magn.)	X		X			X		X	
Physics Laboratory 3 (Electric)				X			X		X
Physics Lab. 4 (Electromagnetism)				X					X
Statistical Physics	X			X	X	X	X		X
Special Relativity Theory							X		X
Thermodynamics	X		X	X		X	X		
Optics and Waves			X	X	X	X	X	X	X
Optics and Waves Laboratory			X	X	X			X	X
Optics	X		X	X					X
Optics Laboratory	X		X	X					
Mathematical Methods in Physics 1	X		X	X	X	X	X	X	X
Mathematical Methods in Physics 2	X		X	X	X	X	X	X	X
Differential Equations 1	X	X		X	X	X	X		
Differential Equations 2	X				X				
Quantum Physics 1	X	X	X		X				X
Quantum Physics 2	X	X	X		X				X
Quantum Physics				X				X	
Atom Physics	X		X	X			X		X
Atom Physics Laboratory			X						
Molecule Physics			X			X			X
Molecule Physics Laboratory			X						
Electronic 1	X		X	X		X	X		
Electronic 2	X		X	X			X		
Electronic					X		X	X	X
Electronic Laboratory	X		X	X	X		X		X
Electromagnetic Theory			X	X		X		X	X
Quantum Mechanics 1						X			
Quantum Mechanics 2						X			
Quantum Mechanics								X	
Solid Physics	X			X	X	X	X		

Table 2.2 Continued

Physics Courses	Balıkesir Uni.	Boğaziçi Uni.	Dokuz Eylül Uni.	Gazi Uni.	Hacettepe Uni	Karadeniz Technical Uni.	Marmara University	Middle East Technical Uni.	Selçuk Uni.
Solid Physics 1			X						X
Solid Physics 2			X						X
Electric and Magnetism 1					X	X	X		X
Electric and Magnetism 2					X				X
Mechanics	X						X		X
Theoretical Mechanics						X			
Modern Physics			X		X	X	X	X	
Modern Physics Laboratory			X		X		X	X	X
Particle Physics			X						
Nuclear Physics				X		X	X		X
Classical Mechanics 1		X							
Classical Mechanics 2		X							
Classical Mechanics								X	
Special Problems in Physics	X			X				X	
Applied Physics			X						X
X Rays and Applications				X					
Linear Algebra					X	X			
History of Physics/ Science			X				X		
Fluid Mechanics			X						X
Physical Electronic				X					
Advanced Electronic				X					
Knowledge of Air and Climate 1				X					
Knowledge of Air and Climate 2				X					
Nucleus Physics				X					
Digital Electronic				X			X		
Technical Electric Laboratory				X					
Radiations and Electromagnetic Particles		X							X
Atom and Nuclear Physics Applications	X			X					
Analytic Mechanics									X
Spectroscopy									X
Thermal Characteristics of Matter		X							
Electrical Engineering		X							
Philosophy of Physics							X		
Waves 1	X								
Waves 2	X								
Waves Laboratory	X								

Table 2.3 General Pedagogical Knowledge Must Courses and Elective Courses

General Pedagogical Knowledge Courses	Balikesir Uni.	Boğaziçi Uni.	Dokuz Eylül Uni.	Gazi Uni.	Hacettepe Uni	Karadeniz TechnicalUni.	Marmara University	Middle East TechnicalUni.	Selçuk Uni.
Introduction to Teaching Profession	X	X	X	X	X	X	X	X	X
Development and Learning	X	X	X	X	X	X	X	X	X
Instructional Planning and Evaluation	X	X	X	X	X	X	X	X	X
Methods of Physics Teaching 1	X	X	X	X	X	X	X	X	X
Methods of Physics Teaching 2	X	X	X	X	X	X	X	X	X
School Experience in Secondary Edu.1	X	X	X	X	X	X	X	X	X
School Experience in Secondary Edu.2	X	X	X	X	X	X	X	X	X
Instructional Technology and Material Development	X	X	X	X	X	X	X	X	X
Classroom Management	X	X	X	X	X	X	X	X	X
Analysis of Secondary Edu. Textbooks	X	X	X	X	X	X	X	X	X
Guidance	X	X	X	X	X	X	X	X	X
Practice Teaching in Secondary Edu.	X	X	X	X	X	X	X	X	X
Computer Assisted Physics Education	X								
Special Problems in Physics Education									X
Physics Experiments at High School Level 1			X	X					
Physics Experiments at High School Level 2				X					
Modelling in Physics Education				X					
Statistics of Science and Mathematics Education 1					X				
Statistics of Science and Mathematics Education 2					X				
Security of Science Education Laboratory					X				
Teaching of Modern Physics					X				
Final Developments in Science and Mathematics Education	X								
Learning Difficulties in Physics			X						
Measurement and Evaluation in Science	X								
Research Methods in Science Education	X	X							X
Research Project						X		X	
Introduction to Secondary Science and Mathematics Statistics	X								
Seminar of Teaching Physics		X							
Basic Principles of Guidance and Psychological Counselling		X							
Instructional Computer Material Development 1	X								
Instructional Computer Material Development 2	X								

Table 2.4 General Knowledge Must Courses and Elective Courses

General Knowledge Courses	Balıkesir Uni.	Boğaziçi Uni.	Dokuz Eylül Uni.	Gazi Uni.	Hacettepe Uni	Karadeniz Technical Uni.	Marmara University	Middle East Technical Uni.	Selçuk Uni.
Principles of Atatürk and History of Revolutions 1	X	X	X	X	X	X	X	X	X
Principles of Atatürk and History of Revolutions 2	X	X	X	X	X	X	X	X	X
Turkish 1	X	X	X	X	X	X	X	X	X
Turkish 2	X	X	X	X	X	X	X	X	X
Mathematics/ Calculus 1	X	X	X	X	X		X	X	X
Mathematics/ Calculus 2	X	X	X	X	X		X	X	X
Mathematical Analysis 1						X			
Mathematical Analysis 2						X			
General Chemistry 1	X	X	X	X	X	X	X	X	X
General Chemistry 2	X	X	X	X	X	X	X	X	X
General Chemistry Laboratory 1	X	X	X	X	X		X	X	X
General Chemistry Laboratory 2	X		X	X	X		X	X	X
Biology 1				X	X				X
Biology 2					X				X
Biology	X			X					
Biology Laboratory	X			X					X
Art and Society			X						
Human Rights			X						
Health			X						
Capital Speech and Writing			X						
Introduction to Computer 1		X				X	X		
Introduction to Computer 2						X	X		
Computer Programming 1			X	X	X				
Computer Programming 2			X	X					
Computer	X				X				
Basic Computer Sciences									X
Foreign Language 1 (English)	X		X	X		X	X		X
Foreign Language 1 (German)				X	X				X
Foreign Language 1 (French)				X					X
Foreign Language 2 (English)	X		X	X		X	X		X
Foreign Language 2 (German)				X	X				X
Foreign Language 2 (French)				X					X
Professional English 1			X	X		X			
Professional English 2			X	X		X			
Development of English Reading and Writing Skills 1								X	
Development of English Reading and Writing Skills 2								X	
English (Academic Oral Presentation)		X				X		X	
English (Advanced Communication)		X				X		X	
Physical Education/ Fine Arts			X						

The tables show that physics subject matter must courses are incoherent and different lessons are given in each university. However, all general pedagogical knowledge must courses are the same and they are given at last three semesters in all universities. General knowledge must courses in each university are also the same. Physics subject matter knowledge, general pedagogical knowledge, and general knowledge elective courses are incoherent in all universities.

2.3 Issues of Physics Teacher Education Programs

In this part, firstly knowledge requirements of pre-service physics teachers on subject matter knowledge, general pedagogical knowledge, and general knowledge were investigated. Then, qualification of the lecturers in physics education program and teaching of lessons were researched. Finally, advantages and disadvantages of new high school teacher education program were investigated.

2.3.1 Knowledge Requirements of Pre-service Physics Teachers

In many countries today high schools do not produce enough students who are interested in physics. McDermott (1990) explained that reasons for the steady attrition are complex. Political, social economic and intellectual factors all play a role, and it is difficult to separate causes from effects. She emphasized that one of the most important factors affecting enrolment and retention of students is the shortage of teachers adequately prepared to teach physics. Lacking the proper background to teach with enthusiasm and confidence, teachers often transmit to students a dislike of science, especially physical science.

The Commission on Teacher Education of the American Council of Education in an extensive study of the qualities of the good teacher listed the following (as cited in Eryılmaz & İlaslan, 1999):

1. respect for personality,
2. community-mindedness,
3. rational behavior and emotional surefootedness,
4. creative power,
5. skill in cooperation,
6. increasing knowledge, skill in mediating knowledge, breadth and integration of scholarship,
7. skill in mediating knowledge,
8. friendliness with children,
9. social understanding and behavior,
10. effective citizenship in the school,
11. skill in evaluation,
12. faith in worth of teaching.

McDermott (1990) declared the needs of high school physics teachers as follows:

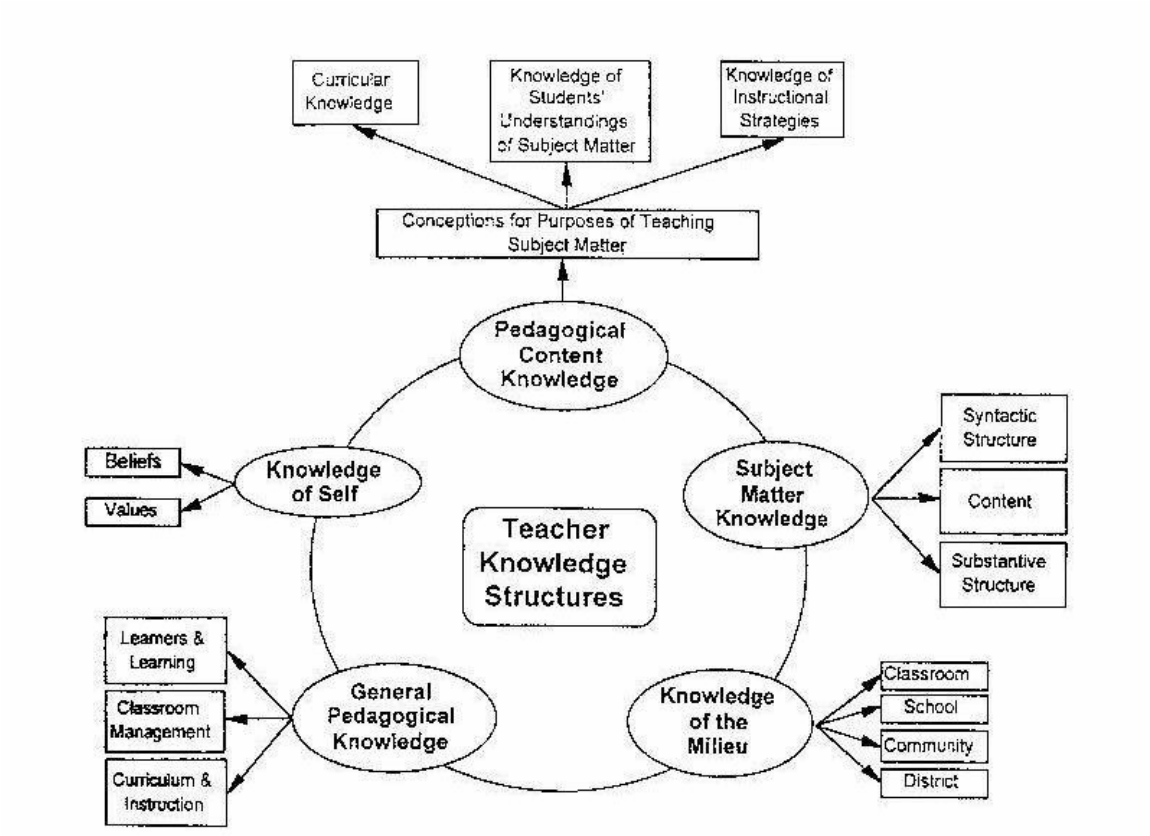
1. Physics teachers should understand elementary physics in depth.
2. Physics teachers should examine origins of knowledge of physics.
3. Physics teachers should experience laboratory center learning.
4. Physics teachers should acquire a sense of the unity of physics.
5. Physics teachers should relate physics to the real world.
6. Physics teachers should see physics as part of the real world.

7. Physics teachers should become familiar with good programs.
8. Physics teachers should apply learning theory to teaching.
9. Physics teacher should develop skills for inquiry in science.

Teaching was declared as a professional occupation in 1739 numbered Milli Eğitim Temel Kanunu (MEB-Öğretmen Yetiştirme ve Eğitimi Genel Müdürlüğü, 2006). According to it, pre-service teachers have to get qualities of general education knowledge, content field knowledge, and general knowledge.

Elbaz (1983) derived five categories of teacher knowledge about teaching based on her investigation of practical professional knowledge. These categories were knowledge of (a) self, (b) the milieu of teaching, (c) subject matter, (d) curriculum development, and (e) instruction. Other categorization of teacher knowledge was developed by Grossman (1990). Grossman's categories were (a) general pedagogical knowledge, (b) subject matter knowledge, (c) pedagogical content knowledge, and (d) knowledge of context. A synthesis of these two models is developed by Adam and Krockover (1997) (see Figure 2.1).

Figure 2.1: Model of teacher knowledge after Elbaz (1983) and Grossman (1990)



Knowledge requirements of pre-service physics teachers were investigated under three headings: 1) Physics Subject matter knowledge, 2) General pedagogical knowledge, and 3) General knowledge.

2.3.1.1 Physics Subject Matter Knowledge

Demirel (1995) stated that a better educated and more experienced teacher is a necessary component of better ‘quality of education’. It is essential that a well-qualified teacher should know his or her own subject-matter field very well. For this reason subject matter courses are very important in pre-service teacher education

curricula and course objectives should be identified, determined, and stated very clearly.

Gil-Perez (2006) stated four fundamental points of science education on physics teacher training: (1) The need of in-depth knowledge of the subject matter to be taught, (2) Questioning of teachers 'common sense' ideas about physics teaching and learning, (3) The acquisition of theoretical knowledge about the learning of physics; (4) Implication in physics education researches and innovation.

Czerniak and Chiarelott (1990) explained that science education suffers from teachers' inadequate and negative attitudes. In their research they found that science anxiety was correlated with science achievement and teachers' attitudes correlated with their science anxiety. Social cognitive theory suggested that anxiety is a result of feeling of inefficiency. Teachers' anxiety over teaching science is likely to have noticeable effects on both the quantity and quality of science instruction. Several research reports supported the view that teachers with a stronger science content background tend to exhibit attitudes and behaviours associated with effective science teaching. Czerniak (1989) found that teachers who take more science content courses in college and who have experience success with science content courses have lower levels of anxiety toward teaching science than teachers who have less science content training. The literature on science instruction suggested that adequate science content instruction; pedagogical strategies such as inquiry teaching, individualized instruction can lower anxiety and increase efficacy.

Lederman, Gess-Newsome, and Latz (1994) stated previous paradigms of research on teachers' knowledge and effectiveness provide us with correlational data on quantitative measures of teachers' knowledge. In their research, they found that

the planning and implementation of science lessons directly influenced the pre-service teachers' conceptualization of subject matter.

McDermott (1990) emphasized that the effectiveness of a pre-college teacher should be determined by the number and rigor of courses taken in the discipline. However, traditional physics courses generally do not provide the type of preparation that teachers should have. The content of the typical high-school courses is closely matched to that of the first-year college course, but study of the same material in college is not adequate preparation for teaching it in high school. Advanced physics courses do not provide useful preparation for teaching. The lecture format encourages passive learning. Students become accustomed to receiving knowledge rather than helping to generate it. The laboratory sequence that accompanies the introductory course also does not address the needs of teachers. Often the equipment used is not available in the teachers' schools, and no provision is made for showing them how to plan laboratory experiences that utilize simple apparatus. A more shortcoming is that experiments are mostly limited to the verification of known principles.

Çepni and Akdeniz (1996) emphasized that the existing curriculum of the faculties does not have courses with adequate contents to equip the teacher candidates with the knowledge and skills needed in teaching- learning process of physics at the secondary level. When the physic education program at education faculties was searched, it was shown that the importance was given to physics subject lessons and pedagogical content lessons. As a result, necessity of new additional lessons was felt. Çepni and Akdeniz stated that a lesson based on the action research model have to add the program. In this lesson, pre-service physics

teachers have to learn how to determine and evaluate research in education. They will learn determining the problem, writing the hypothesis, searching the literature, getting and organizing the knowledge, using the correct instruments, analyzing the data, and writing a research report. By this lesson, the pre-service physics teachers should be trained as a researcher.

Eryılmaz and İlaslan (1999) made a study to investigate the characteristics of prospective physics teachers, to evaluate attitudes of pre-service physics teachers toward to be a physics teacher, and to evaluate pre-service physics teachers' qualifications. A questionnaire is developed and is administered to 50 pre-service physics teachers from 4 universities; METU, Gazi, Hacettepe, and Marmara universities. The responses of the pre-service physics teachers showed that they have great problems. Most of the pre-service physics teachers are not ready to take mission in high schools. According the results of the questionnaire most of the pre-service physics teachers will be graduated below the ideal standards. Pre-service physics teachers take physics courses related to the high school physics contents in first two years of their university education. However, while they are studying advanced physics courses, they forget the details of the freshman physics. Their physics courses related with high school physics content are not enough in numbers. Pre-service physics teachers have conceptual difficulties. They learn the concepts by memorizing and theoretically. These affect their achievement in physics. So, laboratory is an important factor affecting training of pre-service physics teachers. However, there are not enough laboratory courses related high school physics contents. Teaching courses in the university programs are not effective. Most of the pre-service teachers are not ready to teach physics after taking those courses. The

teaching courses also do not give anything about school administration and management to the pre-service physics teachers. The most important problem is that none of the pre-service physics teachers chose the education faculties as the first preference in the university entrance exam.

Victor (as cited in Eryılmaz, 1999) reported that pre-service teachers are approaching the profession with very limited knowledge in physics and with a low probability of improvement before they enter to the teaching profession. The purpose of Eryılmaz's study was to evaluate content-based competency of pre-service physics teachers at Turkish Universities. The subject of the study was 160 pre-service physics teachers (4 th year students in the Department of Science Education) from seven Turkish Universities. She concluded that content of high school physics courses should be close to university physics course, but study of the same courses in universities is not adequate preparation for teaching it in high school. First year introductory physics course is insufficient for teaching a high school physics course, however, it does not follow that advanced physics courses provide useful preparation for pre-service physics teachers. The results also showed that pre-service physics teachers have conceptual difficulties. Sequeira and Leite (1991) found that pre-service physics teachers' conceptual understanding causes have a large effect on their achievement in physics. Giving teachers a better preparation on the history of science and providing them with adequate teaching materials, conceptual understanding in physics becomes more effectively.

Tekkaya, Çakıroğlu, and Özkan (2002) stated a number of studies revealing that both pre-service and in-service teachers frequently hold misconceptions about a variety of science concepts. The results showed that they are most probably unaware

of the misconceptions they held. Therefore, many of the misconceptions teachers hold are likely to be transmitted to their students. The existence of these misconceptions among students leads to a serious obstacle to learning in science, since misconceptions have been shown to be pervasive, stable, and often resistant to change through traditional classroom instruction. Misconceptions do not simply signify a lack of knowledge, or factual, or incorrect definitions. They represent explanations of phenomena constructed in response to prior knowledge and experience. Teachers with misconceptions about scientific ideas are not likely to be able to develop scientifically accurate conceptions in their students.

Subject knowledge of newly qualified teacher is currently a key concern of the teaching profession (Lenton & Turner, 1999). The study showed that science graduates do not necessarily understand and have sound knowledge of all parts of their own areas, and they also have misconceptions on science concepts. From their observations, often prior misconceptions do not become ‘unlearned’ just by teaching that topic. They assumed that unless student-teachers are observed and corrected by mentors, or other teachers, during their school practice, the mis-taught subject knowledge may well pass through the net and take some time to be learned. The majorities of mentors do not have time or see it as their role to generally check subject matter, unless it is obvious during teaching. It may be that this area will become increasingly important as a task for mentors.

Çepni (1998) made a study to reveal how and which level pre-service physics teachers understand the basic terms which constitute nature and source of science and to study the relationship between academic success of pre-service physics teachers and misconceptions on basic terms. 104 pre-service physics teachers at

Physics Education Program in Education Faculty in 1995-96 semesters participated in this study. The results showed that some pre-service physics teachers do not know the steps completely which have to be followed in a research study to reach a theory or law by scientists. The pre-service physics teachers do not know meaning of law, theory, and hypothesis. Therefore, the pre-service physics teachers should do research studies to understand laws, theories, principles, and hypotheses on science. It is obvious that a pre-service physics teacher who understands wrongly or does not understand the nature and source of physics will meet difficulties at teaching physics and probably will transfer wrong knowledge to students. The results also showed that academic success of pre-service physics teachers who do not know the steps on getting process of knowledge at physics is low. Especially, the pre-service teachers do not understand what the theories express at Quantum Physics, Quantum Mechanics, Atom and Nucleus physics lessons.

Gemici, Küçüközer, and Kocakülah (2002) made a research to determine the general physics (dynamic, electricity, geometric optic, magnetism) knowledge level of pre-service physics teachers, who completed 3.5 years subject content lessons and were at the beginning of the 1.5 years pedagogical content lessons program. A questionnaire which consists of two sections was developed and applied to 24 pre-service physics teachers from Balıkesir University. The results showed that the pre-service physics teachers are insufficient at basic physics contents; they make mathematics operation errors; they have problems on unit transform, especially experimental data and error calculations. These indicated that pre-service physics teachers are not trained well at laboratory studies. Kocakülah (as cited in Gemici, Küçüközer, & Kocakülah, 2002) emphasized that the content of the subject

knowledge lessons at physics education program do not cover the content of high school physics lessons; the lessons which contain high school physics subjects take part at the initial semesters but the lessons which take part at last semesters are abstract and do not remind, support, and consolidate the lessons of previous semesters; number of theoretical lessons are more than number of laboratory lessons. They claimed that after 1.5 years pedagogical education probability of forgetting basic physics knowledge can be increased. As a result, distribution and content of the lessons have to be organized again to remove all these problems.

Laboratory studies take an important part in science teacher education. Necessities of laboratory studies were explained as science subjects are abstract generally and students at elementary and high school levels do not understand them; students are more interested in application and hands on activities; by doing experiment students get realizing easiness of the basics of science, capability of making research and generalization, developing problem solving talent, obtaining scientific knowledge, developing positive attitudes to science by Tamir (as cited in Akdeniz, Çepni, & Azar, 1999). The study revealed that pre-service physics teachers do not recognize the instruments and equipments well which are used in the high school laboratories and do not know how to use them because laboratory studies at university do not harmonize with laboratory studies at high schools (Akdeniz, Çepni, & Azar, 1999).

Flick and Bell (2000) stated science and technology education have enjoyed a meaningful partnership across most of this century. Science education has generally involved teaching not only a body of knowledge but also the processes and activities of scientific work. Technology both as a tool for learning science content and

processes and as a topic of instruction in itself has traditionally been a part of teacher education in secondary science. Because, (a) technology should be introduced in the context of science content, (b) technology should address worthwhile science with appropriate pedagogy, (c) technology instruction in science should take advantage of the unique features of technology, (d) technology should make scientific views more accessible, and (e) technology instruction should develop students' understanding of the relationship between technology and science.

2.3.1.2 General Pedagogical Knowledge

Yager, Hidayat, and Penick (1988) reported that a strong science content background is necessary but it is not sufficient for effective teaching. Futhermore, Demircioğlu, Bulut, and Yıldırım (1997) emphasized that having well subject knowledge is not lonely sufficient to be a good teacher because a pre-service teacher has to love teaching, students, and people. Some researches seemed to indicate that the development of process skills in teachers may be more important to attitude changes and instructional improvement than the amount of science content training.

Goldsmith (1986) found that pre-service teachers' levels of anxiety about teaching science could be reduced with a process-skill orientation in methods classes. Process-skill training may be important for lowering anxiety toward science teaching, improving attitudes toward science, and influencing the effectiveness of science instruction. Teacher education programs need to prepare teachers for the realities of classroom management, particularly in science. Experiences with management and control of science classes, which differ in some ways from other

subject areas due to the laboratory, inquiry-based nature of science, should be an integral part of teacher education.

Johnston, Ryan, Çepni, and Azar (as cited in Azar & Ayas, 1998) stated classroom management and discipline are the most important problems which new teachers meet. Azar and Ayas made a study to determine the problems of pre-service teachers meet on classroom management and discipline, to designate the approaches which are thought by pre-service teachers to use for solving these problems, and to reveal how these approaches are used in practice. 35 pre-service teachers at Karadeniz Technical University Science Teacher Education participated in this study. The data was gathered by questionnaire, observation, and interview. The results showed that speaking of students to each other, asking unnecessary questions, not listening the lesson even not taking note, walking in the classroom without permission are the problems which pre-service teachers meet. The pre-service teachers plan to apply planned teaching approach to solve the problems which are met on classroom management and discipline. However, they use authoritarian approach in real classroom atmosphere. This situation showed that pre-service teachers can not put into practice what they believe. The basic reason is that the knowledge which is given on classroom management and discipline is very abstract and pre-service teachers do not know how to use them in practice.

Lock and Soares (1998) emphasized that good science teachers need to have good teaching competence and classroom management skills, as do effective teachers in any subject area. Transforming subject matter knowledge into teachable content requires a clear understanding of the subject and an ability to represent it in different ways. Shulman (as cited in Lock and Soares, 1998) considered pedagogic content

knowledge as crucial to teaching. He also said that teachers cannot just transmit the knowledge they have directly to pupils, but must rework it to develop the most powerful analogies, illustrations, examples, explanations, and demonstrations that build on their pupils' existing understanding, i.e. they must develop pedagogic content knowledge.

Etkina (2005) stated teachers should know how people learn, how the human brain functions, how memory operates and how a brain develops with age. However, the content knowledge and the knowledge of learning and learners cannot be considered separate domains. Teachers should possess understandings and abilities that integrate their knowledge of science content curriculum, learning, teaching, and students. This special knowledge called pedagogical content knowledge, distinguishes the science knowledge of teachers from that of scientists. In physics, Pedagogical Content Knowledge can be described as an application of general, subject-independent knowledge of how people learn to the learning of physics. Pedagogical Content Knowledge is no limited to knowledge of physics curricula, knowledge of student difficulties, knowledge of effective instructional strategies for a particular concept, and knowledge of assessment methods.

Lederman, Gess-Newsome, and Latz (1994) stated that if we desire highly interconnected subject matter structures in our pre-service teachers, subject-specific pedagogy courses must be integrated as well as subject matter courses.

Jong, Ahtee, Goodwin, Hatzinikita, and Koulaidis (1999) stated although science teachers may be expected to acquire their content knowledge during their student period, they develop their pedagogical content knowledge mainly from the moment that they start teaching. Lederman, Gess-Newsome, and Latz (1994) also

stated that as a prior research indicates well-formed pedagogy knowledge structure should not be expected without actual experiences with ‘real’ secondary students. Pedagogical knowledge is considered to be at work during the assessment of students’ understanding and the decision to try a different approach.

A lot of studies showed that school experiences have an important affect on pre-service teachers obtaining knowledge and skills. Therefore, it was stated that school experiences constitute the most important part of the teacher education by Book, Byers, Freeman, Kitchers, Sands, and Özçelik (as cited in Kete, Özdemir, Yıldırım, & Durmuş, 2002).

Etkina (2005) stated the sequence of physics teaching methods courses combined with clinical practice offers students an opportunity to re-learn physics content knowledge in a science-like environment; learn how to help their future students construct understanding of physics concepts in similar environment; learn how to use the advantages of contemporary technology while teaching physics; engage high school student in authentic research; build expert-like problem solving skills; and practice this new, reformed style of instruction with students of different ages with different degrees of autonomy.

Saka (2001) emphasized that pre-service physics teachers seem many problems during high school experiences. These problems arise from insufficient and unplanned organization of the high school experiences; insufficiency of the lecturers at guidance; numerical, functional and technological insufficiency of teaching equipments and materials.

Karamustafaoğlu and Akadeniz (2002) made a research to determine how much chance is given to pre-service physics teachers at school experiences to get the

necessity behaviors they have to acquire for being a teacher. The sample of the study consisted of 8 pre-service physics teachers from Karadeniz Technical University and three mentors in the spring semester of 2000-01. The results showed that sufficient chance is not given pre-service physics teachers at school experiences by the mentors to benefit from laboratory and teaching technologies, to prepare evaluation materials, and to develop simple equipments and materials. The causes could be enumerated as unwillingness of pre-service physics teachers towards to profession, unwillingness of pre-service physics teachers towards to school experiences, unwillingness of mentors towards to pre-service physics teachers, inadequate time, crowded classrooms, and inadequacy of the school conditions.

Lach and Goodwin (2002) stated new teachers probably haven't written many lesson plans, given many tests, or led many discussions. They aren't familiar with lab equipment and how to use it safely with a group of teenagers. More importantly, they do not have the repertoire of tricks or confidence that comes with years of experience. Therefore, mentors need to acknowledge the perspectives and mindset of new teachers. Mentoring is a complex role that encompasses critism and praise, pressure and nurturing, logistic, organization, and persistence.

Mentors have a lot of responsibilities and duties (Lach & Goodwin, 2002). They should fill new science teachers in on district and school policies, first day strategies, classroom structures, and share school laboratories of facilities. Classroom management is often a challenge for new teachers. Mentors should emphasize that many classroom discipline problems are avoided by having organized classroom operating systems, such as managing laboratory materials, distributing and collecting papers, recording tardy students, and conducting group work. Mentors should help

ease some of the burden by showing new teachers how to complete progress reports, order materials, reserve space in computer labs, set up field trips, and obtain resources from the library or media center. Mentors also should explain how to record attendance and tardies and ways to track phone calls to parents. Lach and Goodwin emphasize that the most inexperienced faculty members should be assigned to the least difficult classes. This allows the new teachers to ease into the career of teaching by minimizing frustration to ensure a positive attitude about science, students, and the teaching and learning process.

Goodlad emphasized mentors and universities share responsibility on the education of pre-service teachers and their development of profession as a teacher (as cited in Çimer & Çimer, 2002). Çimer and Çimer (2002) made a research to investigate the opinions of pre-service teachers about characteristics of mentors at practice schools. The study was realized at England Nottingham University Education Faculty in 2000-2001 semesters. The sample was formed pre-service high school teachers who participate in high school teacher training course (PGCE); 13 English, 7 History, 8 Mathematics, 15 Modern Foreign Language, 25 Science (physics, chemistry, biology). A questionnaire which consists of three sections was applied to gather data. Pre-service teachers emphasize the importance of mentors having sufficient knowledge on subject content, on classroom management, on how to interest in students having special problems; giving constructive, positive, clear feedback concerning the study of pre-service teachers; spending sufficient time each pre-service teacher; helping pre-service teachers to measure and evaluate students accurately; helping pre-service teachers to realize the learning needs of students; supporting pre-service teachers not to lose enthusiasms and ideals; appreciating and

praising the studies and efforts of pre-service teachers; helping pre-service teachers to have self-confidence; behaving as a friend to pre-service teachers. The results showed that mentors at practice schools have an important role on the pre-service teachers' professional and individual development.

Yıldırım (1998) emphasized at many assemblies and conferences in which training of qualified teacher is discussed school experience appeared an important subject which has to be taken up and studied on firstly. However, for years more importance was given subject content on teacher training at university level. However; pedagogical training was consisted of a few theoretical lessons. School experiences became a neglecting and step by step shrinking lesson. As a result, the teachers who graduated education faculties or teacher certificate programs did not gather practical teaching experiences sufficiently. The problems meeting at school experiences in respect of education faculties are having troubles to find the school where effective and productive experiences can be carried out, to designate time, to determine mentors and to educate them. The problems as to schools do not know own missions at school experiences and how to participate the responsibility with education faculty.

Education which is given before service to teachers is more theoretical and importance does not attach to practice studies. As a result, pre-service teachers meet some problems at school experiences, such as; not keeping discipline and classroom management, not evaluating the students' studies, not using the correct teaching materials, no knowing asking question techniques, not motivating the students to lesson, not determining the individual differences as emphasized by Azar (as cited in Azar & Ayas, 1998).

A study was made to investigate application of School Experience lesson which was put into practice in 1996-97 semesters by Arı and Kiraz (1998). 37 pre-service physics teachers and 4 the lecturers at Balıkesir University Necatibey Education Faculty Secondary Science and Mathematics Education entered into this qualitative research. School Experience files were examined and had an interview with pre-service physics teachers and the lecturers at university. The results showed that a lot of studies which have to be realized at school experience lesson by pre-service teachers do not. The reasons were enumerated as; pre-service teachers think that realization of some activities is very hard or impossible, pre-service teachers think that some activities are unnecessary or meaningless; reasons arise from guide book Teacher Education-School Experiences, reasons arise from pre-service teachers' lack of interests, reasons arise from attitudes of mentors, reasons arise from lectures at university, reasons arise from between schools and education faculty. Arı and Kiraz emphasized that the most important deficiency is broken off communication between schools and education faculty and avoid of the lecturers from sharing the responsibility. Pre-service teachers do not consider the activities adequately and do not know which point these activities will contribute their professional development.

Battal (1998) made a study to evaluate School Experience and Teaching Practice activities which are taken part in YÖK/World Bank Project- Development of Turkish National Education Project- in Balıkesir University. 446 pre-service teachers at Balıkesir University and 364 mentors in Balıkesir took part in this survey study and data was gathered by two questionnaires. The results showed that there is no correlation between lessons at faculties and at practice schools; lesson load of the

lecturers at education faculties is too much so they can not investigate the pre-service teachers' teaching files sufficiently and can not guide pre-service teachers adequately; school experience and teaching practice lessons are not organized systematically by education faculties and schools; physical conditions and teacher capacity of the schools are average level. Battal emphasized that School Experience and Teaching Experience lessons' activities are not realized at desirable level. Mentoring should be bringing attractive conditions to solve this problem. Extra wage should be paid; mentors should take advantage of the university (laboratory, seminars, social possibilities, etc); priority on making master should be possible.

2.3.1.3 General Knowledge

General knowledge is an important dimension of teacher education that supports and develops content field knowledge and general education knowledge qualities of pre-service teachers (Öğretmen Yetiştirme ve Eğitimi Genel Müdürlüğü, 2006). According to Ministry of National Education, (1) explaining (physics) events and facts by using different disciplines' concepts, (2) making connect between different disciplines and (physics) content, (3) motivating students in learning period, (4) benefit from different disciplines to illustrate, compare, analyze, and synthesize the (physics) content in learning period, (5) motivating students to improve their culture lives and standards are general knowledge adequacies of pre-service (physics) teachers.

Okçabol (2005) stated there are not courses to improve students' culture in teacher education programs. General knowledge which is not improved by any

courses can not be gained by other ways, because many education faculties of universities can not provide educational and cultural activities.

Balcı (2002) emphasized that while educating our teachers, besides given the theoretical information well, we must support this by the technological tools of the day. The previous studies show that our teachers abstain from using technology at the classroom. Because, serious number of the teachers are not trained using technology or they do not have adequate knowledge about technological equipments and materials of the day. Using technology in the education of the teachers and teaching how to use technology to the teacher candidates, we can expect that next generations will be educated in the hands of the people who are not afraid of using technology.

Köksal (1999) emphasized that teacher is the most important component in education. Owing to the characteristics of education, changing the teacher with another component of education is not possible. In developed countries it is believed that computer cannot replace teacher but the teacher can be educated on data processing technology and to use the computer his/her the best assistant. The teachers, the natural pioneers of change and development in the society, have to be the persons who are expected to keep up with the processing technology era, are aware of the development at processing technology as a guide and educator of the next generations, and use the computer effectively in the classroom.

2.3.2 Qualification of The lecturers in Physics Education Program and Teaching Methods Used in Lessons

Baskan (2001) emphasized that Education Faculties have important problems such as; quality and quantity insufficiency of the lecturers, excessive of lectures' lessons, and insufficiency of teaching program.

Craven and Penick (2001) stated the science teacher educators function in a variety of specific roles. They must continuously and simultaneously play and teach these roles as they challenge and improve the developing professional's understandings, beliefs, and skills. The roles of the science teacher educators are described briefly. (1) Probe: The student's understandings and skills about science education are continually probed by the science teacher educator (as well as the students themselves). Pre existing knowledge, beliefs, and prior experiences have on a powerful influence teacher's approach to teaching science. Teacher educators, therefore, must have students articulate, discuss, support, and defend their views about the goals and roles in the science classroom. (2) Prod: The activities chosen for the methods course are designed to move the learner toward deeper understandings about the teaching and learning of science. Investigations both inside and outside the classroom are designed to cause cognitive dissonance for students holding views and attitudes towards science education that impede scientific literacy. (3) Model: The science teacher educators must continually model the habits and attitudes of a superior teacher. They must structure a classroom environment that values high expectations, fosters student-to-student interactions, and promotes scientific literacy. (4) Mentor: The science educators must recognize that the conceptual change can often be difficult and deeply personal for the student. As a mentor, they move the

students to develop professionally by engaging one-on-one with students as expertise is shared and support is provided. These roles require the science educators to (1) know how students learn; (2) use expertise to structure an environment that promotes meaningful learning; (3) purposefully design tasks that lead to conceptual understanding, promote professional attitudes, and foster reflective practice; (4) use assessments that inform instruction yet cultivate meaningful strategies for learning by the students.

The types of instruction plays important role on the achievement of pre-service physics teachers in physics (Eryılmaz, 1999). The results of the study showed that the achievement of the pre-service physics teachers on the physics competency test came out to be unexpectedly very low. This may be caused by type of instruction. Science most of the physics courses is taught in the lecture format, pre-service teachers have to become familiar with lecturing as a mode of instruction. Lecturing, however, is less effective for adolescent. As a result, instructor in a course should not transmit information by lecturing and pre-service physics teachers should take active roles.

In study of Trumbul and Kerr (1993), they found that the lecturers teaching university science courses are not pleased with some aspects of their teaching. In this study, two different groups interview neophytes and scientists. The graduate student teaching assistants are referred as neophytes, and university teachers and researchers are referred as scientists. Laboratory courses are given by neophytes. Most of them don’t know how to teach, and they think they need to be taught. They contrast mere memorization and real understanding, but none are articulate about the nature of understanding. They expect that if students work hard at doing the standard lab work

and assignments the activities would some how bring about understanding. They only use written examination. They think that oral examination is a time consuming. Scientists admit that although it takes time away from their research, they enjoy teaching. The scientists exhibit a lack of pedagogical knowledge when they speak of science teaching. The scientists use routine tests and papers to evaluate student learning for advanced courses. Some recognize that there are problems with these methods of evaluation. They don't want to talk about any teaching strategies they have used to lead to increase students' involvement.

Işık and Soran (2000) made a study to collect data about the efficiency of the curricula of the institutions training biology teachers in Turkey and also to determine the reasons of the curricula's deficiencies. To achieve these aims, a questionnaire was developed and administered to 34 the lecturers from 8 Education Faculties, to 410 biology teachers from 14 provinces, and 113 senior university students from 3 institutions. The results showed that there are differences among the teachers involved based on their graduation from different institutions; classical methods such as lecture is found to be used more frequently than the scientific methods such as discovery; visual materials are employed more frequently than audio, visual-audio materials, computers; in terms of testing and evaluation, classical methods such as examination are often used whereas the frequency of others such as student projects, assignments is relatively lower.

Öztürk (1999) emphasized that teaching performance of the lecturers in the universities is one of the most important factors affecting the quality of learning at universities. Knutson, Schmidgall, and Sciarini stated that teaching performance of the lecturers in the universities at developed countries is evaluated by many

evaluation systems (as cited in Öztürk, 1999), such as, students' evaluation using by standard questionnaires, department chairman's evaluation, another the lecturer's written evaluation who gives lessons at the same program, another the lecturer's observing evaluation who gives lessons at the same program, another the lecturer's observing evaluation who gives lessons at different faculties. The most used evaluation system is the students' evaluation. Data gathered by questionnaire is analyzed and the results are investigated by the department chairman. The result is declared by department chairman or dean of faculty with written and verbal. The evaluation results are used to give feedback the lecturers to improve success of teaching performance, and to make a decision on situation of the lecturers; continue, dismiss, reward, and promotion. Yeşiltaş and Öztürk (2000) made a study to examine the applicability of teaching performance evaluation system in the Turkish state universities, which is widely used in many universities of developed countries. A questionnaire was developed and applied to Dean of four universities in Ankara. The results showed that evaluation system is not practiced in Turkish state universities widely.

Öztürk (1999) emphasized that application of this evaluation system at Turkish state universities seems difficult because of some points. First, higher education in Turkish state universities is free. The university students have to get the lessons whether the quality is high or not and they could not put pressure on the faculty management. Second, the lecturers at state universities work as civil servant. Third, the number of the qualified academic personal is insufficient. Fourth, salary of the university the lecturers is very low.

Alkan (1993) stressesed there are some differences between the universities in Turkey. University entrance point of the teacher education programs at the universities which are on the east of Turkey is less than the universities which are on the west of Turkey. Moreover, the number of the lecturers and the faculty conditions of universities on the east of Turkey are less than the universities on the west of Turkey. More important point is that education faculties' portion getting from university budget is becoming less from west to east. As a result, the pre-service teachers at universities on the east of Turkey start the profession a step behind the pre-service teachers at universities on the west of Turkey and it cannot be expected the pre-service teachers having the same qualities.

2.3.3 High School Teacher Education Program Put into Practice in 1998-99 Semesters

By new teacher education program, high school teacher education was increased master (without-thesis master) degree. This program was put into practice in two types; 3.5+1.5 years application and 4+1.5 years application.

Özyar (as cited in Baskan, 2001) emphasized reasons of Ministry of National Education which appoint the teachers in Turkey to support the new teacher training program:

1. The universities not only having enough the lecturers but also substructure are not ready to train teacher.
2. Enough collaboration and dialogue can not be founded between the ministry and universities.

3. Supply and demand of teachers can not be balanced.
4. While researching of basic science, teacher training is became the second duty at some departments of education faculties.
5. Pre-service teachers can not practice sufficiently at schools.
6. One or two of the basic components of teacher training; general culture, content knowledge, pedagogical knowledge is ignored in the course of the time.

New teacher training program has some advantages and disadvantages according to educators. Yıldırım (1998) stated that school experience which is carried out at last year were insufficient at teacher training. Observation and teaching experience are squeezed in one practice lesson content and so pre-service teachers can not gain teaching experience accurately. In new teacher training program two school experience lessons and one teaching practice lessons take part. School Experience-1 lesson aims pre-service teachers to recognize the school, students, and teaching as a profession from different aspects. School Experience-2 aims pre-service teachers to gain teaching experiences by doing small practices. Teaching Practice lesson aims pre-service teachers to teach a lesson or lessons well-planned in the classroom. By new teacher training program, more importance attaches school practice, and number of the practice hours are increased. A document was prepared to improve the collaboration between education faculties and practice schools, and a directive which comprises duty of national directorship of education, practice schools, education faculties, and pre-service teachers will be publicized.

Baskan (2001) made a research to get information the opinions of education faculties' deans on the new teacher training program which was put in to practice in 1998-99 semesters. The results showed that: the communication between the Education Faculties and Ministry of National Education has to be developed and a Teacher Training National Committee has to be constituted; education faculties program has to be parallel to teacher needs of Ministry of National Education and side-subject application has to put into practice; duties and functions of Education Faculties and Art and Science Faculties has to become more clear. New teacher training program exposes meaningful results, such as; the portion of the school experience was increased, faculty-school cooperation guide book was broadcasted, a new directive which organizes the cooperation between faculties and school came into force.

Özdemir (1998) emphasized that teaching has been struggling to be a profession for 150 years and has not been a profession yet. An agriculture engineer can not work as a doctor but he or she works as a teacher. This shows that teaching is not a professional job. He supported new teacher training program which is a new beginning for change in teacher education. He stated that this model has three important properties; (1) giving more importance to the education of primary teacher, (2) having master degree to be high school teacher, (3) separating education management from teaching. According to him the teachers do not have to work as civil servant. Quality of teacher can be increased by making contract between local management and teacher.

Saçlı (1998) emphasized that Education Faculties have needed a new re-organization. Education Faculties should train teachers for primary and elementary schools. At this condition Education Faculties are not adequate to train high school teachers. He stated that high school teachers have to train at Art and Science Faculties on their own subject. After that, they should be trained at master level to become a high school teacher. So, new teacher training program is the correct first step to reach the target. However, this program has some deficiencies. 1.5 year pedagogical training and content of the program are not adequate to train ideal teacher. Only a few pedagogical lessons have been added the content of old program forming the new program. Saçlı proposed that the time should be increased 2 years and a lot of new lessons should be added new program to make the content wealthier. All pre-service teachers have to learn using computer, speak a foreign language (preference English) fluently, and learn the national education of current law. This training should be executed a new institution such as 'Teacher Academy', or 'Advanced Teacher Institute'.

Ergün (1998) expressed that new teacher training program have some advantages and disadvantages. Considering special teaching methods important, becoming more serious on school practicing, and putting order and control at the program of education faculties are the advantages of the new program. First disadvantage of the new program is that there are two types of high school teacher education programs; 3.5+1.5 and 4+1.5 years. The difference between is not clear and this will make a confusion between the high school teachers who work at the same school. The second disadvantage is that disorder between the lesson programs and the lectures. There are important differences between high school lessons' content and

Art and Science Faculty lessons' content; and Art and Science laboratories do not have present the equipments and materials of high school laboratories. The third disadvantage is that the lecturers at Education Faculties will be alienated to science.

Duman (1998) emphasized that we have had a wealthy past on teacher training for 150 years. However, we have some serious discussions and anxieties on teacher training. As a result, a new teacher training program was put into practice in 1998-1999. New program has some advantages and disadvantages. This new program put an end to teacher certificate program and this changing will boost the quality of the teachers. Moreover, some graduates from Art and Science Faculty can choose becoming teacher because of fear of unemployment and 1.5 year is not enough for preparing himself/herself to become teacher. And also, there will be differences at education level of the teachers working at the same school.

Akyüz (2004) stated that new teacher training program has some adequate and critic points on the reorganization and rearrangement of teacher training. There is no information how the members of the study team is chosen and the quality of these persons on teacher training. So, this new program seems getting from abroad. From that point, new teacher training program is not supported by a lot of university the lecturers. Doing a pilot study for new program should be better than putting into practice suddenly. The second point is that some lessons such as psychology, sociology, philosophy, Turkish National Education History do not take part in the program. The lessons in the new program are at graduate level. Therefore, master certificate or science specialist's certificate can not be given with these inadequate lessons. This is inconvenient viewpoint of the academic value and scientific attitude.

Recently, occupation love, duty sense, occupation soul, and motivation can not be gain by without thesis program in 1.5 years.

Kırbıyık (1998) stated that new teacher training program has some shortages. In preceding teacher programs, the students know that they will become a teacher and they will study to reach this target. During the training, they are preparing themselves to be a teacher. However, in new program the students will decide to be a teacher after graduate Art and Science Faculty, and they will not prepare themselves psychologically. Furthermore, intelligent, hardworking students who get high points at the university entrance exam will not choose the education faculties because of the extra 1.5 years to be a teacher. A new project beginning with good wishes can prevent the successful students to choose education faculties.

Oktay (1998) emphasized that to bring teaching esteemed position at the first years of the republic we have to make effort for quality youngs to choose teaching as a profession. If we can not erase the opinion of everybody who graduate university can be a teacher from the mind, we can not deliver being teacher to be the last choice of the youngs.

Beside teacher education, teacher selection is also an important subject in Turkey. Arslan (1997) explained history of teacher selection in Turkey in his doctorate thesis. Aim of his study was to learn the opinions of the directors, the lecturers, and inspectors about importance degree of personal and occupational qualities at teacher selection, and nominative selection steps. 141 directors, 132 the lecturers, and 136 inspectors in Ankara took place in this study. Arslan prepared ‘Türkiye’de Öğretmen Seçimi Araştırması’ Questionnaire and gathered the data. The

results of the study indicated that the participants think that moral qualitities and to develop oneself are more important qualities than the others. They also suggested that progressive selection system consisting interview, examination composed of subject matter test, ability test, and general knowledge test, and presentation in the classroom and elimination at each step should be applied at teacher selection in Turkey.

2.4 Summary of the Literature Review

Findings from the literature were summarised in this part.

1. Teacher education generally falls into three categories in the world; (1) Certificate or Diploma Programs, (2) Bachelor's Degree Programs, (3) Master's Degree Programs (Cobb, 1999).
2. In Japan, pre-service education of teachers takes place at the universities and the colleges which are authorized by Monbusho. All teachers must have teaching certificates which are classified by school type, by subject matter, and by particular specialty of special education. Certificates are also classified into three levels as second class, first class, and advanced class. (Kobayashi, 1993; Ministry of Education, Culture, Sports, Science, and Technology, 2004; Moriyoshi, 2004)
3. In Germany, teacher training is the responsibility of the individual states (Lander), operating under guidelines set by the Standing Conference of the Ministers of Education and Cultural Affairs. In each state teacher training consists of two phases; university study and student teaching. University

training is completed with the First State Examination and student teaching is completed with Second State Examination. (Hand & Nitsch, 1993; Pritchard, 1993; Professional Teacher Training, 2004)

4. In the United States of America, the preparation of teachers varies from state to state and from institution to institution. Teacher training is through 4-year college degree, 5-year integrated or extended programs and postbaccalaureate programs, and certification programs. (Professional Teacher Training, 2004)
5. In England and Wales, pre-service teachers must first complete a programme of initial teacher training (ITT) and achieve qualified teacher status (QTS). Different ways into teaching can be chosen to follow: (1) Undergraduate options, (2) Postgraduate options: a) Train to be a teacher in 1-2 years, b) Train and qualify as a teacher while working in a school, (3) QTS assessment-only options. (gtrr/England, 2006; TDA-Training and Development Agency for Schools, 2006; Teacher Training in England and Wales, 2006).
6. Total credits of the courses in 5 years Physics Teacher Education Programs at Turkish universities are different; the minimum credits are given by Middle East Technical University and the maximum credits are given by Karadeniz Technical University.
7. The teacher is one of the most important components which affect the achievement of children in education (McDermott, 1990; Trumbull & Kerr, 1993; Demirel, 1995; Köksal, 1999).

8. Some studies investigated qualities of the ideal teachers (Milli Eğitim Bakanlığı Tebliğler Dergisi, 1992; Eryılmaz & İlaslan, 1999).
9. Categories of teachers' knowledge are stated (Adams & Krockover, 1997; Cobb, 1999; Jong, Ahtee, Goodwin, Hatzinkita, & Koıulaidis, 1999).
10. Science education suffers from unwilling and inadequate teachers (Czerniak & Chiarelott, 1990; Demircioğlu, Bulut, & Yıldırım, 1997).
11. Existing curriculum of the physics education program does not have courses with adequate contents to physics at the high school level (McDermott, 1990; Çepni & Akdeniz, 1996; Eryılmaz, 1999).
12. Both pre-service and in-service teachers have misconceptions about a variety of science concepts (Çepni, 1998; Lentor & Turner, 1999; Tekkaya, Çakıroğlu, & Özkan, 2002).
13. Pre-service physics teachers are not trained well at laboratory courses (Akdeniz, Çepni, & Azar, 1999; Gemici, Küçüközer, & Kocakülah, 2002).
14. Quality science teachers need to have pedagogical knowledge besides the subject content knowledge (Azar & Ayas, 1998; Goldsmith, 1986; Lederman, Gess-Newsome, & Latz, 1994; Lock & Soares, 1998; Yager, Hidayat, & Penick, 1998).
15. School experiences constitute the most important part of the teacher education (Azar & Ayas, 1998; Karamustafaoğlu & Akdeniz, 2002; Kete, Özdemir, Yıldırım, & Durmuş, 2002; Lederman, Gess-Newsome, & Latz, 1994; Yıldırım, 1998).
16. Mentors have a lot of responsibilities and duties (Çimer & Çimer, 2002; Lach & Goodwin, 2002).

17. The cooperation and communication between education faculties and practice schools is insufficient (Arı & Kiraz, 1998; Battal, 1998).
18. Quality and quantity insufficiency of the lecturers are important problems of education faculties (Alkan, 1993; Trumbull & Kerr, 1993; Öztürk, 1999; Işık & Soran, 2000; Baskan, 2001).
19. Advantages and disadvantages of new teacher training program were explained (Akyüz, 2004; Baskan, 2001; Duman, 1998; Ergün, 1998; Kırbıyık, 1998; Özdemir, 1998; Saçlı, 1998; Yıldırım, 1998).

CHAPTER 3

METHODS

In the previous chapters, problems of the study were presented, related literature was reviewed accordingly, and the essence of the study was justified. In this chapter, population and sampling, description of variables, development of measuring tools, procedure, and methods used to analyze data and assumptions and limitations were explained briefly.

3.1 Population and Sample

All pre-service physics teachers who are in 5-years Physics Teacher Education Program in Secondary Science and Mathematics Education Department, all pre-service physics teachers who are in 4+1.5 years Physics Teacher Education Program in Graduate School of Natural and Applied Sciences or in Graduate School of Educational Sciences, and all the lecturers at Physics Teacher Education Programs in Turkey were identified as the target population of this study.

Five years Physics Teacher Education Programs are open in 12 universities' education faculties: Atatürk University: Kazım Karabekir Education Faculty, Balıkesir University: Necatibey Education Faculty, Boğaziçi University: Education Faculty, Dicle University: Ziya Gökalp Education Faculty, Dokuz Eylül University: Buca Education Faculty, Gazi University: Gazi Education Faculty, Hacettepe University: Education Faculty, Karadeniz Technical University: Fatih Education

Faculty, Marmara University: Atatürk Education Faculty, Middle East Technical University: Education Faculty, Selçuk University: Education Faculty, and Yüzüncü Yıl University: Education Faculty.

4+1.5 years Physics Teacher Education Programs are open in 34 universities; Abant İzzet Baysal University, Afyon Kocatepe University, Anadolu University, Ankara University, Atatürk University, Balıkesir University, Başkent University, Celal Bayar University, Çukurova University, Dicle University, Dokuz Eylül University, Dumlupınar University, Ege University, Erciyes University, Fırat University, Gazi University, Gaziosmanpaşa University, İnönü Üniversity, İstanbul University, Kafkas University, Karadeniz Technical University, Kocaeli University, Marmara University, Mersin University, Middle East Technical University, Muğla University, Ondokuz Mayıs University, Pamukkale University, Sakarya University, Selçuk University, Süleyman Demirel University, Trakya University, Yıldız Technical University, Yüzüncü Yıl University, and Zonguldak Karaelmas University.

The population of pre-service physics teachers who are in 5-years program was 410 according to 2005-2006 semesters (Yükseköğretim Kurulu Öğrenci Seçme ve Yerleştirme Merkezi, 2005). The population of pre-service physics teachers who are in 4+1.5 years program was learned by phoning each university and it is 895. The population of the lecturers was learned by searching on the web site of the universities and it was 135. The population and the sample of the lecturers and the pre-service physics teachers are given in Table 3.1.

Table 3.1 Population and sample of the lecturers and the pre-service physics teachers

		The Lectureres	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
Population	f	135	410	895
Sample	f	85	245	297
	(%)	(63)	(60)	(33)

3.2 Measuring Tools

In this cross-sectional survey study, three questionnaires were used; Pre-service Physics Teacher Questionnaire-1 (PPTQ-1) for pre-service physics teachers who are in 5-years program, Pre-service Physics Teacher Questionnaire-2 (PPTQ-2) for pre-service physics teachers who are in 4+1.5 years program, and The Lecturer Questionnaire (LQ). The questionnaires were designed to determine the issues related to education of pre-service physics teachers in Turkey. All of the items in the questionnaire were identified by literature review, by direct interview with pre-service physics teachers and the lecturers, and by the researcher.

By means of the literature review, all problems related to education of pre-service physics teachers from all articles and books were gathered. Then, the problems were grouped in three categories; (1) Problems occurred before entering Physics Teacher Education Program, (2) Problems occurred during Physics Teacher Education Program, and (3) Problems occurred after graduation from Physics Teacher Education Program. In order to determine the sub-problems, at first, a meeting was convened with pre-service physics teachers who were at third, fourth, and fifth grade in Physics Teacher Education Program in Middle East Technical

University. Then, the researcher interviewed with three research assistants in Physics Teacher Education Program in Middle East Technical University. Finally, every problem gathered from the articles, books, meeting, and interviews were written. The sub-problems were determined and written for each category. The questions related to each sub-problem were designated. The number of the questions was too much, so the questions expressing the same meaning were eliminated. However, the number of the questions was still too much. Therefore, experts' opinions were taken from four pre-service physics teachers and eight the lecturers in Physics Teacher Education Program in Middle East Technical University. All feedback and criticisms about these interviews were analyzed by the researcher and necessary changes were finalized in the measuring tools. The total number of questions in the PPTQ-1 was 55; 21 questions were from literature review with some adaptation and 34 questions were designed by the researcher. The total number of questions in the PPTQ-2 was 36; 12 questions were from literature review with some adaptation and 24 questions were designed by the researcher. The total number of questions in the LQ was 62; 22 questions were from literature review with some adaptation and 40 items were designed by the researcher. The distribution of the questions according to the item numbers in the questionnaires and corresponding references are given in Table 3.2.

Table 3.2 Distribution of Questions Used in the Questionnaires in terms of Reference

Question Numbers of			References
PPTQ-1	PPTQ-2	LQ	
1, 2.1, 2.2, 3.2, 4.2, 4.3, 5.1, 5.2, 5.3, 9, 10, 11.1, 11.2, 11.3, 11.4, 13.1, 13.2, 13.3, 13.4, 14.1, 14.2, 14.3, 14.4, 15.1, 15.2, 15.3, 15.4, 19.1, 19.2, 20.1, 20.2, 21.1, 21.2	1, 2, 3.2, 3.3, 4.1, 4.2, 4.3, 8, 9, 10.1, 10.2, 10.3, 10.4, 13.1, 13.2, 13.3, 13.4, 17.1, 17.2, 18.1, 18.2, 19.1, 19.2	2.1, 2.2, 2.3, 4, 5.1, 5.2, 5.3, 5.4, 7, 8, 9.1, 9.2, 11, 12, 13.2, 13.3, 14.1, 14.2, 14.3, 18, 19, 20.1, 20.2, 20.3, 20.4, 30.1, 30.2, 30.3, 30.4, 30.5, 30.6, 31.1, 31.2, 32.1, 32.2, 33.1, 33.2, 33.3	By the Researcher
12	11	21	Adapted from MEB-Öğretmen Yetiştirme ve Eğitimi Genel Müdürlüğü (2005) (see Appendix A)
4.1	3.1	13.1	Adapted from Korur (2001)
16, 17, 18.1, 18.2	14, 15, 16.1, 16.2	1, 3, 6.1, 6.2, 10.1, 10.2, 22, 23, 24.1, 24.2, 25.1, 25.2, 26, 27.1, 27.2, 28.1, 28.2, 29.1, 29.2	Adapted from Baltacı (2002)
6, 22.1, 22.2, 22.3, 22.4 ,22.5, 22.6, 22.7, 22.8, 22.9, 22.10, 22.11, 22.12	5, 12.1, 12.2, 12.3, 12.4	15	Adapted from Say (1994)
3.1, 7, 8	6, 7	16, 17	Adapted from Okçabol (2005)

Finally, the PPTQ-1, the PPTQ-2, and the LQ were designed in the form of booklet (see Appendix B). In the first page, all directions related to aim of the research, possible usage of the research results, and way of filling the questionnaire were explained. All directions and items in the questionnaires were given in Turkish.

The questionnaires contained objective test items and essay type questions related to problems of the pre-service physics teachers. The structure and number of questions in the questionnaires were given in Tables 3.3, Table 3.4, and Table 3.5.

Table 3.3 Distribution of Questions Related to Problems Occurred Before Entering Physics Teacher Education Program

Problems occurred before entering Physics Teacher Education Program	PPTQ-1		PPTQ-2		LQ	
	Type of Items	Number of Items	Type of Items	Number of Items	Type of Items	Number of Items
Orientation of students to Education Faculties	Objective Test Items	4	Objective Test Items	1	Objective Test Items	1
	Essay Type Questions	1	Essay Type Questions	1	Essay Type Questions	1
Student Selection to Education Faculties	Objective Test Items	-	Objective Test Items	-	Objective Test Items	-
	Essay Type Questions	2	Essay Type Questions	2	Essay Type Questions	2
Qualities of the students	Objective Test Items	1	Objective Test Items	1	Objective Test Items	1
	Essay Type Questions	-	Essay Type Questions	-	Essay Type Questions	-
Quato of Physics Teacher Education Program	Objective Test Items	2	Objective Test Items	2	Objective Test Items	2
	Essay Type Questions	1	Essay Type Questions	1	Essay Type Questions	1

Table 3.4 Distribution of Questions Related to Problems Occurred During Physics Teacher Education Program

Problems occurred during Physics Teacher Education Program	PPTQ-1		PPTQ-2		LQ	
	Type of Items	Number of Items	Type of Items	Number of Items	Type of Items	Number of Items
Physics Teacher Education Program	Objective Test Items	1	Objective Test Items	1	Objective Test Items	1
	Essay Type Questions	2	Essay Type Questions	2	Essay Type Questions	3
Courses in Physics Education Program	Objective Test Items	14	Objective Test Items	10	Objective Test Items	8
	Essay Type Questions	7	Essay Type Questions	3	Essay Type Questions	1

Table 3.4 Continued

Problems occurred during Physics Teacher Education Program	PPTQ-1		PPTQ-2		LQ	
	Type of Items	Number of Items	Type of Items	Number of Items	Type of Items	Number of Items
Applications in the courses	Objective Test Items	-	Objective Test Items	-	Objective Test Items	-
	Essay Type Questions	12	Essay Type Questions	4	Essay Type Questions	-
Innovations in Physics Teacher Education Program	Objective Test Items	-	Objective Test Items	-	Objective Test Items	3
	Essay Type Questions	-	Essay Type Questions	-	Essay Type Questions	3
Quality and quantity of the lecturers	Objective Test Items	1	Objective Test Items	1	Objective Test Items	13
	Essay Type Questions	1	Essay Type Questions	1	Essay Type Questions	7
Physical conditions of the Education Faculties	Objective Test Items	2	Objective Test Items	2	Objective Test Items	3
	Essay Type Questions	-	Essay Type Questions	-	Essay Type Questions	1
Communication and Cooperation between the Institutions	Objective Test Items	-	Objective Test Items	-	Objective Test Items	4
	Essay Type Questions	-	Essay Type Questions	-	Essay Type Questions	2

Table 3.5 Distribution of Questions Related to Problems Occurred After Graduation from Physics Teacher Education Program

Problems occurred after graduation from Physics Teacher Education Program	PPTQ-1		PPTQ-2		LQ	
	Type of Items	Number of Items	Type of Items	Number of Items	Type of Items	Number of Items
Public Personnel Selection Exam (KPSS)	Objective Test Items	1	Objective Test Items	1	Objective Test Items	1
	Essay Type Questions	1	Essay Type Questions	1	Essay Type Questions	1
Anxiety of unemployment	Objective Test Items	1	Objective Test Items	1	Objective Test Items	1
	Essay Type Questions	1	Essay Type Questions	1	Essay Type Questions	2

During the administration process in the universities, the lecturers were informed with application instruction guide (see Appendix C). The instruction guide consisted of all details about the application process from starting to the end. It was designed and sent with questionnaires in order to achieve that in all universities the questionnaires would be applied in the same way.

To establish the face validity, questionnaires were checked by four pre-service physics teachers and eight the lecturers from Physics Teacher Education Program in Middle East Technical University in terms of correct spelling of words, their format and whether they measure the problems of pre-service physics teachers. These experts' views supported the face validity of the questionnaires. As stated above from the literature review all measuring tools related to problems of pre-service teachers were gathered. The questions of the questionnaires were taken from the literature review directly or a little adaptation. This structure of the questionnaires supported the content validity.

3.3 Procedure

At the beginning, a detailed literature search was carried out by the researcher. For the literature review, first the key terms were determined and the keyword list was prepared. By the help of these keywords Educational Resources Information Center (ERIC) and Dissertation Abstracts International (DAI) were researched systematically. Social Science Citation Index (SSCI), Science Citation Index, and Ebscohost were searched in METU library by computers. Previous studies, MS and PhD theses made in Turkey were also searched from YOK. Hacettepe Eğitim Dergisi, Eğitim ve Bilim, and Çağdaş Eğitim Dergisi were

searched by hand. Photocopies of obtainable documents were taken from METU library, library of Bilkent University and TUBİTAK Ulakbim. All periodicals and related books were gathered. Articles were organized in terms of year and alphabetical order. In case of new recent articles on this topic the researcher continuously checked and followed the literature by regularly maintaining the research on internet and in the libraries. All of the papers were read and results of the studies were compared with each other.

In this study, survey research methodology was used. Surveys describe the characteristics of a population. Fraenkal and Wallen (2003) explain the major purpose of surveys as concentrate on how the members of a population distribute themselves on one or more variables like age, ethnicity, religious preference, attitudes toward school. Three major characteristics that surveys posses are; (1) Information is collected from a group of people in order to describe some aspects or characteristics of the population of which that group is a part, (2) The main way in which the information is collected is through asking questions, (3) Information is collected from a sample rather than from every member of the population (Fraenkal & Wallen, 2003). In this study a cross sectional survey design which collects information from a sample that has been drawn from a predetermined population at just one point in time was used. The selection of sample was previously discussed in Section 3.1.

To administer the questionnaires to all universities, it was absolutely necessary to get permission from the presidency of the universities, since the universities principals asked for the permission document. For this purpose, firstly, the researcher contacted with head of Secondary Science and Mathematic Education

department of Faculty of Education and got initial permission of the study and secondly she contacted with the presidency of Middle East Technical University to receive official permission of the study (see Appendix D). Thirdly, with this legal permission presidency of METU contacted to the other universities' presidencies. Finally, 33 universities gave permission to apply the questionnaires. All these procedure take more than one month.

The questionnaires were sent in the form of cargo packages for every universities out of Ankara that contain all possible detailed items like a questionnaire application guide, permission document of METU Presidency. The packages also contained the PPTQ-1, the PPTQ-2, and the LQ. The universities in Ankara the packages were carried by the researcher and they were given to the lecturers and they were informed about the packages. Total application and resending process took two months during 2005-2006 spring semesters. Finally, all of the data directly were entered to the computer. Then the variables were formed, and statistical analyses were done by using MS-Excel and statistical package for the social science (SPSS) programs.

3.4 Analysis of Data

Three data lists were prepared by using Excel in which columns show variables and rows show pre-service physics teachers and the lecturers participating in the study. Then the researcher coded data, and prepared for the statistical analysis. The data obtained from the study were analysed statistically by using both Ms-Excel and SPSS programs. The data were analysed using descriptive statistics.

CHAPTER 4

RESULTS

The results of the study are analysed in the three general dimensions: 1) The problems occurred before entering Physics Teacher Education Program, 2) The problems occurred during Physics Teacher Education Program, and 3) The problems occurred after graduation from Physics Teacher Education Program.

4.1. Description of the findings and their discussions

The percentages and frequencies of the lecturers and the pre-service physics teachers in various universities participated in this research are shown in Table 4.1.

Table 4.1 Percentage and Frequency of the Lecturers and the Pre-service Physics Teachers

Universities	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Anadolu Uni.	5 (5.9)	0 (0.0)	4 (1.3)
Ankara Uni.	0 (0.0)	0 (0.0)	5 (1.7)
Atatürk Uni.	6 (7.1)	0 (0.0)	49 (16.5)
Balıkesir Uni.	7 (8.2)	23 (9.4)	0 (0.0)
Boğaziçi Uni.	1 (1.2)	20 (8.2)	0 (0.0)
Dicle Uni.	5 (5.9)	38 (15.5)	18 (6.1)
Ege Uni.	2 (2.4)	0 (0.0)	25 (8.4)
Erciyes Uni.	1 (1.2)	0 (0.0)	5 (1.7)
Fırat Uni.	5 (5.9)	0 (0.0)	21 (7.1)
Gazi Uni.	13 (15.3)	27 (11.0)	29 (9.8)

Table 4.1 Continued

Universities	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Hacettepe Uni.	5 (5.9)	13 (5.3)	0 (0.0)
Kafkas Uni.	2 (2.4)	0 (0.0)	5 (1.7)
Karadeniz Technical Uni.	3 (3.5)	23 (9.4)	0 (0.0)
Kocaeli Uni.	4 (4.7)	0 (0.0)	19 (6.4)
Marmara Uni.	5 (5.9)	38 (15.5)	0 (0.0)
Mersin Uni.	1 (1.2)	0 (0.0)	10 (3.4)
Middle East Technical Uni.	11 (12.9)	12 (4.9)	0 (0.0)
Ondokuz Mayıs Uni.	4 (4.7)	23 (9.4)	16 (5.4)
Pamukkale Uni.	1 (1.2)	0 (0.0)	11 (3.7)
Sakarya Uni.	2 (2.4)	0 (0.0)	19 (6.4)
Selçuk Uni.	1 (1.2)	28 (11.4)	55 (18.5)
Yıldız Technical Uni.	1 (1.2)	0 (0.0)	6 (2.0)
Total	85 (100)	245 (100)	297 (100)

4.1.1 The Problems Occurred Before Entering Physics Teacher Education Program

4.1.1.1 Orientation of High School Students to Education Faculties

To learn opinions of the lecturers and the pre-service physics teachers about whether high school students come to Physics Teacher Education Program willingly and consciously, Question 1 in the PPTQ-1 and Question 11 in the LQ were asked. The results are shown in Table 4.2.

Table 4.2 Opinions of the Lecturers and the Pre-service Physics Teachers on High School Students' Coming to Physics Teacher Education Program Willingly and Consciously

Answers	Lecturers	Pre-service Physics Teachers (5 Years Program)
	f (%)	*f (%)*
Yes	8 (9.4)	81 (33.1)
Not Sure	56 (65.9)	124 (50.6)
No	14 (16.5)	39 (15.9)
Total answers	78 (91.8)	244 (99.6)
Missing answers	7 (8.2)	1 (0.4)
Total participants	85 (100)	245 (100)

The data show that 16.5 % of the lecturers and 15.9 % of the pre-service physics teachers think that high school students do not come to Physics Teacher Education Program willingly and consciously. This result is supported by Question 2.1 in the PPTQ-1 which was asked pre-service physics teachers who are in 5 years Physics Teacher Education Program to learn choice sequence of Physics Teacher Education Program in their university entrance exam. Table 4.3 shows the choice sequence of the pre-service teachers. The data show that about 22 % of the pre-service teachers put Physics Teacher Education Program in their choices between 1 st and 3 rd. 50.6 % of the pre service students were not sure about coming to this program willingly and consciously.

Table 4.3 Choice Sequence in University Entrance Exam of the Pre-service Physics Teachers Who are in 5 Years Physics Teacher Education Program

Choice Sequence	Pre-service Physics Teachers (5 Years Program)	
	f	*%*
1	15	6.1
2	28	11.4
3	12	4.9
4	26	10.6
5	33	13.5
6	18	7.3
7	11	4.5
8	10	4.1
9	9	3.7
10	8	3.3
11	9	3.7
12	6	2.4
13	15	6.1
14	3	1.2
15	7	2.9
16	9	3.7
17	5	2.0
18	8	3.3
Total answers	236	96.3
Missing answers	13	5.0
Total participants	245	100

Question 2.2 in the PPTQ-1 was asked pre-service physics teachers who are in 5 years Physics Teacher Education Program to learn why they have chosen Physics Teacher Education Program. The reasons and results are shown in Table 4.4. The results show that only 25.7 % of the pre-service teachers wanted to be a physics teacher very much. Results indicate that 32.7 % of the pre-service physics teachers chosen Physics Teacher Education Program due to the points got from university entrance exam.

Table 4.4 Reasons of the Pre-service Physics Teachers to Choose Physics Teacher Education Program

Reasons	Pre-service Physics Teachers (5 Years Program) *f (%)*
I want to be a physics teacher very much	63 (25.7)
To hold a scholarship	4 (1.6)
To take extra points in the university entrance exam	10 (4.1)
To find a job easily	37 (15.1)
To be at the university	13 (5.3)
Due to the my points get from the university entrance exam	80 (32.7)
Effect of my family and environment	5 (2.0)
I want to be a teacher very much	23 (9.4)
I like science/physics	16 (6.5)

Question 3.1 in the PPTQ-1 was asked to learn who orientate the high school students to Physics Teacher Education Program much more systematically and orderly. The answers of the pre-service physics teachers are given in Table 4.5. The results show that the private establishments preparing the high school students for university entrance exam oriented the high school students much more than the others. 15.9 % of the pre-service teachers state that anyone or any establishments did not guide them choosing the university or program. This result is parallel to answer of the pre-service teachers to Question 1 in the PPTQ-1 because 15.9 % of them say that they did not come to this program consciously.

Table 4.5 People and Establishments Orientating High School Students to Physics Teacher Education Program

People and establishments	Pre-service Physics Teachers (5 Years Program) *f (%)*
High schools	65 (26.5)
Private establishments preparing students for university entrance exam	85 (34.7)
Published written sources	32 (13.1)
University entrance exam point	7 (2.9)
Family and environment	9 (3.7)
None	39 (15.9)

To learn what can be do to orient successful high school students to Physics Teachers Education Program, essay type questions; Question 3.2 in the PPTQ-1, Question 2 in the PPTQ-2, and Question 12 in the LQ were asked. The suggestions of the lecturers and pre-service physics teachers about this topic are given in Table 4.6. Appointment of the pre-service physics teachers is stated as first suggestion by 41.2 % of the lecturers and second suggestion by about 37 % of the pre-service physics teachers. According to pre-service physics teachers to cause students to love physics and physics lessons was the first suggestion. An important point is that 5.3 % of the pre-service physics teachers in 5 years program and 9.1 % of the pre-service physics teachers in 4+1.5 years program do not want successful students to be oriented to Physics Teacher Education Program because of the unemployment.

Table 4.6 Suggestions of the Lecturers and the Pre-service Physics Teachers about Orientation of Successful High School Students to Physics Teacher Education Program

Suggestions	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
To cause high school students to love physics and physics lessons	15 (17.6)	91 (37.1)	110 (37)
To give scholarship to students choosing the Physics Teacher Education Program	11 (12.9)	1 (0.4)	0 (0.0)
To appoint the pre-service physics teachers	35 (41.2)	57 (23.3)	89 (30.0)
To enhance the economical and spiritual respectability of the teaching career	17 (20.0)	23 (9.4)	22 (7.4)
To attach necessary importance to science/physics in our country	0 (0.0)	17 (6.9)	7 (2.4)
To provide guiding services in the high school working much more	10 (11.8)	46 (18.8)	32 (10.8)
To make changes in our education system (especially high school program)	4 (4.7)	23 (9.4)	14 (4.7)
To make need assessment of the our country about the physics teachers	6 (7.1)	0 (0.0)	0 (0.0)
To educate quality physics teachers for being good models for students	3 (3.5)	15 (6.1)	8 (2.7)
To make research studies about why the students do not like physics and succeed in physics	0 (0.0)	0 (0.0)	1 (0.3)
To choose the university department/program wanting to receive education after one year university education	2 (2.4)	0 (0.0)	0 (0.0)
Do not orient the successful high school students to Physics Teacher Education Program	0 (0.0)	13 (5.3)	27 (9.1)

4.1.1.2 Characteristics of Students Chosen Physics Teacher Education Program

Question 4.1 in the PPTQ-1, Question 3.1 in the PPTQ-2, and Question 13.1 in the LQ were asked to learn what characteristics of the students chosen Physics Education Program supposed to have. The results are shown in Table 4.7.

Table 4.7 Opinions of the Lecturers and the Pre-service Physics Teachers about Which Characteristics the Students Chosen to Physics Teacher Education Program Should Have

Characteristics	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
To love teaching carrier	81 (95.3)	227 (92.7)	266 (89.6)
To love learning and teaching	78 (91.8)	215 (87.8)	265 (89.2)
To love people	64 (75.3)	126 (51.4)	147 (49.5)
To have positive individuality characteristics	61 (71.8)	131 (53.5)	163 (54.9)
To be an idealist	57 (67.1)	136 (55.5)	182 (61.3)
To be a researcher	74 (87.1)	192 (78.4)	244 (82.2)
To be a hard-worker	71 (83.5)	149 (60.8)	207 (69.7)
To speak and write Turkish correctly and fluently	71 (83.5)	142 (58.0)	163 (54.9)
To have a healthy physical appearance	38 (44.7)	44 (18.0)	46 (15.5)
To have a healthy psychology	62 (72.9)	148 (60.4)	178 (59.9)
To have sufficient science and mathematics knowledge	72 (84.7)	222 (90.6)	258 (86.9)

Results indicate that, the first and the most important characteristic is to love teaching carrier for the lecturers and the pre-service physics teachers. According to

participants, having a healthy physical appearance should be the last characteristics looking for to be a physics teacher.

4.1.1.3 Selection of Students for Physics Teacher Education Program

The lecturers and pre-service physics teachers think that all characteristics given in Table 4.7 are important and necessary to be a good physics teacher. However, today which of them can be measured with university entrance exam. To learn the answer of this question, Question 4.2 in the PPTQ-1, Question 3.2 in the PPTQ-2, and Question 13.2 in the LQ were asked to the lecturers and pre-service teachers. The answers of the participants are shown in Table 4.8.

Table 4.8 Opinions of the Lecturers and the Pre-service Physics Teachers on Which Characteristics can be Measured with University Entrance Exam

Characteristics	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
To love teaching carrier	0 (0.0)	0 (0.0)	0 (0.0)
To love learning and teaching	0 (0.0)	0 (0.0)	0 (0.0)
To love people	0 (0.0)	0 (0.0)	0 (0.0)
To have positive individuality characteristics	0 (0.0)	0 (0.0)	0 (0.0)
To be an idealist	2 (2.4)	5 (2.0)	0 (0.0)
To have a researcher individuality	6 (7.1)	9 (3.7)	7 (2.4)
To be a hard-worker	24 (28.2)	97 (39.6)	105 (35.4)
To speak and write Turkish correctly and fluently	10 (11.8)	25 (10.2)	13 (4.4)
To have a healthy physical appearance	4 (4.7)	8 (3.3)	10 (3.4)

Table 4.8 Continued

Characteristics	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
To have a healthy mental	1 (1.2)	14 (5.7)	5 (1.7)
To have sufficient science and mathematics knowledge	49 (57.6)	168 (68.6)	182 (61.3)
None of the characteristics	17 (20.0)	33 (13.5)	67 (22.6)

The results show that, 57.6 % of the lecturers, 68.6 % of the pre-service physics teachers in 5 years program, and 61.3 % of the pre-service physics teachers in 4+1.5 years program think that only having sufficient science and mathematics knowledge could be measured with this university entrance exam. 20 % of the lecturers, 13.5 % of the pre-service physics teachers in 5 years program, and 22.6 % of the pre-service physics teachers in 4+1.5 years program state none of the characteristics can be measured.

To learn how these characteristics could be measured, essay type questions; Question 4.3 in the PPTQ-1, Question 3.3 in the PPTQ-2, and Question 13.3 in the LQ were asked to the lecturers and pre-service teachers. The suggestions of the participants are shown in Table 4.9.

Table 4.9 Opinions of the Lecturers and the Pre-service Physics Teachers on How These Characteristics can be Measured

Suggestions	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
To ask multiple choice questions (test)	11 (12.9)	9 (3.7)	20 (6.7)
To hold a performance/practice exam	13 (15.3)	21 (8.6)	24 (8.1)
To have an interview	22 (25.9)	32 (13.1)	40 (13.5)
To hold a psychological/individuality test	8 (9.4)	38 (15.5)	41 (13.8)
To ask for a health certificate	1 (1.2)	1 (0.4)	0 (0.0)
Decision of the high school teacher council about the students whether she/he should be a teacher or not	4 (4.7)	9 (3.7)	8 (2.7)
To prepare a detailed personal file for each students about interests, abilities, and academic achievement from elementary school to high school	9 (10.6)	23 (9.4)	34 (11.4)
Each university hold own entrance exam	0 (0.0)	4 (1.6)	3 (1.0)
To make changes in our education system and prepare new university entrance exam according to new system	6 (7.1)	20 (8.2)	18 (6.1)
To choose the university department/program at the second year after one year university education	1 (1.2)	2 (0.8)	0 (0.0)
To get the students from Anatolian Teacher Training High Schools directly	1 (1.2)	1 (0.4)	0 (0.0)

The higher rates in the suggestions of the lecturers successively are having an interview with the students, holding a performance/practice exam, and holding an

exam consist of the multiple choice questions. The higher rates in the suggestions of the pre-service teachers are holding a psychological/individuality test, having an interview, and preparing a detailed personal file for each student about interests, abilities, and academic achievement from elementary school to high school. The results show that the lecturers and pre-service teachers want a university entrance exam consisting of multiple exams and assessing the all education life.

4.1.1.4 Quota of Physics Teacher Education Program

In order to learn better qualified physics teachers can be trained if the quota of Physics Teacher Education Program is decreased, Question 5.1 in the PPTQ-1, Question 4.1 in the PPTQ-2, and Question 14.1 in the LQ were asked. Table 4.10 shows the opinions of the lecturers and pre-service physics teachers on the effects of the quota to the education of better qualified physics teachers.

Table 4.10 Opinions of the Lecturers and the Pre-service Physics Teachers on Effects of Quota to Education of Highly Qualified Physics Teachers

Answers	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Yes	29 (34.1)	114 (46.5)	127 (42.8)
Not Sure	37 (43.5)	81 (33.1)	109 (36.7)
No	15 (17.6)	49 (20.0)	59 (19.9)
Total answers	81 (95.3)	244 (99.6)	295 (99.3)
Missing answers	4 (4.7)	1 (0.4)	2 (0.7)
Total participants	85 (100)	245 (100)	297 (100)

34.1 % of the lecturers and 46.5 % of the pre-service physics teachers in 5 years program, and 42.8 % of the pre-service physics teachers in 4+1.5 years

program think that quota affects the education of the quality physics teachers. To learn the reasons of why the quota is important for education of better qualified physics teachers, essay type questions; Question 5.3 in the PPTQ-1, Question 4.3 in the PPTQ-2, and Question 14.3 in the LQ were asked. The lecturers and the pre-service physics teachers state the reasons; 1) to provide high quality and better education, 2) there are over employment physics teachers in Turkey and they are waiting for the appointment, 3) insufficiency of the universities' physical conditions (laboratory, classrooms, materials, the lecturers), 4) to choose the students who love teaching carrier and physics, are idealist and willing to study in Physics Teacher Education Program.

Question 5.2 in the PPTQ-1, Question 4.2 in the PPTQ-2, and Question 14.2 in the LQ were asked to learn what the quota of the Physics Teacher Education Program should be. The suggestion quota numbers are given in Table 4.11.

Table 4.11 Opinions of the Lecturers and the Pre-service Physics Teachers on Quota of Physics Teacher Education Program

Quota of the Physics Teacher Education Program	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
0	0 (0.0)	9 (3.7)	0 (0.0)
1-10	10 (11.8)	47 (19.2)	58 (19.5)
10-20	28 (32.9)	97 (39.6)	125 (42.1)
20-30	34 (40.0)	67 (27.3)	80 (26.9)
30- above	5 (5.9)	17 (6.9)	24 (8.1)
Total answers	77 (90.6)	237 (96.7)	287 (96.6)
Missing answers	8 (9.4)	8 (3.3)	10 (3.4)
Total participants	85 (100)	245 (100)	297 (100)

The higher rates of the lecturers think that the quota should be between 20 and 30. However, higher rates of the pre-service physics teachers think that the quota

should be between 10 and 20. The quotas of Physics Teacher Education Programs in Turkish universities are given in Table 2.1 and it shows that the quotas of the Physics Teacher Education Programs are between 30 and 40. The results show that the lecturers and the pre-service physics teachers want the quota to be decreased.

4.1.2 The Problems Occurred During Physics Teacher Education Program

4.1.2.1 Physics Subject Matter Knowledge

In this part, the answer of the question whether the Physics Teacher Education Program can respond the students' necessities on physics subject matter knowledge was investigated.

Question 12 in the PPTQ-1, Question 11 in the PPTQ-2, and Question 21 in the LQ were asked to learn whether Pyhsics Teacher Education Program can cause the pre-service physics teachers to gain effencies in physics subjects matter knowledge which are determined by Ministry of National Education (see Appendix A). The results are given in Table 4.12. The results show that, both the lecturers and the pre-service physics teachers choose 'Not Sure' response for all questions. Therefore, 'Not Sure' answer might be determined as zero point to make analysis. Both the lecturers and the pre-service physics teachers state that 'To produce knowledge doing research on physics', 'To use the methods which engourage the students for asking questions concerning the physics', 'To use the methods which encourage the students for recognizing the opinions related to physics from different perspectives', 'To use the methods which encourage the students for producing knowledge on physics', and 'To design experiments which provide students' knowledge and skills to associate physics with different subjects' can not be gained.

Moreover, the pre-service physics teachers state that ‘To explain different research methods’ can not be gained.

Table 4.12 Opinions of lhe Lecturers and the Pre-service Physics Teachers on Whether Physics Teacher Education Program can Respond Students’ Necessities on Physics Subject Matter Knowledge

Efficiencies in physics subject matter knowledge	Lecturers				Pre-service Physics Teachers (5 Years Program)				Pre-service Physics Teachers (4+1.5 Years Program)			
	Yes f (%)	Not Sure f (%)	No f (%)	Total Ans. f (%)	Yes f (%)	Not Sure f (%)	No f (%)	Total Ans. f (%)	Yes f (%)	Not Sure f (%)	No f (%)	Total Ans. f (%)
To explain basic physics knowledge, concepts, and principles in different ways	23 27.1	59 69.4	3 3.5	85 100	81 33.1	125 51	39 15.9	245 100	93 31.3	146 49.2	58 19.5	297 100
To produce knowledge doing research on physics	10 11.8	49 57.6	26 30.6	85 100	36 14.7	108 44.1	101 41.4	245 100	53 17.8	120 40.4	124 41.8	297 100
To choose and assess the teaching resources	21 24.7	57 67.1	7 8.2	85 100	66 26.9	105 42.9	74 30.2	245 100	65 21.9	168 56.6	64 21.5	297 100
To use the methods which encourage the students for asking questions concerning the physics	14 26.5	54 63.5	17 20.0	85 100	54 22.0	111 45.3	80 32.7	245 100	63 21.2	140 47.1	94 31.6	297 100

Table 4.12 Continued

Efficiencies in physics subject matter knowledge	Lecturers				Pre-service Physics Teachers (5 Years Program)				Pre-service Physics Teachers (4+1.5 Years Program)			
	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans
	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %
To use the methods which encourage the students for recognizing the opinions related to physics from different perspectives	12 14.1	54 63.5	19 22.4	85 100	38 15.5	109 44.5	98 40.0	245 100	56 18.9	131 44.1	110 37.0	297 100
To use the methods which encourage the students for producing knowledge on physics	15 17.6	51 60.0	19 22.4	85 100	36 14.7	115 46.9	94 38.4	245 100	42 14.1	144 48.5	111 37.4	297 100
To explain the different learning methods	25 29.4	52 61.2	8.0 9.4	85 100	78 31.8	104 42.4	63 25.7	245 100	97 32.7	119 40.1	81 27.3	297 100
To explain the different research methods	19 22.4	56 65.9	10 11.8	85 100	52 21.2	115 46.9	78 31.8	245 100	77 25.9	141 47.5	79 26.6	297 100
To recognize the problems concerning the physic	22 25.9	55 64.7	8 9.4	85 100	85 34.7	122 49.8	38 15.5	245 100	107 36.0	144 48.5	46 15.5	297 100
To search solutions to the problems concerning the physics	24 28.2	50 58.8	11 12.9	85 100	72 29.4	122 49.8	51 20.8	245 100	95.0 32.0	150 50.5	52 17.5	297 100
To choose the correct solution to the problems concerning the physics	18 21.2	58 68.2	9 10.6	85 100	72 29.4	126 51.4	47 19.2	245 100	89 30.0	158 53.2	50 16.8	297 100

Table 4.12 Continued

Efficiencies in physics subject matter knowledge	Lecturers				Pre-service Physics Teachers (5 Years Program)				Pre-service Physics Teachers (4+1.5 Years Program)			
	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans
	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %
To apply the correct solution to the problems concerning the physics	20 23.5	52 61.2	13 15.3	85 100	63 25.7	130 53.1	52 21.2	245 100	84 28.3	160 53.9	53 17.8	297 100
To assess the correct solution to the problems concerning the physics	11 12.9	61 71.8	13 15.3	85 100	59 24.1	129 52.7	57 23.3	245 100	77 25.9	154 51.9	66 22.2	297 100
To design experiments which provide students' knowledge and skills to associate physics with different subjects	3 3.5	45 52.9	37 43.5	85 100	36 14.7	110 44.9	99 40.4	245 100	39 13.1	128 43.1	130 43.8	297 100

In order to learn on which physics subjects the students' knowledge level is insufficient, Question 6 in the PPTQ-1, Question 5 in the PPTQ-2, and Question 15 in the LQ were asked. The answers of the lecturers and pre-service physics teachers are shown in Table 4.13. The results show that the highest rates of the lecturers and the pre-service physics teachers think that the pre-service physics teachers are insufficient on astronomy. Moreover, the lecturers think that the pre-service teachers are insufficient on pyhsics at high school level and physics laboratory activities at high school level, too. However, the pre-service teachers think different. According to them they are insufficient on waves and electricity-magnetism.

Table 4.13 Opinions of the Lecturers and the Pre-service Physics Teachers on Which Physics Subjects Students are Insufficient

Physics Subjects	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Matter and properties	13 (15.3)	18 (7.3)	25 (8.4)
Electricity and Magnetism	31 (36.5)	95 (38.8)	76 (25.6)
Waves	33 (38.8)	102 (41.6)	85 (28.6)
Optics	26 (30.6)	27 (11.0)	28 (9.4)
Mechanics	18 (21.2)	41 (16.7)	19 (6.4)
Modern Physics	39 (45.9)	88 (35.9)	65 (21.9)
Thermodynamic	37 (43.5)	61 (24.9)	86 (29.0)
Astronomy	47 (55.3)	156 (63.7)	218 (73.4)
Physics at high school level	40 (47.1)	49 (20.0)	60 (20.2)
Physics laboratory activities at high school level	39 (45.9)	49 (20.0)	70 (23.6)

Question 9.1 in the PPTQ-1, Question 8.1 in the PPTQ-2, and Question 18.1 in the LQ were asked to learn the reasons why the pre-service physics teachers are insufficient on physics subject matter knowledge. Table 4.14 shows the reasons.

Table 4.14 Reasons of the Pre-service Physics Teachers Being Insufficient on Physics Subject Matter Knowledge

Reasons	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
The subjects of the lessons are too much abstract and the students can not understand	37 (43.5)	103 (42.0)	88 (29.6)
The students try to memorize the physics subjects which they can not understand	62 (72.9)	106 (43.3)	88 (29.6)
The lessons are teached very theoretical	42 (49.4)	152 (62.0)	172 (57.9)
Sufficient time is not spared for the application in the lessons	36 (42.4)	135 (55.1)	153 (51.5)
Experienced teachers are not brought into the classroom and model applications are not done in the classroom	32 (37.6)	106 (43.3)	132 (44.4)

Table 4.14 Continued

Reasons	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Different teaching methods are not used in the lessons	44 (51.8)	161 (65.7)	153 (51.5)
Different measurement-assessment techniques are not used in the lessons	31 (36.5)	136 (55.5)	109 (36.7)
Examples from the daily life are not given teaching the lesson	38 (44.7)	108 (44.1)	109 (36.7)
The students do not have sufficient mathematics background	45 (52.9)	34 (13.9)	38 (12.8)
The students do not have ability of analytical thinking	46 (54.1)	29 (11.8)	29 (9.8)
The students do not understand the three dimensional drawings	38 (44.7)	25 (10.2)	49 (16.5)
The students do not interpret the graphs	46 (54.1)	21 (8.6)	26 (8.8)
The students do not have sufficient physics background	32 (37.6)	40 (16.3)	40 (13.5)
The students have misconceptions but they can not correct them	43 (50.6)	53 (21.6)	57 (19.2)
The students do not understand the lessons because the lessons are teached in foreign language	13 (15.3)	35 (14.3)	11 (3.7)
The content of the lessons is too much	27 (31.8)	97 (39.6)	99 (33.3)
The students do not believe the lessons are necessary for being a physics teacher	33 (38.8)	89 (36.3)	70 (23.6)
The students do not give sufficient importance to the lessons	33 (38.8)	35 (14.3)	41 (13.8)
The students do not believe they will be appointed	4 (4.7)	0 (0.0)	0 (0.0)
The students do not get sufficient background knowledge from the high schools	1 (1.2)	0 (0.0)	0 (0.0)

Results show that, the highest rate of the lecturers state the students are insufficient because they try to memorize the physics subjects which they can not understand and do not have a good grasp of the physics subjects. The highest rate of the pre-service physics teachers in 5 years program state they are unsuccessful because different teaching methods are not used in the lessons. The highest rate of

the pre-service physics teachers in 4+1.5 years program state they are unsuccessful because the lessons are taught very theoretically.

In order to learn whether physics lessons are sufficient from the theoretical and application point of view, Question 22.1 and 22.3 in the PPTQ-1 were asked. The answers of the pre-service physics teachers are shown in Table 4.15.

Table 4.15 Opinions of the Pre-service Physics Teachers about Physics Lessons

Participants			Theory	Application
Pre-service Physics Teachers (5 Years Program)	Yes	f (%)	96 (39.2)	17 (6.9)
	Not Sure	f (%)	96 (39.2)	118 (48.2)
	No	f (%)	35 (14.3)	93 (38.0)
	Total answers	f (%)	227 (92.7)	228 (93.1)
	Missing answers	f (%)	18 (7.3)	17 (6.9)
	Total participants	f (%)	245 (100)	245 (100)

14.3 % of the pre-service physics teachers think that physics subject lessons are not sufficient with regard to theoretical point of view. Essay type question; Question 22.2 in the PPTQ-1 was asked to learn the reasons why they think so. They reveal the reasons under seven titles: 1) Lessons' level are very high, the contents are very abstract, and the subjects do not consists of the high school physics subjects; 2) Memorization oriented education is done; 3) The subjects are slurred over and are not comprehended; 4) The lecturers use classical teaching methods in the lessons and do not improve themselves; 5) The students are not oriented to search; 6) The physical conditions of the faculties are not sufficient; 7) There are not enough the lecturers.

38 % of the pre-service physics teachers think that physics subject lessons are not sufficient with regard to application point of view. Essay type question; Question 22.4 in the PPTQ-1 was asked to learn the reasons why they think so. They reveal the reasons under five titles: 1) The laboratories are worn out and they are insufficient through the materials; 2) The number of the laboratories is inadequate so they can not carry out experiments; 3) The experiments are too advance, not at high school level, and so they are done in a haphazard; 4) Daily application of the subjects are not consisted in the lessons; 5) Inadequacy of the lecturers especially research assistants in the laboratories.

Essay type questions; Question 13.1 and 13.2 in the PPTQ-1 were asked to learn which teaching methods were used in the physics lessons and which teaching methods the pre-service physics teachers want to be used. The results are given in Table 4.16. The results show that the classical teaching method, lecture, is most used by the lecturers in the physics lessons. However, 60 % of the pre-service physics teachers want the lecturers to use all of the teaching methods.

Table 4.16 Opinions of the Pre-service Physics Teachers which Teaching Methods They Want to be Used in Physics Lessons

Teaching Methods	Pre-service Physics Teachers (5 Years Program)	
	Using Teaching Methods *f (%)*	Teaching Methods Want to be used *f (%)*
Lecture	158 (64.5)	24 (9.8)
Inquiry	7 (2.9)	27 (11.0)
Problem based instruction	1 (0.4)	2 (0.8)
Question-Answer	22 (9)	23 (9.4)
Discussion	1 (0.4)	18 (7.3)
Presentation	27 (11.0)	20 (8.2)

Table 4.16 Continued

Teaching Methods	Pre-service Physics Teachers (5 Years Program)	
	Using Teaching Methods *f (%)*	Teaching Methods Want to be used *f (%)*
Brainstorming	1 (0.4)	10 (4.1)
Role Play	0 (0.0)	1 (0.4)
Project	1 (0.4)	25 (10.2)
Experimental	27 (11.0)	44 (18.0)
Cooperative Learning	0 (0.0)	3 (1.2)
Case study	0 (0.0)	1 (0.4)
Computer-assisted education	0 (0.0)	3 (1.2)
Visual instruction	0 (0.0)	3 (1.2)
Student centered learning	6 (2.4)	23 (9.4)
Memorization	11 (4.5)	1 (0.4)
Excursion-Observation	0 (0.0)	4 (1.6)
All of the teaching methods	0 (0.0)	148 (60.4)

In order to learn which measurement and evaluation techniques are used in the physics lessons and which measurement and evaluation techniques the pre-service physics teachers want to be used, essay type questions; Question 13.3 and 13.4 in the PPTQ-1 were asked. The answers of the pre-service physics teachers are shown in Table 4.17. The results show that essay type questions in the midterm and final exams are most used by the lecturers in the physics lessons. Moreover, pre-service physics teachers want the lecturers to use this method, too.

Table 4.17 Opinions of the Pre-service Physics Teachers which Measurement and Evaluation Techniques They Want to be Used in Physics Lessons

Measurement and Assessment Techniques	Pre-service Physics Teachers (5 Years Program) Using techniques *f (%)*	Pre-service Physics Teachers (5 Years Program) Techniques Want to be Used *f (%)*
Essay type questions	148 (60.4)	55 (22.4)
Multiple choice questions (test)	29 (11.8)	21 (8.6)
Presentation	8 (3.3)	17 (6.9)
Carry out a project	6 (2.4)	25 (10.2)
Assessment of the participant to lesson	3 (1.2)	10 (4.1)
Oral examination	4 (1.6)	6 (2.4)
Preparing a portfolio	2 (0.8)	10 (4.1)
Homework	5 (2.0)	13 (5.3)
Quiz	0 (0.0)	2 (0.8)
All of the techniques/ Different techniques	0 (0.0)	12 (4.9)

4.1.2.2 General Pedagogical Knowledge

In this part, the answer of the question whether the Physics Teacher Education Program can respond the students' necessity on general pedagogical knowledge was investigated.

Question 12 in the PPTQ-1, Question 11 in the PPTQ-2, and Question 21 in the LQ were asked to learn whether Pyhsics Teacher Education Program can cause the pre-service physics teachers to gain effencies in general pedagogical knowledge which are determined by Ministry of National Educatiom (see Appendix A) . The results are given in Table 4.18. The results show that, both the lecturers and the pre-service physics teachers choose 'Not Sure' response for all questions. Therefore, 'Not Sure' answer might be determined as zero point to make analysis. Both the lecturers and the pre-service physics teachers state that 'To recognize students'

physical, mental, emotional, and psycho-motor characteristics', To recognize students' learning methods', To follow individual development of the students and help solving the problems of them', and 'To guide the students about being successful on the physics' can not be gained.

Table 4.18 Opinions of the Lecturers and the Pre-service Physics Teachers on Whether Physics Teacher Education Program can Respond Students' Necessities on General Pedagogical Knowledge

Efficiencies in general pedagogical knowledge	Lecturers				Pre-service Physics Teachers (5 Years Program)				Pre-service Physics Teachers (4+1.5 Years Program)			
	Yes	Not Sure	No	Total Ans.	Yes	Not Sure	No	Total Ans.	Yes	Not Sure	No	Total Ans.
	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %
To recognize students' physical, mental, emotional, and psycho-motor characteristics	10 11.8	59 69.4	16 18.8	85 100	55 22.4	94 38.4	96 39.2	245 100	85 28.6	123 41.4	89 30	297 100
To recognize students' learning methods	10 11.8	54 63.5	21 24.7	85 100	57 23.3	99 40.4	89 36.3	245 100	87 29.3	117 39.4	93 31.3	297 100
To determine the aim, content, and teaching method of the instruction	21 24.7	61 71.8	3 3.5	85 100	71 29	129 52.7	45 18.4	245 100	107 36	142 47.8	48 16.2	297 100
To determine and develop instructional material	26 30.6	54 63.5	5 5.9	85 100	76 31	129 52.7	40 16.3	245 100	108 36.4	139 46.8	50 16.8	297 100
To make yearly, unit, daily, and experiment plan	42 49.4	38 44.7	5 5.9	85 100	110 44.9	98 40	37 15.1	245 100	148 49.8	117 39.4	32 10.8	297 100

Table 4.18 Continued

Efficiencies in general pedagogical knowledge	Lecturers				Pre-service Physics Teachers (5 Years Program)				Pre-service Physics Teachers (4+1.5 Years Program)			
	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans
	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %
To use different teaching methods	22 25.9	60 70.6	3 3.5	85 100	97 39.6	106 43.3	42 17.1	245 100	119 40.1	132 44.4	46 15.5	297 100
To organize instruction media and take security measures	20 23.5	53 62.4	12 14.1	85 100	71 29	120 49	54 22	245 100	81 27.3	151 50.8	65 21.9	297 100
To regulate teaching pace to the students and regulate time	15 17.6	60 70.6	10 11.8	85 100	74 30.2	112 45.7	59 24.1	245 100	97 32.7	139 46.8	61 20.5	297 100
To determine and apply measurement and evaluation techniques appropriate the aim	15 17.6	59 69.4	11 12.9	85 100	74 30.2	132 53.9	39 15.9	245 100	88 29.6	167 56.2	42 14.1	297 100
To follow individual development of the students and help solving the problems of them	11 12.9	52 61.2	22 25.9	85 100	47 19.2	99 40.4	99 40.4	245 100	79 26.6	129 43.4	89 30	297 100
To guide the students about being successful on the physics	11 12.9	55 64.7	19 22.4	85 100	53 21.6	101 41.2	91 37.1	245 100	66 22.2	140 47.1	91 30.6	297 100

In order to learn on which general pedagogical knowledge subjects the students' knowledge level is insufficient, Question 7 in the PPTQ-1, Question 6 in the PPTQ-2, and Question 16 in the LQ were asked. The answers of the lecturers and pre-service physics teachers are shown in Table 4.19.

Table 4.19 Opinions of the Lecturers and the Pre-service Physics Teachers on Which General Pedagogical Knowledge Subjects Students are Insufficient

General Pedagogical Knowledge Subjects	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Recognition the student	33 (38.8)	55 (22.4)	41 (13.8)
Teaching physics	29 (34.1)	30 (12.2)	28 (9.4)
Material development	42 (49.4)	85 (34.7)	115 (38.7)
Guidance	34 (40.0)	68 (27.8)	106 (35.7)
Instructional planning	29 (34.1)	60 (24.5)	65 (21.9)
Instruction and classroom management	36 (42.4)	52 (21.2)	53 (17.8)
Instructional measurement and evaluation	43 (50.6)	50 (20.4)	50 (16.8)

The results show that the highest rate of the lecturers state that pre-service physics teachers are insufficient on instructional measurement and evaluation. However, the highest rate of the pre-service physics teachers state that pre-service physics teachers are unsuccessful on material development.

Question 9.2 in the PPTQ-1, Question 8.2 in the PPTQ-2, and Question 18.2 in the LQ were asked to learn the reasons why the pre-service physics teachers are insufficient on general pedagogical knowledge lessons. Table 4.20 shows the responses. Results indicate that, the highest rate of the both the lecturers and the pre-service physics teachers in 5 years program state that pre-service physics teachers are insufficient on general pedagogical knowledge lessons because experienced teachers are not brought into the classroom and model applications are not done in the classroom. Moreover, the highest rate of the pre-service teachers in 4+1.5 years program state that the students try to memorize the general pedagogical knowledge subjects which they can not understand. 36.5 % of the lecturers think that the

students do not give sufficient importance to the general pedagogical knowledge subjects.

Table 4.20 Reasons of the Pre-service Physics Teachers Being Insufficient on General Pedagogical Knowledge Lessons

Reasons	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
The subjects of the lessons are too much abstract and the students can not understand	11 (12.9)	25 (10.2)	43 (14.5)
The students try to memorize the general education subjects which they can not understand	28 (32.9)	80 (32.7)	105 (35.4)
The lessons are teached very theoretical	27 (31.8)	65 (26.5)	54 (18.2)
Sufficient time is not spared for the application in the lessons	19 (22.4)	62 (25.3)	54 (18.2)
Experienced teachers are not brought into the classroom and model applications are not done in the classroom	33 (38.8)	97 (39.6)	104 (35.0)
Different teaching methods are not used in the lessons	26 (30.6)	74 (30.2)	88 (29.6)
Different measurement-assessment techniques are not used in the lessons	24 (28.2)	62 (25.3)	81 (27.3)
Examples from the daily life are not given teaching the lesson	14 (16.5)	26 (10.6)	32 (10.8)
The students do not have sufficient mathematics background	7 (8.2)	10 (4.1)	14 (4.7)
The students do not have ability of analytical thinking	7 (8.2)	6 (2.4)	16 (5.4)
The students do not understand the three dimensional drawings	3 (3.5)	4 (1.6)	6 (2.0)
The students do not interpret the graphs	4 (4.7)	4 (1.6)	7 (2.4)
The students do not have sufficient physics background	3 (3.5)	4 (1.6)	11 (3.7)
The students have misconceptions but they can not correct them	14 (16.5)	16 (6.5)	37 (12.5)
The students do not understand the lessons because the lessons are teached in foreign language	6 (7.1)	17 (6.9)	3 (1.0)
The content of the lessons is too much	11 (12.9)	35 (14.3)	42 (14.1)
The students do not believe the lessons are necessary for being a physics teacher	17 (20.0)	34 (13.9)	53 (17.8)
The students do not give sufficient importance to the lessons	31 (36.5)	40 (16.3)	56 (18.9)
The students do not believe they will be appointed	3 (3.5)	0 (0.0)	0 (0.0)
The students do not get sufficient background knowledge from the high schools	1 (1.2)	0 (0.0)	0 (0.0)

In order to learn on whether general pedagogical knowledge lessons are sufficient from the theoretical and application point of view, Question 22.5 and 22.7 in the PPTQ-1 and Question 12.1 and 12.3 in PPTQ-2 were asked. The answers of the pre-service physics teachers are shown in Table 4.21.

Table 4.21 Opinions of Pre-service Physics Teachers about General Pedagogical Knowledge Lessons

Participants			Theory	Application
Pre-service Physics Teachers (5 Years Program)	Yes	f (%)	107 (43.7)	49 (20.0)
	Not Sure	f (%)	86 (35.1)	89 (36.3)
	No	f (%)	20 (8.2)	72 (29.4)
	Total answers	f (%)	213 (86.9)	210 (85.7)
	Missing answers	f (%)	32 (13.1)	35 (14.3)
	Total participants	f (%)	245 (100)	245 (100)
Pre-service Physics Teachers (4+1.5 Years Program)	Yes	f (%)	128 (43.1)	58 (19.5)
	Not Sure	f (%)	122 (41.1)	145 (48.8)
	No	f (%)	43 (14.5)	91 (30.6)
	Total answers	f (%)	293 (98.7)	294 (99.0)
	Missing answers	f (%)	4 (1.3)	3 (1.0)
	Total participants	f (%)	297 (100)	297 (100)

About 43 % of the pre-service physics teachers in 5 years program and about 56 % of the pre-service physics teachers in 4+1.5 years program gave the answer ‘No’ or ‘Not Sure’. Essay type questions; Question 22.6 in the PPTQ-1 and Question 12.2 in PPTQ-2 were asked to learn the reasons why the lessons are insufficient from

the theoretical point of view. They revealed the reasons under four titles: 1) Processing of the lessons. The pre-service teachers state that rote learning is done in the lessons, different teaching methods are not used and so lessons are very boring, examples from daily life related to subject are not given by the lecturers, information about how teaching methods are applied on the physics subjects are not given, the subjects are teached too abstract, the pre-service teachers only present the subjects and the lecturers do not give information sufficiently, lessons time is not enough to comprehend the subjects. 2) Content of the lessons. The pre-service physics teachers stated that the lessons are too theoretical and intense, there are not lessons oriented to high school physics, and the lessons do not meet necessities of the pre-service teachers. 3) Inadequacy of the lecturers from the numbers and qualities. 4) Inadequacy of the universities' physical conditions; physics laboratories, computer laboratories, classrooms, technological equipments.

About 66 % of the pre-service physics teachers in 5 years program and about 79 % of the pre-service physics teachers in 4+1.5 years program gave the answer 'No' or 'Not Sure'. Essay type questions; Question 22.8 in the PPTQ-1 and Question 12.4 in PPTQ-2 were asked to learn the reasons why the lessons are insufficient from the application point of view. They revealed the reasons under seven titles: 1) Only having practicing chance in the practice high schools. 2) Inadequacy of the practice high schools' physical conditions. The pre-service teachers state that the classroom are too crowded, the mentors have negative attitudes towards the pre-service teachers, they do not practice sufficiently, the mentors and the supervisors do not give feedback about the presentations, the physics laboratories of the high schools are insufficient. 3) Not giving importance to high school practice. 4) Not putting into

practices oriented to high school physics. 5) Not making model presentations by the lecturers. 6) Inadequacy of the lecturers from the numbers and qualities. 7) Inadequacy of the universities' physical conditions.

Essay type questions; Question 14.1 and 14.2 in the PPTQ-1, Questions 13.1 and 13.2 in the PPTQ-2 were asked to learn which teaching methods are used in the general pedagogical knowledge lessons and which teaching methods the pre-service physics teachers want to be used. The results are given in Table 4.22. The results show that the lecture is the most used teaching method by the lecturers in general pedagogical knowledge lessons. Pre-service physics teachers in 5 years education program want to be used making presentation and lecture teaching methods and pre-service physics teachers in 4+1.5 years program want to be used lecture and experimental teaching methods much more than the others.

Table 4.22 Opinions the Pre-service Physics Teachers which Teaching Methods They Want to be Used in General Pedagogical Knowledge Lessons

Teaching Methods	Pre-service Physics Teachers (5 Years Program)		Pre-service Physics Teachers (4+1.5 Years Program)	
	Using teaching methods *f (%)*	Teaching Methods Want to Used *f (%)*	Using teaching methods *f (%)*	Teaching Methods Want to be Used *f (%)*
Lecture	106 (43.3)	25 (10.2)	148 (49.8)	39 (13.1)
Inquiry	3 (1.2)	8 (3.3)	4 (1.3)	10 (3.4)
Problem based instruction	1 (0.4)	0 (0.0)	0 (0.0)	0 (0.0)
Question-Answer	20 (8.2)	14 (5.7)	38 (12.8)	27 (9.1)
Discussion	19 (7.8)	21 (8.6)	15 (5.1)	24 (8.1)
Presentation	41 (16.7)	30 (12.2)	34 (11.4)	26 (8.8)
Role Play	0 (0.0)	4 (1.6)	0 (0.0)	3 (1.0)
Brainstorming	2 (0.8)	3 (1.2)	3 (1.0)	9 (3.0)
Project	12 (4.9)	15 (6.1)	7 (2.4)	17 (5.7)
Experimental	3 (1.2)	2 (0.8)	17 (5.7)	33 (11.1)
Cooperative Learning	6 (2.4)	4 (1.6)	7 (2.4)	1 (0.3)
Case study	2 (0.8)	11 (4.5)	2 (0.7)	6 (2.0)

Table 4.22 Continued

Teaching Methods	Pre-service Physics Teachers (5 Years Program)		Pre-service Physics Teachers (4+1.5 Years Program)	
	Using teaching methods *f (%)*	Teaching Methods Want to Used *f (%)*	Using teaching methods *f (%)*	Teaching Methods Want to be Used *f (%)*
Computer-assisted education	2 (0.8)	3 (1.2)	0 (0.0)	0 (0.0)
Visual instruction	0 (0.0)	1 (0.4)	0 (0.0)	1 (0.3)
Student centred learning	9 (3.7)	17 (6.9)	14 (4.7)	25 (8.4)
Memorization	6 (2.4)	0 (0.0)	4 (1.3)	0 (0.0)
Excursion-Observation	2 (0.8)	2 (0.8)	0 (0.0)	0 (0.0)
All of the teaching methods	11 (4.5)	20 (8.2)	7 (2.4)	38 (12.8)

In order to learn which measurement and evaluation techniques are used in the general pedagogical knowledge lessons and which measurement and evaluation techniques the pre-service physics teachers want to be used, essay type questions; Questions 14.3, 14.4 in the PPTQ-1, and Questions 13.3, 13.4 in the PPTQ-2 were asked. The answers of the pre-service physics teachers are shown in Table 4.23. The results show that essay type questions in the midterm and final exams are most used by the lecturers in the general education lessons. Moreover, pre-service physics teachers want the lecturers to use classical techniques multiple choices questions and essay type questions in the midterms and final exams, too.

Table 4.23 Opinions of the Pre-service Physics Teachers which Measurement and Evaluation Techniques They Want to be Used in General Pedagogical Knowledge Lessons

Measurement and Assessment Techniques	Pre-service Physics Teachers (5 Years Program) Using techniques *f (%)*	Pre-service Physics Teachers (5 Years Program) Techniques Want to be Used *f (%)*	Pre-service Physics Teachers (4+1.5 Years Program) Using techniques *f (%)*	Pre-service Physics Teachers (4+1.5 Years Program) Techniques Want to be Used *f (%)*
Essay type questions	85 (34.7)	33 (13.5)	116 (39.1)	36 (12.1)
Multiple choice questions (test)	65 (26.5)	44 (18.0)	69 (23.2)	53 (17.8)
Presentation	14 (5.7)	13 (5.3)	23 (7.7)	21 (7.1)
Carry out a project	17 (6.9)	19 (7.8)	12 (4.0)	25 (8.4)
Assessment of the participant to lesson	7 (2.9)	6 (2.4)	0 (0.0)	4 (1.3)
Oral examination	0 (0.0)	1 (0.4)	5 (1.7)	0 (0.0)
Preparing a portfolio	5 (2.0)	8 (3.3)	0 (0.0)	2 (0.7)
Homework	20 (8.2)	11 (4.5)	25 (8.4)	14 (4.7)
Quiz	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
All of the techniques	8 (3.3)	13 (5.3)	5 (1.7)	23 (7.7)

4.1.2.3 General Knowledge

In this part, the answer of the question whether the Physics Teacher Education Program can respond the students' necessities on general knowledge was investigated.

Question 12 in the PPTQ-1, Question 11 in the PPTQ-2, and Question 21 in the LQ were asked to learn whether Pyhsics Teacher Education Program can cause the pre-service physics teachers to gain effencies in general knowledge which are

determined by Ministry of National Educatiom (see Appendix A) . The results are given in Table 4.24. The results show that, both the lecturers and the pre-service physics teachers choose 'Not Sure' response for all questions. Therefore, 'Not Sure' answer might be determined as zero point to make analysis. Both the lecturers and the pre-service physics teachers state that 'To explain events and facts using different disciplines', 'To benefit from the other disciplines in teacing process for analyses, 'To benefit from the other disciplines in teaching process for syntheses can not be gained. Moreover, the lecturers state that 'To reach a decision on one's own' can not be gained'. The pre-service physics teachers in 5 years program state that 'To establish relastionship between the physics and the other disciplines' and 'To benefit from the other disciplines in teaching process for giving examples' can not be gained.

Table 4.24 Opinions of the Lecturers and the Pre-service Physics Teachers on Whether Physics Teacher Education Program can Respond Students' Necessities on General Knowledge

Efficiencies in general knowledge subjects	Lecturers				Pre-service Physics Teachers (5 Years Program)				Pre-service Physics Teachers (4+1.5 Years Program)			
	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans
	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %
To explain events and facts using different disciplines	9 10.6	54 63.5	22 25.9	85 100	46 18.8	138 56.3	61 24.9	245 100	66 22.2	157 52.9	74 24.9	297 100
To establish relationship between the physics and the other disciplines	13 15.3	59 69.4	13 15.3	85 100	46 18.8	132 53.9	67 27.3	245 100	75 25.3	150 50.5	72 24.2	297 100

Table 4.24 Continued

Efficiencies in general knowledge subjects	Lecturers				Pre-service Physics Teachers (5 Years Program)				Pre-service Physics Teachers (4+1.5 Years Program)			
	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans	Yes	Not Sure	No	Tot. Ans
	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %	f %
To prepare and motivate the students to lesson	18 21.2	65 76.5	2 2.4	85 100	86 35.1	117 47.8	42 17.1	245 100	100 33.7	140 47.1	57 19.2	297 100
To benefit from the other disciplines in teaching process for giving examples	14 16.5	60 70.6	11 12.9	85 100	50 20.4	136 55.5	59 24.1	245 100	78 26.3	151 50.8	68 22.9	297 100
To benefit from the other disciplines in teaching process for comparison and distinction	12 14.1	62 72.9	11 12.9	85 100	50 20.4	123 50.2	72 29.4	245 100	65 21.9	162 54.5	70 23.6	297 100
To benefit from the other disciplines in teaching process for analysis	8 9.4	61 71.8	16 18.8	85 100	51 20.8	122 49.8	72 29.4	245 100	51 17.2	166 55.9	80 26.9	297 100
To benefit from the other disciplines in teaching process for synthesis	10 11.8	58 68.2	17 20	85 100	50 20.4	117 47.8	78 31.8	245 100	49 16.5	159 53.5	89 30	297 100
To discuss the problems from different dimensions	10 11.8	64 75.3	11 12.9	85 100	56 22.9	128 52.2	61 24.9	245 100	80 26.9	148 49.8	69 23.2	297 100
To determine the solution alternatives for the problem, choose the best one, and apply it	11 12.9	63 74.1	11 12.9	85 100	59 24.1	134 54.7	52 21.2	245 100	83 27.9	161 54.2	53 17.8	297 100
To follow and assess the process when face to problem	11 12.9	62 72.9	12 14.1	85 100	60 24.5	120 49	65 26.5	245 100	82 27.6	143 48.1	72 24.2	297 100
To reach a decision on one's own	10 11.8	61 71.8	14 16.5	85 100	76 31	116 47.3	53 21.6	245 100	87 29.3	147 48.8	65 21.9	297 100

In order to learn on which general knowledge subjects students' knowledge level is insufficient, Question 8 in the PPTQ-1, Question 7 in the PPTQ-2, and Question 17 in the LQ were asked. The answers of the lecturers and pre-service physics teachers are shown in Table 4.25.

Table 4.25 Opinions of the Lecturers and the Pre-service Physics Teachers on which General Knowledge Subjects Students are Insufficient

General Knowledge Subjects	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Turkish/Literature	54 (63.5)	42 (17.1)	52 (17.5)
History	36 (42.4)	103 (42.0)	152 (51.2)
Sociology	30 (35.3)	126 (51.4)	124 (41.8)
Fine arts	34 (40.0)	124 (50.6)	151 (50.8)
The art of public speaking	57 (67.1)	64 (26.1)	55 (18.5)
Philosophy	46 (54.1)	130 (53.1)	140 (47.1)
Psychology	36 (42.4)	63 (25.7)	73 (24.6)
Others (Law Constitution)	0 (0.0)	0 (0.0)	5 (1.7)

The results show that the lecturers and the pre-service physics teachers think different. The highest rate of the lecturers thinks that pre-service physics teachers are insufficient on the art of public speaking, the pre-services physics teachers in five years program thinks that they are insufficient on the philosophy, and the pre-service physics teachers in 4+1.5 years program thinks that they are insufficient on history.

Question 9.3 in the PPTQ-1, Question 8.3 in the PPTQ-2, and Question 18.3 in the LQ were asked to learn the reasons why the pre-service physics teachers are insufficient on general knowledge lessons. Table 4.26 shows the reasons.

Table 4.26 Reasons of the Pre-service Physics Teachers Being Insufficient on General Knowledge Lessons

Reasons	Lecturers *f (%)*	Pre-service Physics Teachers (5 Years Program) *f (%)*	Pre-service Physics Teachers (4+1.5 Years Program) *f (%)*
The subjects of the lessons are too much abstract and the students can not understand	6 (7.1)	23 (9.4)	38 (12.8)
The students try to memorize the subjects which they can not understand	15 (17.6)	51 (20.8)	76 (25.6)
The lessons are teached very theoretical	7 (8.2)	36 (14.7)	40 (13.5)
Sufficient time is not spared for the application in the lessons	6 (7.1)	37 (15.1)	45 (15.2)
Experienced teachers are not brought into the classroom and model applications are not done in the classroom	13 (15.3)	49 (20.0)	68 (22.9)
Different teaching methods are not used in the lessons	17 (20.0)	70 (28.6)	65 (21.9)
Different measurement-assessment techniques are not used in the lessons	14 (16.5)	51 (20.8)	47 (15.8)
Examples from the daily life are not given teaching the lesson	7 (8.2)	34 (13.9)	36 (12.1)
The students do not have sufficient mathematics background	2 (2.4)	3 (1.2)	10 (3.4)
The students do not have ability of analytical thinking	4 (4.7)	7 (2.9)	10 (3.4)
The students do not understand the three dimensional drawings	3 (3.5)	5 (2.0)	3 (1.0)
The students do not interpret the graphs	3 (3.5)	3 (1.2)	5 (1.7)
The students do not have sufficient physics background	3 (3.5)	6 (2.4)	5 (1.7)
The students have misconceptions but they can not correct them	6 (7.1)	9 (3.7)	23 (7.7)
The students do not understand the lessons because the lessons are teached in foreign language	3 (3.5)	12 (4.9)	2 (0.7)
The content of the lessons is too much consistent	2 (2.4)	19 (7.8)	28 (9.4)
The students do not believe the lessons are necessary for being a physics teacher	20 (23.5)	37 (15.1)	43 (14.5)
The students do not give sufficient importance to the lessons	23 (27.1)	42 (17.1)	58 (19.5)
The students do not believe they will be appointed	3 (3.5)	0 (0.0)	0 (0.0)
The students do not get sufficient background knowledge from the high schools	2 (2.4)	0 (0.0)	0 (0.0)

Results indicate that the lecturers and the pre-service physics teachers think different about the reasons of insufficiency of the pre-service physic teachers on

general knowledge. The highest rate of the lecturers states that the students are unsuccessful because they do not attach sufficient importance to the lessons. The highest rate of the pre-service physics teachers in 5 years program states that they are unsuccessful because different teaching methods are not used in the lessons. The highest rate of the pre-service physics teachers in graduate without thesis program states that they are unsuccessful because they try to memorize the subjects which they can not understand.

In order to learn on whether general knowledge lessons are sufficient from the theoretical and application point of view, Question 22.9 and 22.11 in the PPTQ-1 were asked. The answers of the pre-service physics teachers are shown in Table 4.27.

Table 4.27 Opinions of the Pre-service Physics Teachers about General Knowledge Lessons

Participants			Theory	Application
Pre-service Physics Teachers (5 Years Program)	Yes	f (%)	42 (17.1)	18 (7.3)
	Not Sure	f (%)	79 (32.3)	60 (24.5)
	No	f (%)	92 (37.6)	134 (54.7)
	Total answers	f (%)	213 (86.9)	212 (86.5)
	Missing answers	f (%)	32 (13.1)	33 (13.5)
	Total participants	f (%)	245 (100)	245 (100)

37.6 % of the pre-service physics teachers think that general knowledge lessons are not sufficient from the theoretical point of view. Essay type question; Question 22.10 in the PPTQ-1 was asked to learn the reasons why they think so.

They reveal the reasons under five titles: 1) The numbers of the general knowledge lessons are few and they have to be increased. 2) The content is changed according the lecturers and the lessons are generally boring. 3) Rote learning is done in the lessons. 4) Following the lessons is not compulsory and so they do not. They only enter for the examinations. 5) Sufficient importance is not given the general culture lessons and pre-service teachers look over them as absents.

54.7 % of the pre-service physics teachers think that general knowledge lessons are not sufficient with regard to application point of view. Essay type question; Question 22.12 in the PPTQ-1 was asked to learn the reasons why they think so. They reveal the reasons under five titles: 1) Rote learning is done in the lessons and any application is not put into practice. 2) The numbers of the general culture lessons are not sufficient. 3) The lecturers have inadequate qualities. 4) Classical teaching methods are used in the lessons. 5) General knowledge lessons are not necessary for them.

Essay type questions; Question 15.1 and 15.2 in the PPTQ-1 were asked to learn which teaching methods are used in the general knowledge lessons and which teaching methods the pre-service physics teachers want to be used. The results are given in Table 4.28. The results show that the classical teaching method, lecture, is most used by the lecturers in the general knowledge lessons. Moreover, the highest rate of the pre-service physics teachers wants the lecturers to continue using the lecture, too.

Table 4.28 Opinions of the Pre-service Physics Teachers which Teaching Methods They Want to be Used in General Knowledge Lessons

Teaching Methods	Pre-service Physics Teachers (5 Years Program)	
	Using teaching methods *f (%)*	Teaching Methods Want to be Used *f (%)*
Lecture	121 (49.4)	40 (16.3)
Inquiry	0 (0.0)	2 (0.8)
Problem based instruction	0 (0.0)	0 (0.0)
Question-Answer	3 (1.2)	14 (5.7)
Discussion	3 (1.2)	20 (8.2)
Presentation	25 (10.2)	24 (9.8)
Role Play	0 (0.0)	2 (0.8)
Brainstorming	0 (0.0)	0 (0.0)
Project	1 (0.4)	13 (5.3)
Experimental	0 (0.0)	0 (0.0)
Cooperative Learning	0 (0.0)	1 (0.4)
Case study	0 (0.0)	7 (2.9)
Computer-assisted education	0 (0.0)	0 (0.0)
Visual instruction	0 (0.0)	1 (0.4)
Student centered learning	1 (0.4)	13 (5.3)
Memorization	13 (5.3)	0 (0.0)
Excursion-Observation	0 (0.0)	4 (1.6)
All of the teaching methods	1 (0.4)	4 (1.6)

In order to learn which measurement and evaluation techniques are used in the general knowledge lessons and which measurement and evaluation techniques the pre-service physics teachers want to be used, essay type questions; Questions 15.3 and 15.4 in the PPTQ-1 were asked. The answers of the pre-service physics teachers are shown in Table 4.29. The results show that essay type questions in the midterm and final exams are most used by the lecturers in the general knowledge lessons. Moreover, pre-service physics teachers want the lecturers to continue use classical measurement and evaluation techniques, essay type questions and multiple choice questions in the midterms and final exams, too.

Table 4.29 Opinions of the Pre-service Physics Teachers which Measurement and Evaluation Techniques They Want to be Used in General Knowledge Lessons

Measurement and Assessment Techniques	Pre-service Physics Teachers (5 Years Program)	
	Using techniques *f (%)*	Techniques Want to be used *f (%)*
Essay type questions	98 (40)	31 (12.7)
Multiple choice questions (test)	38 (15.5)	43 (17.6)
Presentation	2 (0.8)	7 (2.9)
Carry out a project	2 (0.8)	8 (3.3)
Assessment of the participant to lesson	2 (0.8)	9 (3.7)
Oral examination	0 (0.0)	2 (0.8)
Preparing a portfolio	0 (0.0)	0 (0.0)
Homework	1 (0.4)	7 (2.9)
Quiz	0 (0.0)	0 (0.0)
All of the techniques/ Different techniques	0 (0.0)	5 (2.0)

4.1.2.4 Must and Elective Courses in Physics Teacher Education Program

Question 10 in the PPTQ-1, Question 9 in the PPTQ-2, and Question 19 in the LQ were asked to learn which subjects the lecturers and pre-service physics teachers want to be taken place in Physics Teachers Education Program as must course. The results are given in Table 4.30.

The results show that both the lecturers and the pre-service physics teachers want to be taken place ‘Physics at High School Level’ and ‘Physics Applications at High School Level’ in Physics Teacher Education Program as must courses.

Table 4.30 Opinions of the Lecturers and the Pre-service Physics Teachers which Courses They Want to be Taken Place in Physics Teacher Education Program as Must Course

Lessons	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
History of the Science	50 (58.8)	76 (31.0)	97 (32.7)
Philosophy of the Science	46 (54.1)	57 (23.3)	70 (23.6)
Research Techniques	45 (52.9)	105 (42.9)	148 (49.8)
First Aid	18 (21.2)	47 (19.2)	35 (11.8)
History of Turkish Education	14 (16.5)	21 (8.6)	31 (10.4)
History of Science/Physics Education	46 (54.1)	78 (31.8)	127 (42.8)
Educational Psychology	23 (27.1)	78 (31.8)	99 (33.3)
Educational Sociology	11 (12.9)	31 (12.7)	26 (8.8)
Educational Management	12 (14.1)	42 (17.1)	63 (21.2)
Educational Philosophy	25 (29.4)	47 (19.2)	51 (17.2)
Rattling Good Speech and Diction	39 (45.9)	133 (54.3)	119 (40.1)
Human Rights and Democracy	19 (22.4)	53 (21.6)	50 (16.8)
Physics Applications at High School Level	59 (69.4)	153 (62.4)	196 (66.0)
Physics At High School Level	55 (64.7)	148 (60.4)	187 (63.0)
Health	10 (11.8)	31 (12.7)	21 (7.1)

In order to learn whether elective courses in Physics Education Program are well-qualified and having filled content Question 11.1 in the PPTQ-1, Question 10.1 in the PPTQ-2, and Question 20.1 in the LQ; whether the number of the elective courses are adequate Question 11.2 in the PPTQ-1, Question 10.2 in the PPTQ-2, and Question 20.2 in the LQ; whether the elective courses contain the students' need subjects Question 11.3 in the PPTQ-1, Question 10.3 in the PPTQ-2, and Question 20.3 in the LQ were asked. The answers of the pre-service physics teachers are shown in Table 4.31.

Table 4.31 Opinions of the Lecturers and the Pre-service Physics Teachers about Elective Courses Taken Place in Physics Teacher Education Program

Participants	Answers		Is the elective courses well-qualified?	Is the number of elective courses adequate?	Do the elective courses contain the students' need subjects?
The lecturers	Yes	f (%)	23 (27.1)	15 (17.6)	14 (16.5)
	Not Sure	f (%)	48 (56.5)	29 (34.1)	54 (63.5)
	No	f (%)	12 (14.1)	39 (45.9)	15 (17.6)
	Total answers	f (%)	83 (97.6)	83 (97.6)	83 (97.6)
	Missing answers	f (%)	2 (2.4)	2 (2.4)	2 (2.4)
	Total participants	f (%)	85 (100)	85 (100)	85 (100)
Pre-service Physics Teachers (5 years Program)	Yes	f (%)	38 (15.5)	51 (20.8)	38 (15.5)
	Not Sure	f (%)	118 (48.2)	73 (29.8)	98 (40.0)
	No	f (%)	78 (31.8)	109 (44.5)	97 (39.6)
	Total answers	f (%)	234 (95.5)	233 (95.1)	233 (95.1)
	Missing answers	f (%)	11 (4.5)	12 (4.9)	12 (4.9)
	Total participants	f (%)	245 (100)	245 (100)	245 (100)
Pre-service Phyics Teachers (4+1.5 years Program)	Yes	f (%)	63 (21.2)	81 (27.3)	51 (17.2)
	Not Sure	f (%)	145 (48.8)	104 (35.0)	143 (48.1)
	No	f (%)	84 (28.3)	107 (36.0)	98 (33.0)
	Total answers	f (%)	292 (98.3)	292 (98.3)	292 (98.3)
	Missing answers	f (%)	5 (1.7)	5 (1.7)	5 (1.7)
	Total participants	f (%)	297 (100)	297 (100)	297 (100)

The results show that the highest rate of the lecturers and the pre-service teachers are not sure about the elective courses are well qualified and they contain students' needs. Both the lecturers and the pre-service physics teachers think that numbers of the elective courses are not adequate.

Essay type questions; Question 11.4 in the PPTQ-1, Question 10.4 in the PPTQ-2, and Question 20.4 in the LQ were asked to learn which subjects the lecturers and the pre-service physics teachers want to be taken place in Physics Teacher Education Program as elective course. The answers are shown in Table 4.32.

Table 4.32 Opinions of the Lecturers and the Pre-service Physics Teachers which Courses They Want to be Taken Place in Physics Teacher Education Program as Elective Course

Type of Knowledge	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Physics Subject Matter Knowledge	21 (24.7)	68 (27.8)	42 (14.1)
General Pedagogical Knowledge	9 (10.6)	34 (13.9)	28 (9.4)
General Knowledge	6 (7.1)	54 (22.0)	23 (7.7)

The participants want Physics at High School Level, Physics Applications at High School Level, Astronomy, History of Science, Technology and Physics, Physics in our Daily Life, Modern Physics, Laboratory, and Projects courses under Physics Subject Matter Knowledge. They want Educational Philosophy, Classroom Management, Research Techniques, Application of Physics Education (Method), History of Science/Physics Education, Computer Assisted Education, History and Philosophy of Turkish Education, Educational Psychology, Misconceptions, Material Development under General Pedagogical Knowledge. They want Rattling Good Speech and Diction, Philosophy, Psychology, Fine Arts, Computer, Health and First Aid, Human Rights and Democracy, Literature, Law, English, Nature and Environment, and Logic under General Knowledge.

4.1.2.5 Innovations in Physics Teacher Education Program

In order to learn whether increasing the period of Physics Teacher Education Program from 4 years to 5 years supplement better qualified physics teachers in Turkey, Question 30.1 in the LQ was asked. The answers of the lecturers are shown in Table 4.33.

Table 4.33 Opinions of the Lecturers about Increasing Period of Physics Teacher Education Program from 4 Years to 5 Years

Answers	Lecturers *f (%)*
Any	27 (31.8)
Little	10 (11.8)
Partially	22 (25.9)
Much	8 (9.4)
Very much	4 (4.7)
Total answers	71 (83.5)
Missing answers	14 (16.5)
Total participants	85 (100)

The results show that about 43 % of the lecturers think that increasing the period of Physics Teacher Education Program does not supplement better qualified physics teachers in Turkey.

Essay type question, Question 30.2 in the LQ, was asked to learn reasons. About 45 % of the lecturers answered this essay type question and they reveal the negative reasons under 5 titles: 1) General education lessons are taken place the last 1.5 years and that is not sufficient for these lessons. Moreover, 1.5 years is not sufficient to cause the pre-service physics teachers to love teaching career. 2) 3.5 years is not adequate for physics subject matter lessons. Furthermore, these lessons

are forgotten due to not teaching last 1.5 years. 3) Taking place the undergraduate education lessons the last 1.5 years and calling this program as master is not correct. 4) Successful students do not choose Physics Teacher Education Program because of increasing the period from 4 years to 5 years. 5) Increasing the period does not change the quality of the program because the lessons and their content did not change. Therefore, a new program has to be developed. The positive reasons are revealed under 2 titles: The congestion of the program was lessened and school experience and practice teaching in secondary education was supplemented.

Question 30.3 in the LQ was asked to learn whether 1.5 years Graduate Without Thesis Program is different from the prior Teaching Certificate Program. The answers of the lecturers are given in Table 4.34.

Table 4.34 Opinions of the Lecturers on Whether 1.5 Years Graduate Without Thesis Program is Different from Old Teaching Certificate Program

Answers	Lecturers *f (%)*
Yes	25 (29.4)
Not Sure	16 (18.8)
No	29 (34.1)
Total answers	70 (82.4)
Missing answers	15 (17.6)
Total participants	85 (100)

The results show that 34.1 % of the lecturers think that 1.5 years Graduate Without Thesis Program is not different from the old Teaching Certificate Program. Essay type question, Question 30.4 in the LQ, was asked to learn the reasons and about 43 % of the lecturers answered this question. They reveal negative reasons

under 2 titles: 1) Content of the lessons in Graduate Without Thesis Program is empty and this program have to be removed. 2) The pre-service teachers only think to take a certificate. Positive reasons are revealed under 4 titles: 1) New program is more professional, serious, and scientific. 2) More importance is given to school experience and practice teaching in secondary education. 3) The congestion of the program is lessened because of the period. 4) The numbers of the lessons are increased.

Question 30.5 in the LQ was asked in order to learn which Physics Teacher Education Program, 5 years Physics Teacher Education Program or 4+1.5 years Physics Teacher Education Program, is better. The answers of the lecturers are shown in Table 4.35.

Table 4.35 Opinions of the Lecturers on which Physics Teacher Education Program is Better

Answers	Lecturers *f (%)*
5 years physics teacher education program	35 (41.2)
4+1.5 years graduate without thesis physics teacher education program	8 (9.4)
Not a pin to choose between them	26 (30.6)
Total answers	69 (81.2)
Missing answers	16 (18.8)
Total participants	85 (100)

The results show that 41.2 % of the lecturers think that 5 years Physics Teacher Education Program is better. Essay type question, Question 30.6 in the LQ, was asked to learn the reasons and it was answered by about 37 % of the lecturers. The lecturers supporting 5 years program reveal the reasons under 5 titles: 1) The

students in 5 years program choose teaching career willingly and consciously at the beginning. 2) The students in 5 years program are better qualified. 3) The subjects are taught by physics teacher educationalists. 4) The students do not take the lessons seriously in 1,5 years graduate without thesis program. 5) The students start graduate without thesis program because of thinking ‘I can be a teacher if I do not find a job’. The lecturers supporting 4+1.5 years program reveal the reasons under 2 titles: 1) Physics subjects are taught better in Faculty of Art and Science. 2) This program provide job for the physicists graduated from Faculty of Art and Science. The lecturers supporting that there is not difference between the programs reveal the reasons under 2 titles: The lessons and content are the same and both programs have the deficiencies.

4.1.2.6 The Lecturers of Physics Teacher Education Program

Question 18.1 in the PPTQ-1, Question 16.1 in the PPTQ-2, and Question 24.1 in the LQ were asked to learn whether the numbers of the lecturers in Physics Teacher Education Program is adequate. The results are given in Table 4.36. The results show that 43.5 % of the lecturers, 33.9 % of the pre-service physics teachers in 5 years program, and 24.9 % of the pre-service physics teachers in 4+1.5 years program think that the number of the lecturers in Physics Teacher Education Program is not adequate.

Table 4.36 Opinions of the Lecturers and the Pre-service Physic Teachers on Whether Numbers of the Lecturers in Physics Teacher Education Program is Adequate

Answers	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Yes	20 (23.5)	42 (17.1)	95 (32.0)
Not Sure	20 (23.5)	114 (46.5)	126 (42.4)
No	37 (43.5)	83 (33.9)	74 (24.9)
Total answers	77 (90.6)	239 (97.6)	295 (99.3)
Missing answers	8 (9.4)	6 (2.4)	2 (0.7)
Total participants	85 (100)	245 (100)	297 (100)

Essay type questions; Question 18.2 in the PPTQ-1, Question 16.2 in the PPTQ-2, and Question 24.2 in the LQ were asked to learn on which official titles and field the lecturers are required. The results are shown in Table 4.37. The lecturers state that the lecturers on physics education field who attended PhD program and can hold lessons are required in the program. The pre-service physics teachers state that the lecturers on physics education and physics field, especially Professors are required in the program. Moreover, the pre-service physics teachers want better qualified and younger the lecturers.

Table 4.37 Opinions of the Lecturers and the Pre-service Physic Teachers on which Official Titles and Field the Lecturers are Required

Official Titles and Field	Lecturers *f (%)*	Pre-service Physics Teachers (5 Years Program) *f (%)*	Pre-service Physics Teachers (4+1.5 Years Program) *f (%)*
Physics Education	18 (21.2)	17 (6.9)	21 (7.1)
Physics	10 (11.8)	28 (11.4)	24 (8.1)
Educational Sciences	5 (5.9)	20 (8.2)	17 (5.7)
Better qualified and younger	0 (0.0)	12 (4.9)	14 (4.7)
Research Assistant	9 (10.6)	10 (4.1)	14 (4.7)
University The lecturer	4 (4.7)	6 (2.4)	12 (4.0)
Dr. University The lecturer	5 (5.9)	7 (2.9)	11 (3.7)
Assistant Professor Dr.	11 (12.9)	9 (3.7)	11 (3.7)
Associate Professor Dr.	13 (15.3)	14 (5.7)	15 (5.1)
Professor Dr.	12 (14.1)	28 (11.4)	26 (8.8)

In this part, the qualities of the lecturers in Physics Teacher Education Program are investigated. Question 1 in the LQ was asked to learn the official titles of the lectures participated in this study. The results are given in Table 4.38.

Table 4.38 Official Titles of the Lecturers

Official Title	*f (%)*
Research Assistant	31 (36.5)
University The lecturer	5 (5.9)
Dr. University The lecturer	1 (1.2)
Assistant Professor Dr.	30 (35.3)
Associate Professor Dr.	8 (9.4)
Professor Dr.	9 (10.6)
Total answer	84 (98.8)
Missing answer	1 (1.2)
Total participants	85 (100)

In order to learn about academic education of the lecturers, essay type questions; Questions 2.1, 2.2, and 2.3 were asked. The results are shown in Table 4.39. 54.1 % of the lecturers graduated from Physics Education Program. The highest

rate of the lecturers has master degree and doctorate degree on physics. The results show that in Physics Teacher Education Program the numbers of the lecturers who study on pure physics is more than study on physics education.

Table 4.39 Academic Educations of the Lecturers

Study Field	Undergraduate	Master	Doctorate
	f (%)	*f (%)*	*f (%)*
Physics Education	46 (54.1)	30 (35.3)	12 (14.1)
Physics	34 (40.0)	48 (56.5)	38 (44.7)
Science Education	0 (0.0)	1 (1.2)	0 (0.0)
Physics Engineering	2 (2.4)	1 (1.2)	2 (2.4)
Educational Sciences	1 (1.2)	3 (3.5)	3 (3.5)
Chemistry Education	1 (1.2)	0 (0.0)	0 (0.0)
Early Childhood Education	1 (1.2)	0 (0.0)	0 (0.0)
Total answer	85 (100)	83 (97.6)	18 (21.3)
Missing answer	0 (0.0)	2 (2.4)	12 (14.1)
Total Participants	85 (100)	85 (100)	85 (100)

To learn the lecturers' area of interests, essay type question, Question 8 in the LQ, was asked. The answers of the lecturers are given in Table 4.40. The results show that most of the lecturers are interested in educational sciences.

Table 4.40 The Lecturers' Area of Interests

Area of interests	*f (%)*
Physics Education	20 (23.5)
Physics	15 (17.6)
Teacher Education	4 (4.7)
Educational Sciences	36 (42.4)

Question 3 in the LQ was asked to learn experience of the lecturers as a university the lecturer. The results are shown in Table 4.41. The results show that about 35 % of the lecturers are young and are not experienced.

Table 4.41 Experience of the Lecturers as a University Lecturer

Experience as an university lecturer	*f (%)*
1 year-5 years	30 (35.3)
6 years-10 years	13 (15.3)
11 years-15 years	17 (20)
16 years-20 years	6 (7.1)
21years-25 years	9 (10.6)
26 years-30 years	3 (3.5)
31 years- above	7 (8.2)
Total	85 (100)

In order to learn whether the lecturers gained experience as a teacher, Question 4 in the LQ was asked. The results are given in Table 4.42. Half of the lecturers did not gain experience as a teacher.

Table 4.42 Experience of the Lecturers as a Teacher

Experience as a teacher	*f (%)*
Inexperienced	43 (50.6)
1month-12 months	15 (17.6)
1 years-5 years	21 (24.7)
5 years-10 years	4 (4.7)
10 years- above	1 (1.2)
Total answer	84 (98.8)
Missing answer	1 (1.2)
Total participants	85 (100)

Question 5.1 and 5.2 in the LQ were asked to learn the class load of the lecturers. The results are given in Table 4.43. The results show that about 38 % of the lecturers hold courses between 15 hours and 25 hours that is too much class load. About 50 % of the lecturers hold courses in the evening that is exhausting after studying all day.

Table 4.43 Class Load of the Lecturers

Number of the course hours	Holding course in day time	Holding course in the evenings
	f (%)	*f (%)*
Do not teaching	13 (15.3)	41 (48.2)
1 hour- 5 hours	9 (10.6)	18 (21.2)
5 hours- 10 hours	14 (16.5)	20 (23.5)
10 hours- 15 hours	17 (20.0)	3 (3.5)
15 hours- 20 hours	13 (15.3)	2 (2.4)
20 hours- 25 hours	19 (22.4)	0 (0.0)
Total answer	85 (100)	84 (98.8)
Missing answer	0 (0.0)	1 (1.2)
Total participants	85 (100)	85 (100)

In order to learn master and doctorate students' numbers of the lecturers Question 5.3 and 5.4 in the LQ were asked. The results are shown in Table 4.44. About 47 % of the lecturers have master students and about 40 % of the lecturers have doctorate students. Both Table 4.43 and Table 4.44 show that the lectures have too much class load and many graduate students.

Table 4.44 The Lecturers' Master and Doctorate Students' Frequencies and Percentages

Students	Yes									No	Total
	f (%)									*f (%)*	*f (%)*
	1	2	3	4	5	6	8	12	13	0	
Master	16	9	4	5	1	3	1	0	1	45	85
	18.8	10.6	4.7	5.9	1.2	3.5	1.2	0.0	1.2	52.9	100
Doctorate	10	5	6	1	2	0	0	1	0	60	85
	11.8	5.9	7.1	1.2	2.4	0.0	0.0	1.2	0.0	70.6	100

Questions 6.1 and 6.2 in the LQ were asked to learn administrative functions of the lecturers. The results are given in Table 4.45. The results show that about 31 % of the lecturers have administrative functions at university.

Table 4.45 Administrative Functions of the Lecturers

Administrative functions at university	*f (%)*
Dean of Faculty	0 (0.0)
Deputy Dean	3 (3.5)
Department Chair	3 (3.5)
Deputy Department Chair	3 (3.5)
Chair of Physics Education	4 (4.7)
Member of the Faculty Board	3 (3.5)
Co director of Graduate School of Natural and Applied Sciences	1 (1.2)
Vocational School Director	1 (1.2)
No administrative duty	67 (78.8)
Total	85 (100)

In order to learn whether the lecturers can follow up the studies and researches on physics education, Question 9.1 in the LQ was asked. The answers of the lecturers are shown in Table 4.46. Then, Question 9.2 in the LQ was asked, to learn the reasons why they can not follow up the studies and researches on physics education. The lecturers answered the Question 9.1 as 'Not Sure' or 'No' state the reasons. The reasons are given in Table 4.47.

Table 4.46 Opinions of the Lecturers on Following up Studies and Researches on Physics Education

Answers	Lecturers *f (%)*
Yes	28 (32.9)
Not Sure	45 (52.9)
No	9 (10.6)
Total answers	82 (96.5)
Missing answers	3 (3.5)
Total participants	85 (100)

Table 4.47 Reasons of the Lecturers Why They can not Follow up the Studies and Researches on Physics Education

Reasons	*f (%)*
I can not read and write any foreign language to follow the academic researches	8 (9.4)
Conferences, congresses, and seminars are hold in the fixed cities	13 (15.3)
Required subsidy is not granted to attend in the conferences, congresses, and seminars	11 (12.9)
I have outnumber of class load	21 (24.7)
I have official assignment in the department	4 (4.7)
Additional assignments given by the department	5 (5.9)
Others	11 (12.9)

The highest rate of the lecturers state that they can not follow the studies and researches on physics education because their class load is too much which is overlapped with the results in Table 4.43. The other reasons are stated as studying in a crowded room, studying on physics, having too many master and doctorate students, additional assignments given by the deanship, not having too much time.

Question 7 in the LQ was asked to learn the lecturers' published articles. The numbers and subjects of the published articles are shown in Table 4.48.

Table 4.48 Published Articles of the Lecturers

Published Articles	*f (%)*
On physics subjects in the magazines published in Turkey	33 (3.8)
On physics education subjects in the magazines published in Turkey	29 (34.1)
On science education subjects in the magazines published in Turkey	11 (12.9)
On physics subjects in the magazines published in the abroad	32 (37.6)
On physics education subjects in the magazines published in the abroad	9 (10.6)
On science education subjects in the magazines published in the abroad	5 (5.9)
Any	20 (23.5)

The results show that 23.5 % of the lecturers do not have any published articles. The lecturers in Physic Teacher Education Program have published articles on physics more than on physics education. Moreover, about 12 % of the lecturers have only one published articles on physics subjects in the magazines published in Turkey, about 5 % of the lecturers have only one published articles on physics education subjects in the magazines published in Turkey, about 7 % of the lecturers have only one published articles on science education subjects in the magazines published in Turkey, about 6 % of the lecturers have only one published articles on physics subjects in the magazines published in the abroad, about 5 % of the lecturers have only one published articles on physics education subjects in the magazines published in the abroad, and about 4 % of the lecturers have only one published articles on science education subjects in the magazines published in the abroad.

In order to learn the lecturers' opportunities having in the university, Question 10.1 in the LQ was asked. Then, Question 10.2 in the LQ was asked to learn whether the lecturers share the room with anybody. The answers of the lecturers are given in Table 4.49 and Table 4.50.

Table 4.49 The Lecturers' Opportunities Having in University

Opportunities	Have *f (%)*	Do Not Have *f (%)*	Total Answer *f (%)*	Missing Answer *f (%)*	Total Participant *f (%)*
Computer	75 (88.2)	8 (9.4)	83 (97.6)	2 (2.4)	85 (100)
Printer	56 (65.9)	27 (31.8)	83 (97.6)	2 (2.4)	85 (100)
Continuous internet access	79 (92.9)	4 (4.7)	83 (97.6)	2 (2.4)	85 (100)
Telephone	64 (75.3)	19 (22.4)	83 (97.6)	2 (2.4)	85 (100)

Table 4.50 Answers of the Lecturers on Whether Sharing Room with Anybody

Sharing the room with	*f (%)*
Any person	33 (38.8)
1 person	15 (17.6)
2 people	21 (24.7)
3 people	12 (14.1)
4 people	1 (1.2)
5 people	1 (1.2)
Total answer	83 (97.6)
Missing answer	2 (2.4)
Total participant	85 (100)

The results show that about 41 % of the lecturers have to study in the crowded rooms. Moreover, 9.4 % of them do not have a computer.

To learn on whether the lecturers spare sufficient time for solving the problem of the pre-service physics teachers, Questions 25.1 in the LQ was asked. The answers of the lecturers are shown in Table 4.51. About 13 % of the lecturers state that they do not spare sufficient time for solving the problems of the pre-service physics teachers.

Table 4.51 Answers of the Lecturers Whether They Spare Time for Solving Problems of Pre-service Physics Teachers

Answers	Lecturers *f (%)*
Yes	20 (23.5)
Not Sure	45 (52.9)
No	11 (12.9)
Total answers	76 (89.4)
Missing answers	9 (10.6)
Total participants	85 (100)

Essay type question, Question 25.2 in the LQ, was asked to learn which activities can be done for solving the problems of the pre-service physics teachers. The suggestions of the lecturers are revealed under 5 titles: 1) Periodic meetings should be held, 2) Seminars should be held, 3) A guidance office should be established in the Physics Teacher Education Department, 4) Guidance hours should be adjusted, 5) The numbers of the lecturers should be increased.

4.1.2.7 Physical Conditions of Education Faculties

In order to learn which opportunities are given to the pre-service physics teachers for individual development by the universities and whether these opportunities are sufficient, Question 16 in the PPTQ-1, Question 14 in the PPTQ-2, and Question 22 in the LQ were asked. The results are given in Table 4.52.

Table 4.52 Opinions of the Lecturers and the Pre-service Physics Teachers on Whether Opportunities Given to Pre-service Physics Teachers for Individual Development by Universities are Sufficient

Participants			Library	Cinema	Theatre	Culture Center	Sport Center	Student Clubs	Culture Courses
Lecturers	Absent	*f*	1	27	27	18	3	1	13
		(%)	(1.2)	(31.8)	(31.8)	(21.2)	(3.5)	(1.2)	(15.3)
	Insufficient	*f*	32	22	33	34	30	43	42
		(%)	(37.6)	(25.9)	(38.8)	(40)	(35.3)	(50.6)	(49.4)
	Sufficient	*f*	37	26	17	23	42	34	21
		(%)	(43.5)	(30.6)	(20)	(27.1)	(49.4)	(40)	(24.7)
	Highly sufficient	*f*	13	8	6	8	8	5	7
		(%)	(15.3)	(9.4)	(7.1)	(9.4)	(9.4)	(5.9)	(8.2)
	Total answers	*f*	83	83	83	83	83	83	83
		(%)	(97.6)	(97.6)	(97.6)	(97.6)	(97.6)	(97.6)	(97.6)
	Missing answers	*f*	2	2	2	2	2	2	2
		(%)	(2.4)	(2.4)	(2.4)	(2.4)	(2.4)	(2.4)	(2.4)
	Total participants	*f*	85	85	85	85	85	85	85
		(%)	(100)	(100)	(100)	(100)	(100)	(100)	(100)

Table 4.52 Continued

Participants			Library	Cinema	Theatre	Culture Center	Sport Center	Student Clubs	Culture Courses
Pre-service Physics Teachers (5 Years Program	Absent	*f*	12	98	82	83	23	24	58
		(%)	(4.9)	(40)	(33.5)	(33.9)	(9.4)	(9.8)	(23.7)
	Insufficient	*f*	114	87	108	106	116	107	127
		(%)	(46.5)	(35.5)	(44.1)	(43.3)	(47.3)	(43.7)	(51.8)
	Sufficient	*f*	90	45	40	41	85	88	42
		(%)	(36.7)	(18.4)	(16.3)	(16.7)	(34.7)	(35.9)	(17.1)
	Highly sufficient	*f*	23	10	9	8	16	19	12
		(%)	(9.4)	(4.1)	(3.7)	(3.3)	(6.5)	(7.8)	(4.9)
	Total answers	*f*	239	240	239	238	240	238	239
		(%)	(97.6)	(98)	(97.6)	(97.1)	(98)	(97.1)	(97.6)
	Missing answers	*f*	6	5	6	7	5	7	6
		(%)	(2.4)	(2)	(2.4)	(2.9)	(2)	(2.9)	(2.4)
	Total participants	*f*	245	245	245	245	245	245	245
		(%)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Pre-service Physics Teachers (4+1.5 Years Program)	Absent	*f*	12	129	123	79	38	32	69
		(%)	(4)	(43.4)	(41.4)	(26.6)	(12.8)	(10.8)	(23.2)
	Insufficient	*f*	123	94	105	134	140	150	158
		(%)	(41.4)	(31.6)	(35.4)	(45.1)	(47.1)	(50.5)	(53.2)
	Sufficient	*f*	130	64	59	72	102	102	61
		(%)	(43.8)	(21.5)	(19.9)	(24.2)	(34.3)	(34.3)	(20.5)
	Highly sufficient	*f*	29	7	6	8	14	9	5
		(%)	(9.8)	(2.4)	(2)	(2.7)	(4.7)	(3)	(1.7)
	Total answers	*f*	294	294	293	293	294	293	293
		(%)	(99)	(99)	(98.7)	(98.7)	(99)	(98.7)	(98.7)
	Missing answers	*f*	3	3	4	4	3	4	4
		(%)	(1)	(1)	(1.3)	(1.3)	(1)	(1.3)	(1.3)
	Total participants	*f*	297	297	297	297	297	297	297
		(%)	(100)	(100)	(100)	(100)	(100)	(100)	(100)

The results indicate that the lecturers think that library and sport center opportunities are sufficient; theatre, culture center, student clubs, and culture courses opportunities are insufficient. The pre-service physics teachers in 5 years program think that library, theatre, culture center, sport center, student clubs, and culture courses opportunities are insufficient. The pre-service physics teachers in 4+1.5 years program think that library opportunity is sufficient; but culture center, sport center, student clubs, and culture courses opportunities are insufficient. The highest rate of both the lecturers and pre-service physics teachers state that there is not a cinema in the university.

In order to learn which opportunities are given to the pre-service physics teachers for academic development by the universities and whether these opportunities are sufficient, Question 17 in the PPTQ-1, Question 15 in the PPTQ-2, and Question 23 in the LQ were asked. The results are given in Table 4.53.

The results show that both the lecturers and the pre-service physics teachers state that rigging of classrooms with technical equipments, transportable technological equipments for different teaching techniques, and physics laboratories are insufficient. The lecturers and the pre-service physics teachers in 4+1.5 years program state that classrooms are sufficient but the pre-service physics teachers in 5 years program state that classrooms are insufficient. The lecturers state that continues Internet access and computer laboratories are sufficient but the pre-service physics teachers state that they are insufficient. The pre-service physics teachers state that technology classroom is absent in the university.

Table 4.53 Opinions of the Lecturers and the Pre-service Physics Teachers on Whether Opportunities Given to Pre-service Physics Teachers for Academic Development by Universities are Sufficient

	Participants		Class	Rigging of classrooms with techn. equipments	Transportable techn. equipments for different teaching techniques	Physics Lab.	Computer Lab.	Techn Class	Continuous Internet Access
Lecturers	Absent	*f*	1	7	14	3	1	25	4
		(%)	(1.2)	(8.2)	(16.5)	(3.5)	(1.2)	(29.4)	(4.7)
	Insufficient	*f*	34	37	35	46	33	33	30
		(%)	(40)	(43.5)	(41.2)	(54.1)	(38.8)	(38.8)	(35.3)
	Sufficient	*f*	45	37	30	31	43	22	36
		(%)	(52.9)	(43.5)	(35.3)	(36.5)	(50.6)	(25.9)	(42.4)
	Highly sufficient	*f*	3	2	4	3	6	3	13
		(%)	(3.5)	(2.4)	(4.7)	(3.5)	(7.1)	(3.5)	(15.3)
	Total answers	*f*	83	83	83	83	83	83	83
		(%)	(97.6)	(97.6)	(97.6)	(97.6)	(97.6)	(97.6)	(97.6)
	Missing answers	*f*	2	2	2	2	2	2	2
		(%)	(2.4)	(2.4)	(2.4)	(2.4)	(2.4)	(2.4)	(2.4)
	Total participants	*f*	85	85	85	85	85	85	85
		(%)	(100)	(100)	(100)	(100)	(100)	(100)	(100)

Table 4.53 Continued

	Participants		Class	Rigging of classrooms with techn. equipments	Transportable techn. equipments for different teaching techniques	Physics Lab.	Computer Lab.	Techn Class	Continuous Internet Access
Pre-service Physics Teachers (5 Years Program)	Absent	*f*	13	32	60	11	18	126	77
		(%)	(5.3)	(13.1)	(24.5)	(4.5)	(7.3)	(51.4)	(31.4)
	Insufficient	*f*	125	180	145	182	162	97	103
		(%)	(51)	(73.5)	(59.2)	(74.3)	(66.1)	(39.6)	(42)
	Sufficient	*f*	93	25	32	46	55	16	41
		(%)	(38)	(10.2)	(13.1)	(18.8)	(22.4)	(6.5)	(16.7)
	Highly	*f*	7	1	0	0	3	0	16
	sufficient	*(%)*	(2.9)	(0.4)	(0)	(0)	(1.2)	(0)	(6.5)
	Total	*f*	238	238	237	239	238	239	237
	answers	*(%)*	(97.1)	(97.1)	(96.7)	(97.6)	(97.1)	(97.6)	(96.7)
	Missing	*f*	7	7	8	6	7	6	8
	answers	*(%)*	(2.9)	(2.9)	(3.3)	(2.4)	(2.9)	(2.4)	(3.3)
	Total	*f*	245	245	245	245	245	245	245
	participants	*(%)*	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Pre-service Physics Teachers (4+1.5 Years Program)	Absent	*f*	9	33	57	14	19	132	56
		(%)	(3)	(11.1)	(19.2)	(4.7)	(6.4)	(44.4)	(18.9)
	Insufficient	*f*	118	163	158	168	187	125	142
		(%)	(39.7)	(54.9)	(53.2)	(56.6)	(63)	(42.1)	(47.8)
	Sufficient	*f*	153	88	72	106	81	32	76
		(%)	(51.5)	(29.6)	(24.2)	(35.7)	(27.3)	(10.8)	(25.6)
	Highly	*f*	13	10	4	6	6	4	20
	sufficient	*(%*	4.4	3.4	1.3	2	2	1.3	6.7
	Total	*f*	293	294	291	294	293	293	294
	answers	*(%)*	(98.7)	(99)	(98)	(99)	(98.7)	(98.7)	99
	Missing	*f*	4	3	6	3	4	4	3
	answers	*(%)*	(1.3)	(1)	(2)	(1)	(1.3)	(1.3)	(1)
	Total	*f*	297	297	297	297	297	297	297
	participants	*(%)*	(100)	(100)	(100)	(100)	(100)	(100)	(100)

4.1.2.8 Communication and Cooperation between Institutions

In order to learn whether Ministry of National Education and Education Faculties are within communication and cooperation to educate better physics teachers, Question 29.1 in the LQ was asked. The answers of the lecturers are shown in Table 4.54. The results show that 48.2 % of the lecturers think that Ministry of National Education and Education Faculties are not within communication and cooperation to educate better physics teachers.

Table 4.54 Answers of the Lecturers on Whether Ministry of National Education and Education Faculties are Within Communication and Cooperation to Educate Better Physics Teachers

Answers	Lecturers *f (%)*
Yes	4 (4.7)
Not Sure	31 (36.5)
No	41 (48.2)
Total answers	76 (89.4)
Missing answers	9 (10.6)
Total participants	85 (100)

Essay type question, Question 29.2 in the LQ, was asked to learn which problems come into existence due to the communication and cooperation gap between Ministry of National Education and Education Faculties. About 36 % of the lecturers answered this question. They reveal problems under 4 titles: 1) Curriculum inconsistency between the Physics Teacher Education Program and high school physics curriculum, 2) Differences between the numbers of the teachers graduate from education faculty and requirement of the country, 3) Better physics teachers can not be educated, 4) Education is fallen off in quality.

To learn whether Education Faculties study together with national and international institutions to educate better physics teachers, Question 27.1 in the LQ was asked. The answers of the lecturers are shown in Table 4.55. The results show that 20 % of the lecturers state that Education Faculties study together with national and international institutions for training better qualified physics teachers.

Table 4.55 Answers of the Lecturers on Whether Education Faculties Study Together with National and International Institutions to Educate Better Physics Teachers

Answers	Lecturers *f (%)*
Yes	17 (20.0)
No	52 (61.2)
Total answers	69 (81.2)
Missing answers	16 (18.8)
Total participants	85 (100)

In order to learn which studies are cooperated with national and international institutions, essay type question; Question 27.2 in the LQ was asked. The lecturers state these studies; common projects with Ministry of National Education, common projects with The Scientific and Technological Research Council of Turkey, Erasmus and Socrates Projects, Turkish Council of Higher Education and The World Bank Projects, Students Exchange Programs, congresses, conferences, symposiums, The lecturers' Training Program.

Question 26 in the LQ was asked to learn whether the researches and the projects on physics teacher education are supported by the research funds of university and education faculty. The answers of the lecturers are given in Table 4.56.

Table 4.56 Answers of the Lecturers Whether Researches and the Projects on Physics Teacher Education are Supported by Research Funds of University and Education Faculty

Answers	Lecturers *f (%)*
Any	8 (9.4)
Little	24 (28.2)
Partially	25 (29.4)
Much	14 (16.5)
Very much	0 (0.0)
Total answers	71 (83.5)
Missing answers	14 (16.5)
Total participants	85 (100)

About 58 % of the lecturers state that the researches and the projects on physics teacher education are supported little or partially by research funds of university and education faculty.

In order to learn whether Physics Teacher Education Department assesses itself regularly and systematically, Question 28.1 in the LQ was asked. Then, Question 28.2 in the LQ was asked to learn whether the results are reflected to the content of the lessons. The results are shown in Table 4.57 and Table 4.58.

Table 4.57 Answers of the Lecturers Whether Physics Teacher Education Department Assesses Itself Regularly and Systematically

Answers	Lecturers *f (%)*
Yes	7 (8.2)
Not Sure	39 (45.9)
No	24 (28.2)
Total answers	70 (82.4)
Missing answers	15 (17.6)
Total participants	85 (100)

Table 4.58 Answers of the Lecturers Whether Results are Reflected to Content of Lessons

Answers	Lecturers *f (%)*
Yes	6 (7.1)
Not Sure	31 (36.5)
No	25 (29.4)
Total answers	62 (72.9)
Missing answers	23 (27.1)
Total participants	85 (100)

28.2 % of the lecturers state that Physics Teacher Education Department do not assesses its' performance regularly and systematically. Moreover, 29.4 % of the lecturers think that the results of the assessment are not reflected to the content of the lessons.

4.1.3 The Problems Occurred After Graduation from Physics Teacher Education Program

4.1.3.1 Public Personnel Selection Exam (KPSS)

In order to learn whether Public Personnel Selection Exam can measure a pre-service physics teacher has characteristics of a good physics teacher or not, Question 20.1 in the PPTQ-1, Question 18.1 in the PPTQ-2, and Question 31.1 in the LQ were asked. The results are given in Table 4.59. The highest rate of both the lecturers and the pre-service physics teachers think that Public Personnel Selection Exam can not measure a pre-service physics teacher has characteristics of a good physics teacher or not.

Table 4.59 Opinions of the Lecturers and the Pre-service Physics Teachers on Whether Public Personnel Selection Exam can Measure a Pre-service Physics Teacher has Characteristics of a Good Physics Teacher or not

Answers	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Yes	0 (0.0)	1 (0.4)	8 (2.7)
Not Sure	16 (18.8)	32 (13.1)	36 (12.1)
No	59 (69.4)	202 (82.4)	248 (83.5)
Total answers	75 (88.2)	235 (95.9)	292 (98.3)
Missing answers	10 (11.8)	10 (4.1)	5 (1.7)
Total participants	85 (100)	245 (100)	297 (100)

Essay type questions; Question 20.2 in the PPTQ-1, Question 18.2 in the PPTQ-2, and Question 31.2 in the LQ were asked to learn how a pre-service physics teacher has characteristics of a good physics teacher or not can be measured. The suggestion of the lectures and the pre-service physics teachers are given in Table 4.60. The results show that, both the lecturers and the pre-service physics teachers think that an exam should be held; however this exam should include the physics questions.

Table 4.60 Suggestions of the Lectures and the Pre-service Physics Teachers on How a Pre-service Physics Teacher has Characteristics of a Good Physics Teacher or not can be Measured

Suggestions	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
To make physics exam	32 (37.6)	124 (50.6)	159 (53.5)
To make presentation/application exam	14 (16.5)	32 (13.1)	26 (8.8)
To make interview	11 (12.9)	21 (8.6)	27 (9.1)
To make pedagogy exam	4 (4.7)	26 (10.6)	24 (8.1)
To make general culture exam	2 (2.4)	15 (6.1)	7 (2.4)
KPSS+ other types exams	4 (4.7)	2 (0.8)	12 (4.0)
To look the school certificate note	1 (1.2)	17 (6.9)	9 (3.0)
To measure during the education in the university (individual files for students are filled systematically)	3 (3.5)	12 (4.9)	9 (3.0)
To make psychological /mental test	0 (0.0)	5 (2.0)	7 (2.4)
To make individuality test	0 (0.0)	5 (2.0)	5 (1.7)
To prepare a report by university the lecturers committee about pre-service teacher (To be a teacher or not)	2 (2.4)	2 (0.8)	6 (2.0)
To observe the pre-service teacher for one year, then appoint as a teacher or not	1 (1.2)	2 (0.8)	2 (0.7)
To make changes in universities' programs	1 (1.2)	5 (2.0)	1 (0.3)
Not to make an exam because university state that she/he can be a teacher giving school certificate	1 (1.2)	16 (6.5)	22 (7.4)

4.1.3.2 Unemployment Anxiety

In order to learn whether the pre-service physics teachers believe in they will find a job, Question 19.1 in the PPTQ-1, Question 17.1 in the PPTQ-2, and Question 32.1 in the LQ were asked. The results are given in Table 4.61. The highest rate of

both the lecturers and the pre-service physics teachers think that the pre-service physics teachers will not find a job.

Table 4.61 Opinions of the Lecturers and the Pre-service Physics Teachers on Whether

Pre-service Physics Teachers Believe in They will Find a Job

Answers	The lecturers *f (%)*	Pre-service Physics Teachers (5 Years Program) *f (%)*	Pre-service Physics Teachers (4+1.5 Years Program) *f (%)*
Yes	4 (4.7)	38 (15.5)	47 (15.8)
Not Sure	24 (28.2)	94 (38.4)	97 (32.7)
No	48 (56.5)	107 (43.7)	151 (50.8)
Total answers	76 (89.4)	239 (97.6)	295 (99.3)
Missing answers	9 (10.6)	6 (2.4)	2 (0.7)
Total participants	85 (100)	245 (100)	297 (100)

Essay type questions; Question 19.2 in the PPTQ-1, Question 12.1 in the PPTQ-2, and Question 32.2 in the LQ were asked to learn, unemployment anxiety how effecting the performance of the pre-service physics teachers to be a good physics teacher. The answers of the lecturers and the pre-service physics teachers are shown in Table 4.62. The results show that both the lecturers and the pre-service physics teachers think that unemployment anxiety affects the pre-service physics teachers negatively. However, about 4 % of the lecturers and about 12 % of the pre-service physics teachers in 5 years program, and about 12 % of the pre-service physics teachers in 4+1.5 years program state that unemployment anxiety effect the pre-service physics teachers positively and stimulate them, moreover, they study to be the best one.

Table 4.62 Answers of the Lecturers and the Pre-service Physics Teachers on How Unemployment Anxiety Effect the Performance of Pre-service Physics Teachers to Be a Good Physics Teacher

Answers	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Effecting negative	38 (44.7)	120 (49.0)	134 (45.1)
Falling motivation	14 (16.5)	28 (11.4)	24 (8.1)
Falling achievement/Getting lazy	10 (11.8)	29 (11.8)	36 (12.1)
Becoming unhappy and desperate	6 (7.1)	23 (9.4)	28 (9.4)
Losing love and enthusiasm for being a physics teacher	0 (0.0)	6 (2.4)	10 (3.4)
Losing physics love and enthusiasm	0 (0.0)	9 (3.7)	8 (2.7)
Effecting positive and stimulating	3 (3.5)	16 (6.5)	23 (7.7)
Studying for being the best one	0 (0.0)	13 (5.3)	11 (3.7)
Not effecting	1 (1.2)	15 (6.1)	12 (4.0)
Studying for only getting a school certificate	4 (4.7)	7 (2.9)	3 (1.0)

4.1.3.3 Problems Occurred Working as Physics Teacher in Turkey

In order to learn which problems occurred working as physics teacher in Turkey, essay type question, Question 33.2 in the LQ was asked. The answers of the lecturers are given in Table 4.63.

Table 4.63 Opinions of the Lecturers on which Problems Occurred Working as Physics Teacher in Turkey

Problems occurred working as physics teacher in Turkey	Lecturers *f (%)*
Physical conditional inadequacies of the high schools	34 (40.0)
Inadequacies of the teachers and not developing themselves	9 (10.6)
Inadequacies on application of the lessons	8 (9.4)
Class load of the teachers	3 (3.5)
Being low of spiritual and economical respectability of teaching career	15 (17.6)
High school physics lesson curriculum and course hours	8 (9.4)
Not giving sufficient importance to science in Turkey	3 (3.5)
Restriction of the physics education by the university entrance exam	18 (21.2)
Problems related to school administration	9 (10.6)
Appointments of the teachers (influential persons)	1 (1.2)
Difficulty of physics and prejudice of the students	9 (10.6)
Not good working of the guidance service	4 (4.7)
Class passing system	2 (2.4)

Essay type question, Question 33.3 in the LQ, was asked to learn which solutions the lecturers suggest for these problems and about 73 % of the lecturers answered this question. The suggestions are revealed under 11 titles: 1) Physical inadequacies of the high schools should be improved, 2) Much more importance should be given to in-service training, 3) Salary of the teachers should be increased; 4) School audits should be made much more seriously; 5) Science/physics/physics lessons should be caused to love, 6) Much more budget from the national economy should be given to education, 7) Guidance service of the high schools should be worked much more for orientation of students according to interests-abilities and for introduction of the jobs and universities, 8) High school textbooks should be reorganised, 9) High school physics curriculum should be run parallel with curriculum of university entrance exam, 10) Ministry of National Education should

attach much more importance to studies and researches on education for making changes and innovations in the education system, 11) Changes and innovations should be made in high school education system.

Finally, essay type questions; Question 21.1 in the PPTQ-1, Question 19.1 in the PPTQ-2, and Question 33.1 in the LQ were asked to learn, which problems are occurred educating pre-service physics teachers as a good physics teacher. About 76 % of the lecturers, about 75 % of the pre-service physics teachers in 5 years program, and about 69 % of the pre-service physics teachers in 4+1.5 years program answered the questions. The problems are revealed under three headings: 1) Problems occurred before entering Physics Teacher Education Program, 2) Problems occurred during Physics Teacher Education Program, and 3) Problems occurred after graduation from Physics Teacher Education Program. The results are shown in Table 4.64, Table 4.65, and Table 4.66.

Table 4.64 Opinions of the Lecturers and the Pre-service Physics Teachers on which Problems Occurred Before Entering Physics Teacher Education Program

Problems occurred before entering Physics Teacher Education Program	Lecturers *f (%)*	Pre-service Physics Teachers (5 Years Program) *f (%)*	Pre-service Physics Teachers (4+1.5 Years Program) *f (%)*
Orientation of the high school students to Education Faculties	12 (14.1)	12 (4.9)	7 (2.4)
Selection of the high school students to Education Faculties	2 (2.4)	1 (0.4)	5 (1.7)
Characteristics of the high school students who are selected to Education Faculties	13 (15.3)	40 (16.3)	50 (16.8)
Quota of the Physics Teacher Education Program	1 (1.2)	2 (0.8)	4 (1.3)

Table 4.65 Opinions of the Lecturers and the Pre-service Physics Teachers on which Problems Occurred During Physics Teacher Education Program

Problems occurred during Physics Teacher Education Program	Lecturers *f (%)*	Pre-service Physics Teachers (5 Years Program) *f (%)*	Pre-service Physics Teachers (4+1.5 Years Program) *f (%)*
Physics Teacher Education Program			
• Goals of the program	2 (2.4)	1 (0.4)	0 (0.0)
• Courses and content	17 (20.0)	70 (28.6)	70 (23.6)
• Application of the program	14 (16.5)	77 (31.4)	89 (30.0)
• Innovations at the physics teacher education	6 (7.1)	5 (2.0)	6 (2.0)
The lecturers			
• Numbers	10 (11.8)	18 (7.3)	8 (2.7)
• Qualities	13 (15.3)	20 (8.2)	33 (11.1)
• Communication with the students	1 (1.2)	6 (2.4)	5 (1.7)
• Opportunities they have	0 (0.0)	0 (0.0)	0 (0.0)
Physical condition of Education Faculties			
• Classrooms	13 (15.3)	39 (15.9)	30 (10.1)
• Laboratories	17 (20.0)	55 (22.4)	42 (14.1)
• Culture and sport facilities	12 (14.1)	17 (6.9)	29 (9.8)
• Communication and cooperation between the university administration and the department of Physics Education	2 (2.4)	0 (0.0)	0 (0.0)
Communication and cooperation between the public institutions	2 (2.4)	0 (0.0)	0 (0.0)
Financial straits of the students	0 (0.0)	7 (2.9)	8 (2.7)

Table 4.66 Opinions of the Lecturers and the Pre-service Physics Teachers on which Problems Occurred After Graduation from Physics Teacher Education Program

Problems occurred after graduation from Physics Teacher Education Program	Lecturers	Pre-service Physics Teachers (5 Years Program)	Pre-service Physics Teachers (4+1.5 Years Program)
	f (%)	*f (%)*	*f (%)*
Public Personnel Selection Exam (KPSS)	1 (1.2)	3 (1.2)	10 (3.4)
Unemployment anxiety	37 (43.5)	58 (23.7)	90 (30.3)
Working as a good physics teacher	1 (1.2)	0 (0.0)	0 (0.0)

The highest rate of the lecturers and the pre-service physics teachers in 4+1.5 years program state that unemployment anxiety is the most important problem. However, pre-service physics teachers in 5 years program state that application of the program is the most important problem.

Essay type questions; Question 21.2 in the PPTQ-1, Question 19.2 in the PPTQ-2, and Question 33.3 in the LQ were asked to learn which solutions the lecturers and pre-service physics teachers suggest for these problems. About 41 % of the lecturers, about 51 % of the pre-service physics teachers in 5 years program, and 44 % of the pre-service physics teachers in 4+1.5 years program answered the questions. The suggestions are revealed under 17 titles: 1) Guidance service of the high schools should be worked much more for orientation of students according to interests-abilities and for introduction of the occupations and universities. 2) Science/Physics/Physics lessons should be caused to love. 3) University Entrance Exam should be changed and selection of the high school students to education faculty as a pre-service teacher should be fussed. 4) Teacher Education Program of the universities should be overviewed by the experts and changes and innovations

should be made. 5) Teacher Academies should be set up. 6) Ministry of National Education, Turkish Council of Higher Education, and Turkish Council of Higher Education Student Selection and Placement Center should work in cooperation and collaboration. 7) Changes and innovation should be made in Education System of Turkey from elementary school level to university level. 8) Public Personnel Selection Exam (KPSS) should be abolished or changes and innovations should be made. 9) Physical inadequacies of the universities should be improved and the universities should be promoted economically much more. 10) The students should not be gotten in some departments which are not domestic demand or these departments should be closed. 11) The university the lecturers should developed themselves and follow the innovations. 12) Scholarship of the students should be increased. 13) Physics teachers should be appointed and employment opportunity should be provided. 14) Much more budget from the national economy should be given to education. 15) Salary of the teachers should be increased. 16) Class load of the lecturers should be reduced. 17) The numbers of the lecturers should be increased.

CHAPTER 5

CONCLUSIONS, DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

Purpose of this study is to search the opinions of the lecturers and the pre-service physics teachers in 5 years Physics Teacher Education Program and in 4+1.5 years Physics Teacher Education Program on the problems occurred before entering Physics Teacher Education Program, during Physics Teacher Education Program, and after graduation from Physics Teacher Education Program. The findings are usually analysed by comparing the responses of three groups of the participants to parallel questions.

In this chapter, conclusions are presented, the results are discussed, internal and external validity considerations are given and finally implications and recommendations for further research are offered.

5.1 Conclusions

The conclusions derived from the results of the study can be outlined in the three dimensions.

5.1.1 The problems occurred before entering Physics Teacher Education Program

1. The pre-service physics teachers do not come to 5 years Physics Teacher Education Program willingly and consciously.

2. University entrance exam point determines the future of the students much more than their request and other reasons.
3. Guiding services of the high schools do not work sufficiently to orientate the high school students to Physics Teacher Education Program.
4. Characteristics which are important and necessary to be a good physics teacher can not be measured with university entrance exam. The lecturers and pre-service teachers want a university entrance exam consisting of multiple exams and assessing all education life.
5. Quota affects the education of quality physics teachers.

5.1.2 The problems occurred during Physics Teacher Education Program

1. The lecturers and the pre-service physics teachers state that Physics Teacher Education Program can not cause the pre-service teachers to gain the efficiencies completely in physics subject matter knowledge, general pedagogical knowledge, and general knowledge which are determined by Ministry of National Education.
2. The lecturers and the pre-service physics teachers state that pre-service physics teachers are insufficient on astronomy, instructional measurement-evaluation, material development, art of public speaking, philosophy, and history.
3. The pre-service physics teachers are insufficient on physics subject matter knowledge, general pedagogical knowledge, and general knowledge
4. The lecturers and the pre-service physics teachers state that physics subject matter knowledge lessons are sufficient from the theoretical point of view but

insufficient from the implementation point of view. However, general pedagogical knowledge lessons and general knowledge lessons are insufficient from the theoretical and application point of view.

5. Different teaching methods and measurement-evaluation techniques are not used by the lecturers in the physics subject matter knowledge lessons, general pedagogical knowledge lessons, and general knowledge lessons.
6. The lecturers and the pre-service physics teachers want to be taken place 'Physics at High School Level' and 'Physics Applications at High School Level' in Physics Teacher Education Program as must courses.
7. The lecturers and the pre-service physics teachers state that elective courses are not well qualified, the numbers of the elective courses are not enough, and elective courses do not contain students' needs.
8. The lecturers state that increasing the period of Physics Teacher Education Program do not supplement better qualified physics teachers in Turkey.
9. The lecturers think that 1.5 years Graduate Without Thesis Program is different from the old Teaching Certificate Program.
10. The lecturers state that 5 years Physics Teacher Education Program is better than 4+1.5 years Physics Teacher Education Program.
11. The numbers of the lecturers in Physics Teacher Education Department is not adequate.
12. In Physics Teacher Education Program the numbers of the lecturers who study on pure physics is more than study on physics education.
13. Half of the lecturers did not gain experience as a teacher.

14. The class load of the lecturers in Physics Teacher Education Department is too much and they state that they can not follow the studies and researches because of that.
15. The lecturers in Physic Teacher Education Program have published articles on physics more than on physics education.
16. The lecturers, especially research assistants, have to study in the crowded rooms.
17. The lecturers suggest the activities which can be done for solving the problems of the pre-service physics teachers: Periodic meetings and seminars should be held, a guidance office should be established in the Physics Teacher Education Department, guidance hours should be adjusted, the numbers of the lecturers should be increased.
18. The opportunities given to the pre-service physics teachers for individual and academic development by the universities are not sufficient.
19. Ministry of National Education and Education Faculties are not within communication and cooperation to educate better physics teachers.
20. The researches and the projects on physics teacher education are supported little or partially by research funds of university and education faculty.
21. Physics Teacher Education Department does not assess itself regularly and systematically, and the results are not reflected to the content of the lessons.

5.1.3 The problems occurred after graduation from Physics Teacher Education Program

1. The lecturers and the pre-service physics teachers state that Public Personnel Selection Exam can not measure a pre-service physics teacher has characteristics of a good physics teacher or not.
2. The lecturers and the pre-service physics teachers think that the pre-service physics teachers will not find a job and this thought affects the pre-service physics teachers negatively.
3. The lecturers state that physical conditional inadequacies of the high school is the mostly coming across problem while working as a physics teacher in Turkey

5.2 Discussion of the Results

The results of the study are compared with the previous studies in the literature in the three dimensions.

5.2.1 The problems occurred before entering Physics Teacher Education Program

Results of the data analysis indicated that the pre-service physics teachers do not come to 5 years Physics Teacher Education Program willingly and consciously and university entrance exam point determines the future of the students much more than their request and other reasons. The results support Demircioğlu, Bulut, and Yıldırım's (1997) argument that teaching profession has to be chosen consciously or the students have to be attained education faculties by selection to prevent the moral and material losses. However, in our country, attaining of students to education faculties is unwillingly because of wrong choice at university entrance exam.

In this study, the lecturers and the pre-service physics teachers think that the first and the most important characteristic to be a good physics teacher is to love teaching carrier. This result support Demircioğlu, Bulut, and Yıldırım's (1997) argument that a pre-service teacher has to love teaching, students, and people because having well subject knowledge is not lonely sufficient to be a good teacher.

I could not find any studies in the literature examining the selection of students for Physics Teacher Education Program and the quota of Physics Teacher Education Program to compare the results with this study.

5.2.2 The problems occurred during Physics Teacher Education Program

Results of the study indicated that the pre-service physics teachers are insufficient on physics subject matter knowledge because they try to memorize the physics subjects which they can not understand and do not have a good grasp of the physics, the lessons are taught very theoretical and different teaching methods are not used in the lessons. The results support study of Lederman, Gess-Newsome, and Latz (1994) that the planning and implementation of science lessons directly influenced the pre-service teachers' conceptualization of subject matter, and Eryılmaz (1999) that the types of instruction plays important role on the achievement of pre-service physics teachers in physics.

Any studies in the literature examining the reasons of the pre-service physics teachers being insufficient on general knowledge could not be found by the researcher to compare the results with this study.

The lecturers and the pre-service physics teachers stated that physics subject matter knowledge lessons are sufficient from the theoretical point of view but

insufficient from the implementation point of view. The findings of this study are in agreement with study of Akdeniz, Çepni, and Azar (1999) and Gemici, Küçüközer, and Kocakülah (2002) that the pre-service physics teachers are not trained well at laboratory courses.

The lecturers and the pre-service physics teachers think that general pedagogical knowledge lessons are insufficient from the theoretical and application point of view. This results support study of Azar and Ayas (1998), Battal (1998), and Yıldırım (1998) that education which is given before service to teachers is more theoretical and importance does not attach to practice studies. As a result, pre-service teachers meet some problems at school experiences, such as; not keeping discipline and classroom management, not evaluating the students' studies, not using the correct teaching materials, no knowing asking question techniques, not motivating the students to lesson, not determining the individual differences.

The results indicated that general pedagogical knowledge lessons are insufficient from the theoretical and application point of view. This result supports Okçabol's (2005) argument that there are not sufficient courses to improve students' culture in teacher education programs.

The lecturers and the pre-service physics teachers wanted to be taken place 'Physics at High School Level' and 'Physics Applications at High School Level' in Physics Teacher Education Program as must courses. This result supports study of McDermott (1990), Çepni and Akdeniz (1996), and Eryılmaz (1999) that existing curriculum of the physics education program does not have courses with adequate contents to physics at the high school level.

I could not find any studies in the literature examining whether elective courses in Physics Teacher Education Program are well qualified, the numbers of them are adequate, and they contain students' needs to compare the results with this study.

The result showed that classical teaching method, lecture, is most used by the lecturers in the physics subject matter knowledge lessons, in the general pedagogical knowledge lessons, and general knowledge lessons. This result support study of Eryılmaz (1999) that most of the physics courses is taught in the lecture format and pre-service teachers have to become familiar with lecturing as a mode of instruction. Any studies in the literature examining which teaching methods are most used by the lecturers in general knowledge could not be found by the researcher to compare the results with this study.

The lecturers and the pre-service physics teachers stated that essay type questions in the midterm and final exams are mostly used by the lecturers in the physics subject matter knowledge lessons, general pedagogical knowledge lessons, and general knowledge lessons. This result support study of Trumbull and Kerr (1993) that the scientists use routine tests and papers to evaluate student learning for advanced physics courses. There are no studies found in the literature examining which measurement-evaluation techniques are most used by the lecturers in general knowledge lessons to compare the results with this study.

The lecturers think that increasing the period of Physics Teacher Education Program do not supplement better qualified physics teachers in Turkey. This results support arguments of Duman (1998), Ergün (1998), Kırbıyık (1998), Saçlı (1998), and Akyüz (2004).

The lecturers stated that 1.5 years Graduate Without Thesis Program is different from the old Teaching Certificate Program. This results support arguments of Duman (1998), Yıldırım (1998), and Baskan (2001).

The results showed that the lecturers think that 5 years Physics Teacher Education Program is better than 4+1.5 years Physics Teacher Education Program. This results support arguments of Duman (1998) and Kırbıyık (1998).

The results indicated that quality and quantity of the lecturers in Physics Teacher Education Program is not adequate. This result support study of Alkan (1993), Trumbull and Kerr (1993), Öztürk, (1999), Işık and Soran (2000), and Baskan (2001) that quality and quantity insufficiency of the lecturers are important problems of education faculties.

Results of the data analysis indicated that the opportunities given to the pre-service physics teachers for individual and academic development by the universities are not sufficient. This result support arguments of Mc Dermott (1990), Alkan (1993), Balcı (2002), and Okçabol (2005).

The lecturers stated that Ministry of National Education and Education Faculties are not within communication and cooperation to educate better physics teachers. This result support arguments of Battal (1998), Duman (1998), and Oktay (1998).

5.2.3 The problems occurred after graduation from Physics Teacher Education Program

The lecturers and the pre-service physics teachers stated that Public Personnel Selection Exam can not measure a pre-service physics teacher has characteristics of a

good physics teacher or not. They suggested that innovations and changes should be done in Public Personnel Selection Exam such as, a progressive selection system consisting interview, examination composed of physics test, and presentation in the classroom. This result support study of Arslan (1997).

Any studies in the literature examining how unemployment anxiety affects academic success of the pre-service physics teachers could not be found by the researcher to compare the results with this study.

5.3 Internal Validity of the Study

The internal validity of the study refers to the degree to which extraneous variables may influence the results of the research. There are four main threats to validity in survey research: Mortality, location, instrumentation, and instrument decay. Possible threats to internal validity and methods use to cope with them throughout the study are presented in this section.

Mortality threats is the possibility that results are due to the fact that subjects who are for whatever reason ‘lost’ to a study may differ from those who remain so that their absence has an important effect on the results of the study. For this study, this threat is prevented by considering the missing data on the questionnaires. The LQ and the PPTQ-2 are intended to be implemented in 35 universities with 4+1.5 years Physics Teacher Education Program in Turkey. The PPTQ-1 is to be implemented in all of the 12 faculties with 5 years Physics Teacher Education Program in Turkey. Instruments are implemented by direct administration in the universities in Ankara and for the other universities out of Ankara they are sent by cargo. However, 18 universities gather in the study by sending the questionnaire

back. So 63 % of the target population for the lecturers, 60 % of the target population for the pre-service physics teachers in 5 years Physics Teacher Education Program, and 33 % of the target population for the pre-service physics teachers in 4+1.5 years Physics Teacher Education Program was reached.

Location threat results from the possibility that results are due to characteristics of the setting or location in which a study is conducted and instrumentation threat arises from the variations in the way of data collection. In order to cope with location and instrumentation threats, adapted settings of subjects are preferred for the implementation of the instruments and they are similar for the participants in Ankara. The appropriateness of the setting for the subjects is given essence during applications in direct administration, but it can not be proved for the instruments sent by cargo since the researcher is not present in them. However, for those questionnaires to be implemented in the absence of researcher a detailed application directions explaining the instructions for administering and required time is sent together with the questionnaire. Moreover, an application form learning how the questionnaires were applied to pre-service physics teachers, in the classroom or given and taken back one week later, is also sent.

Instrument decay can occur in survey researches if the participants get tired or are rushed and that may affect the internal validity of the study. The instruments are implemented once. Although the questionnaires seem long, giving response is easy and the duration time is nearly 20-25 minutes. It is paid attention that participants are not tired or too busy at the time of implementation of the instrument.

5.4 External Validity of the Study

The study is intended to be conducted on the target population of the lectures and the pre-service physics teachers. So the instruments are sent to all of the 5 years Physics Teacher Education Program and 4+1.5 years Physics Teacher Education Program in Turkey. However, despite the efforts only 63 % of the target population for the lecturers, 70 % of the target population for the pre-service physics teachers in 5 years Physics Teacher Education Program, and 33 % of the target population for the pre-service physics teachers in 4+1.5 years Physics Teacher Education Program can be reached. Since the universities which resent the questionnaire is not selected by the researcher, a kind of randomization occurs. So the three groups of samples used in the study can be accepted to be representatives of the target population, the results of the study can be generalized to all the lecturers and the pre-service physics teachers.

5.5 Implications

This study reveals the current situation about issues related to education of the pre-service physics teachers in Turkey. According to the findings of the study and the previous studies done, following suggestions can be offered:

5.5.1 The problems occurred before entering Physics Teacher Education Program

1. The results of the study showed that the high school students do not come to 5 years Physics Teacher Education Program willingly and consciously. Therefore, guiding services of the high schools should work more sufficiently. The abilities and interest of the students should be determined at

high school and then the students who love physics and teaching career should be oriented to Physic Teacher Education Program. The occupations should be introduced more systematically and tours should be organized to universities. The economical and spiritual respectability of the teaching career should be enhanced in Turkey.

2. The lecturers and the pre-service teachers stated that characteristics which are important and necessary to be a good physics teacher can not be measured with university entrance exam. So, Turkish Council of Higher Education should made changes and innovations in university entrance exam. More than one examination should be held; multiple choice test, performance exam, psychological test, interview. Each university should hold own entrance exam. The students should be gotten from Anatolian Teacher Training High Schools directly.
3. The past studies indicated that more high school teachers were educated than demand of the country due to wrong educational policy. And now, there are over employment physics teachers in Turkey and they are waiting for the appointment. Consequently, Ministry of National Education should make need assessment of our country about the number of physics teachers and the quota of the Physics Teacher Education Program should be changed according the results.

5.5.2 The problems occurred during Physics Teacher Education Program

1. The lecturers and the pre-service physics teachers stated that Physics Teacher Education Program can not cause the pre-service teachers to gain the

efficiencies completely in physics subject matter knowledge, general pedagogical knowledge, and general knowledge which are determined by Ministry of National Education. Thus, 5 years Physics Teacher Education Program should be overviewed by the experts and changes and innovations should be made to educate better physics teachers. Physics lessons and general education lessons should be expanded in 5 years. Physics lessons at high school level should be added to program. More implementation hours should be added to general education lessons. More importance should be given to general knowledge education of the pre-service physics teachers and so more general knowledge lessons should be added to program. The alternatives and numbers of the elective courses should be increased. University training should be completed with two exit examinations as in Germany.

2. The results of the study together with the past studies showed that 4+1.5 years Physics Teacher Education Program has deficiencies and so, it should be reconstructed. This program only should be put into practice by the universities which have Secondary Science and Mathematics Education Department. New physics and general pedagogical knowledge lessons at graduate level should be added to program.
3. The findings indicated that classical teaching methods and measurement-assessment techniques are most used by the lecturers in the lessons. To educate better physics teacher, the lecturers should use student centred different teaching methods and measurement-evaluation techniques in the lessons.

4. The results showed that the quality and the quantity of the lecturers in Physics Teacher Education Program are not adequate. Therefore, the number of the lecturers especially physics educationalists in Physics Teacher Education Program should be increased. The class load of the lecturers should be decreased. The opportunities given to the lecturers by the university should be improved to study at ease. Financial supports should be given to the lecturers to attend in the conferences, congresses, and seminars in Turkey and abroad and make researches and studies to educate better physics teachers.
5. The results indicated that physical conditions of the education faculties are insufficient. Consequently, the universities should be promoted economically much more to improve the physical conditions and to increase opportunities given to the pre-service teachers for individual and academic development of themselves.
6. Since lacking of co-ordination among the responsible units causes the major problems, it should start working actively to provide the flow of knowledge and communication between Ministry of National Education, Turkish Council of Higher Education and Education Faculties to educate better physics teachers.

5.5.3 The problems occurred after graduation from Physics Teacher Education Program

1. The lecturers and the pre-service physics teachers stated that Public Personnel Selection Exam can not measure a pre-service physics teacher has characteristics of a good physics teacher or not. So, changes and innovations

should be made in Public Personnel Selection Exam. More than one examination should be held: Multiple choice test including questions related to physics subject matter knowledge, general pedagogical knowledge, and general knowledge; performance exam; psychological test, interview.

2. Ministry of National Education did not appoint physics teachers for a few years and now there are over employment young physics teachers in Turkey. Therefore, the quota of the Physics Teacher Education Program should be decreased and desiorus students should be chosen to program.
3. The lecturers stated that physical conditional inadequacies of the high schools, restriction of the physics education by the university entrance exam, being low of spiritual and economical respectability of teaching career are the problems mostly occurred working as a physics teacher in Turkey. So, much more budget from the national economy should be given to education, physical conditional inadequacies of the high schools should be improved by help of the private companies and the guardian of the students, curriculum of university entrance exam should be run parallel with curriculum of high school physics lessons, salary of the teachers should be increased.

5.6 Recommendations for Further Studies

Using the findings in this survey;

A comparative study can be designed about selection of students for Physics Teacher Education Program in Turkey and in the world.

Three qualitative researches can be developed as a continuum of this study, searching separately the reasons of opinions of the participants on physic subject

matter knowledge education, general pedagogical knowledge education, and general knowledge education. Because major limitation in this study is not being able to having interviews with the participants after questioning since it is a survey.

A comparative study can be designed about general knowledge education of the pre-service teachers in Turkey and in the world.

A comparative study can be designed about the advantages and disadvantages of 5 years Physics Teacher Education Program and 4+ 1.5 years Physics Teacher Education Program.

This study reveals the current situation about Physics Teacher Education Program. Further studies can be developed in order to search about the ideal Physics Teacher Education Program and how to reach it in the light of this research.

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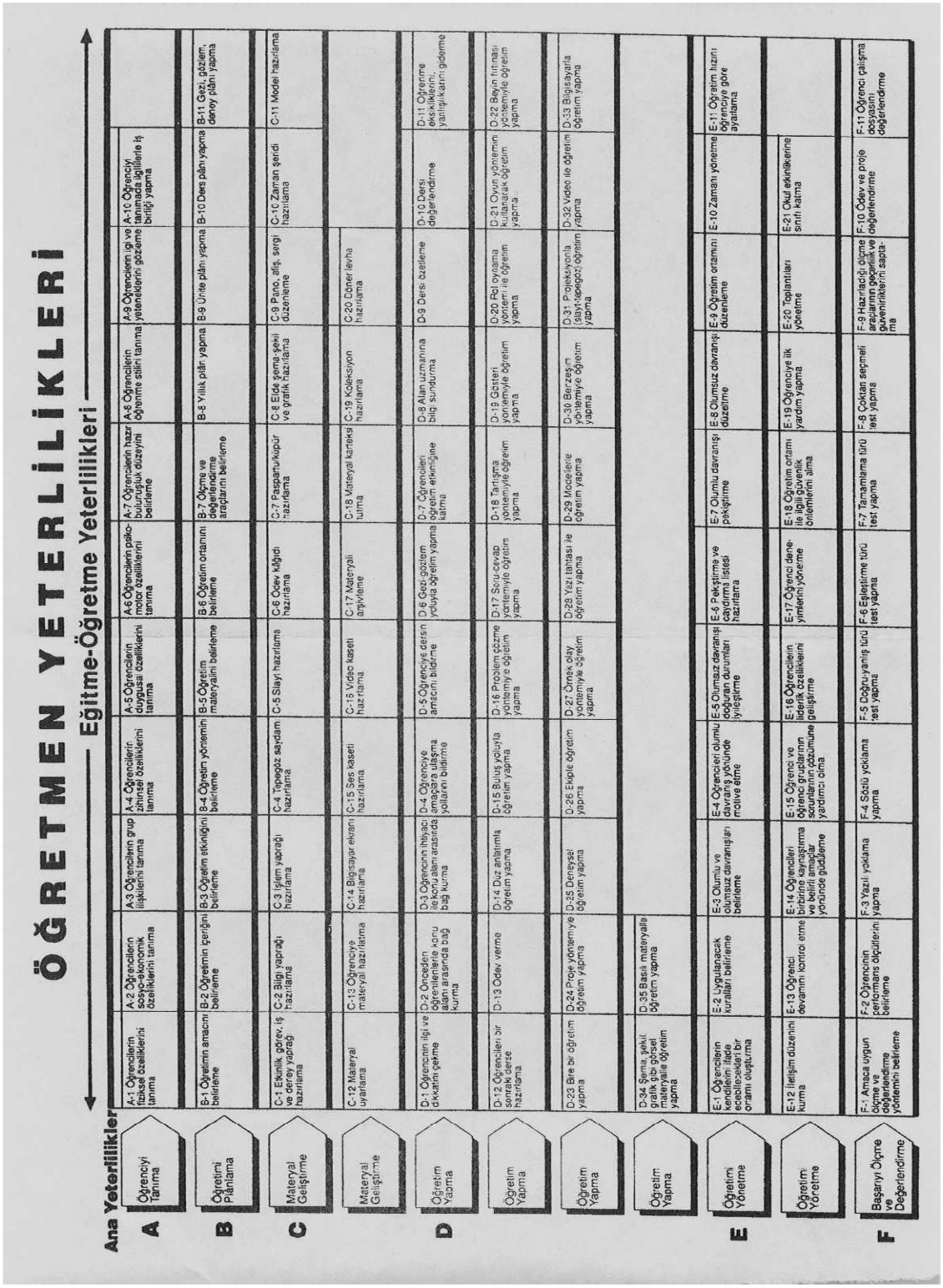
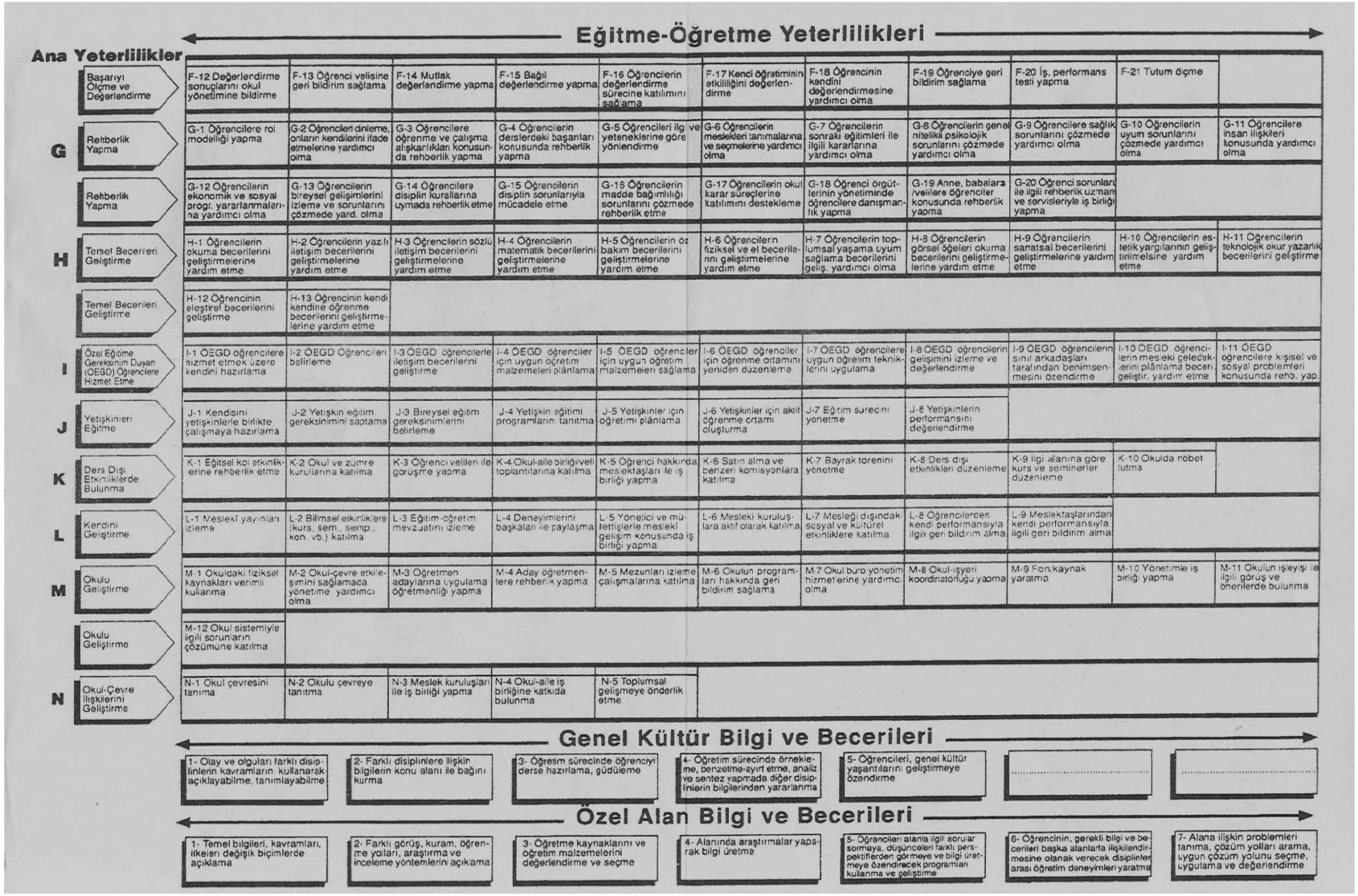
APPENDIX A

TEACHER QUALITIES




Eğitme-Öğretme Yeterlilikleri
Ana Yeterlilikler
Başarıyı Ölçme ve Değerlendirme
F-12 Değerlendirme sonuçlarını okul yönetimine bildirme
F-13 Öğrenci velisine geri bildirim sağlama
F-14 Mutlak değerlendirme yapma
F-15 Bağıl değerlendirme yapma
F-16 Öğrencilerin değerlendirme sürecine katılımını sağlama
F-17 Kendi öğretiminin etkililiğini değerlendirme
F-18 Öğrencinin kendini değerlendirmesine yardımcı olma
F-19 Öğrenciye geri bildirim sağlama
F-20 İş, performans testi yapma
F-21 Tutum ölçme
G
Rehberlik Yapma
G-1 Öğrencilere rol modelliği yapma
G-2 Öğrencileri dinleme, onların kendilerini ifade etmelerine yardımcı olma
G-3 Öğrencilere öğrenme ve çalışma alışkanlıkları konusunda rehberlik yapma
G-4 Öğrencilerin derslerdeki başarıları konusunda rehberlik yapma
G-5 Öğrencileri ilgi ve yeteneklerine göre yönlendirme
G-6 Öğrencilerin meslekleri tanımalarına ve seçmelerine yardımcı olma
G-7 Öğrencilerin sonraki eğitimleri ile ilgili kararlarına yardımcı olma
G-8 Öğrencilerin genel nitelikli psikolojik sorunlarını çözmede yardımcı olma
G-9 Öğrencilere sağlık sorunlarını çözmede yardımcı olma
G-10 Öğrencilerin uyum sorunlarını çözmede yardımcı olma
G-11 Öğrencilere insan ilişkileri konusunda yardımcı olma
Rehberlik Yapma
G-12 Öğrencilerin ekonomik ve sosyal progr. yararlanmalarına yardımcı olma
G-13 Öğrencilerin bireysel gelişimlerini izleme ve sorunlarını çözmede yard. olma
G-14 Öğrencilere disiplin kurallarına uymada rehberlik etme
G-15 Öğrencilerin disiplin sorunlarıyla mücadele etme
G-16 Öğrencilerin madde bağımlılığı sorunlarını çözmede rehberlik etme
G-17 Öğrencilerin okul karar süreçlerine katılımını destekleme
G-18 Öğrenci örgütlerinin yönetiminde öğrencilere danışmanlık yapma
G-19 Anne, babalara /velilere öğrenciler konusunda rehberlik yapma
G-20 Öğrenci sorunları ile ilgili rehberlik uzman ve servisleriyle iş birliği yapma
H
Temel Becerileri Geliştirme
H-1 Öğrencilerin okuma becerilerini geliştirmelerine yardım etme
H-2 Öğrencilerin yazılı iletişim becerilerini geliştirmelerine yardım etme
H-3 Öğrencilerin sözlü iletişim becerilerini geliştirmelerine yardım etme
H-4 Öğrencilerin matematik becerilerini geliştirmelerine yardım etme
H-5 Öğrencilerin öz bakım becerilerini geliştirmelerine yardım etme
H-6 Öğrencilerin fiziksel ve el becerilerini geliştirmelerine yardım etme
H-7 Öğrencilerin toplumsal yaşama uyum sağlama becerilerini geliş. yardımcı olma
H-8 Öğrencilerin görsel öğeleri okuma becerilerini geliştirmelerine yardım etme
H-9 Öğrencilerin sanatsal becerilerini geliştirmelerine yardım etme
H-10 Öğrencilerin estetik yargılarının gelişimine/sine yardım etme
H-11 Öğrencilerin teknolojik okur yazarlık becerilerini geliştirme
Temel Becerileri Geliştirme
H-12 Öğrencinin eleştirel becerilerini geliştirme
H-13 Öğrencinin kendi kendine öğrenme becerilerini geliştirmelerine yardım etme
I
Özel Eğitime Gereksinim Duyan (ÖEGD) Öğrencilere Hizmet Etme
I-1 ÖEGD öğrencilere hizmet etmek üzere kendini hazırlama
I-2 ÖEGD Öğrencileri belirleme
I-3 ÖEGD öğrencilerle iletişim becerilerini geliştirme
I-4 ÖEGD öğrenciler için uygun öğretim malzemeleri planlama
I-5 ÖEGD öğrenciler için uygun öğretim malzemeleri sağlama
I-6 ÖEGD öğrenciler için öğrenme ortamını yeniden düzenleme
I-7 ÖEGD öğrencilere uygun öğretim teknikllerini uygulama
I-8 ÖEGD öğrencilerin gelişimini izleme ve değerlendirme
I-9 ÖEGD öğrencilerin sınıf arkadaşları tarafından benimsenmesini özendirme
I-10 ÖEGD öğrencilerin mesleki geleceklerini planlama beceri geliştir. yardım etme
I-11 ÖEGD öğrencilere kişisel ve sosyal problemleri konusunda reh. yap.
J
Yetişkinleri Eğitme
J-1 Kendisini yetişkinlerle birlikte çalışmaya hazırlama
J-2 Yetişkın eğitim gereksinimini saptama
J-3 Bireysel eğitim gereksinimlerini belirleme
J-4 Yetişkin eğitimi programlarını tanıtma
J-5 Yetişkinler için öğretimi planlama
J-6 Yetişkinler için aktif öğrenme ortamı oluşturma
J-7 Eğitim sürecini yönetme
J-8 Yetişkinlerin performansını değerlendirme
K
Ders Dışı Etkinliklerde Bulunma
K-1 Eğitsel kol etkinliklerine rehberlik etme
K-2 Okul ve zümre kurullarına katılma
K-3 Öğrenci velileri ile görüşme yapma
K-4 Okul-aile birliği veli toplantılarına katılma
K-5 Öğrenci hakkında meslektaşları ile iş birliği yapma
K-6 Satın alma ve benzeri komisyonlara katılma
K-7 Bayrak törenini yönetme
K-8 Ders dışı etkinlikleri düzenleme
K-9 İlgi alanına göre kurs ve seminerler düzenleme
K-10 Okulda nöbet tutma
L
Kendini Geliştirme
L-1 Mesleki yayınları izleme
L-2 Bilimsel etkinliklere (kurs, sem., semp., kon. vb.) katılma
L-3 Eğitim-öğretim mevzuatını izleme
L-4 Deneyimlerini başkaları ile paylaşma
L-5 Yönetici ve müfettişlerle mesleki gelişim konusunda iş birliği yapma
L-6 Mesleki kuruluşlara aktif olarak katılma
L-7 Mesleği dışındaki sosyal ve kültürel etkinliklere katılma
L-8 Öğrencilerden kendi performansıyla ilgili geri bildirim alma
L-9 Meslektaşlarından kendi performansıyla ilgili geri bildirim alma
M
Okulu Geliştirme
M-1 Okuldaki fiziksel kaynakları verimli kullanma
M-2 Okul-çevre etkileşimini sağlamada yönetime yardımcı olma
M-3 Öğretmen adaylarına uygulama öğretmenliği yapma
M-4 Aday öğretmenlere rehberlik yapma
M-5 Mezunları izleme çalışmalarına katılma
M-6 Okulun programları hakkında geri bildirim sağlama
M-7 Okul büro yönetim hizmetlerine yardımcı olma
M-8 Okul-işyeri koordinatörlüğü yapma
M-9 Fon kaynak yaratma
M-10 Yönetimle iş birliği yapma
M-11 Okulun işleyişi ile ilgili görüş ve önerilerde bulunma
Okulu Geliştirme
M-12 Okul sistemiyle ilgili sorunların çözümüne katılma
N
Okul-Çevre İlişkilerini Geliştirme
N-1 Okul çevresini tanıma
N-2 Okulu çevreye tanıtma
N-3 Meslek kuruluşları ile iş birliği yapma
N-4 Okul-aile iş birliğine katkıda bulunma
N-5 Toplumsal gelişmeye önderlik etme
Genel Kültür Bilgi ve Becerileri
1- Olay ve olguları farklı disiplinlerin kavramlarını kullanarak açıklayabilme, tanımlayabilme
2- Farklı disiplinlere ilişkin bilgilerin konu alanı ile bağını kurma
3- Öğretim sürecinde öğrenciyi derse hazırlama, güdüleme
4- Öğretim sürecinde örnekleme, benzetme-ayırt etme, analiz ve sentez yapmada diğer disiplinlerin bilgilerinden yararlanma
5- Öğrencileri, genel kültür yaşantılarını geliştirmeye özendirme
Özel Alan Bilgi ve Becerileri
1- Temel bilgileri, kavramları, ilkeleri değişik biçimlerde açıklama
2- Farklı görüş, kuram, öğrenme yolları, araştırma ve inceleme yöntemlerini açıklama
3- Öğretme kaynaklarını ve öğretim malzemelerini değerlendirme ve seçme
4- Alanında araştırmalar yaparak bilgi üretme
5- Öğrencileri alanla ilgili sorular sormaya, düşünceleri farklı perspektiflerden görmeye ve bilgi üretmeye özendirecek programları kullanma ve geliştirme
6- Öğrencinin, gerekli bilgi ve becerileri başka alanlarla ilişkilendirmesine olanak verecek disiplinler arası öğretim deneyimleri yaratma
7- Alana ilişkin problemleri tanıma, çözüm yolları arama, uygun çözüm yolunu seçme, uygulama ve değerlendirme

APPENDIX B

Pre-service Physics Teacher Questionnaire-1

ÖĞRETMEN ADAYI ANKETİ

Değerli öğretmen adayı,

Bu anket fizik öğretmenliği bölümünde okuyan öğrencilerin eğitimle ilgili problemlerini belirlemek amacı ile hazırlanmıştır. ODTÜ Fen Bilimleri Enstitüsü bünyesinde 'Türkiye deki Fizik Öğretmenliği Öğrencilerinin Eğitim-Öğretimle İlgili Sorunlarının Analizi' adıyla yürütülmekte olan yüksek lisans tez çalışmasında kullanılacak olan bu ankete vereceğiniz tutarlı cevaplar, çalışmanın verimliliği açısından önem taşımaktadır. Bu çalışmadan elde edilecek bulgular, Milli Eğitim Bakanlığı'nın,Yüksek Öğretim Kurumu'nun ve ilgili eğitim-öğretimi veren üniversitelerin 'Türkiye de neden iyi fizik öğretmenleri yetiştiremiyoruz?' sorusuna yanıt bulmalarına yardımcı olacak ve Fizik Öğretmenliği Programında yapılacak yeniliklere ışık tutacaktır. Araştırmanın geçerliliği cevaplarınızın samimiyetine bağlıdır. **Sorularda birden fazla seçeneği işaretleyebilirsiniz**. Anket formuna adınızı yazmanız gerekmemektedir. Değerli vaktinizi ayırarak araştırmama yapacağınız katkıdan dolayı teşekkür ederim.

ANKET SORULARI

Devam ettiğiniz programı işaretleyiniz: ( ) 5 yıllık fizik öğretmenliği programı ( ) 4+1,5 tezsiz yüksek lisans programı

1. Fizik Öğretmenliği Bölümünü isteyerek ve bilinçli olarak mı tercih ettiniz?
( )Evet ( ) Kısmen ( )Hayır

2.1. Fizik Öğretmenliği Bölümü üniversiteye giriş sınavında kaçıncı tercihinizdi? …….
2.2. Neden?
( ) Fizik öğretmeni olmayı çok istediğim için ( ) Burs alabilmek için
( ) Ek puan alabilmek için ( ) Kolay iş bulabilmek için
( ) Diğer (……)

3.1. Aşağıdakilerden hangisi/hangileri öğrencilerin Fizik Öğretmenliği Bölümüne yönlendirilmesini daha sistemli ve düzenli olarak yapıyor?
( ) Okuduğum lise ( ) Devam ettiğim dershane ( ) Yayınlanan yazılı kaynaklar
( ) Diğer (……..…..…….)
3.2. Sizce başarılı öğrencilerin Fizik Öğretmenliği Bölümüne yönlendirilmesi için neler yapılması gerekir?
……
……
……

4.1. Fizik öğretmenliği bölümüne alınacak öğrencilerde aranması gereken nitelikler neler olmalıdır?
( ) 1. Mesleği sevmek ( ) 2. Öğrenmeyi ve öğretmeyi sevmek
( ) 3. İnsanları sevmek ( ) 4. Olumlu kişilik özelliklerine sahip olmak
( ) 5. İdealist olmak ( ) 6. Araştırmacı bir kişiliğe sahip olmak
( ) 7. Çalışkan olmak ( ) 8. Türkçe'yi doğru ve akıcı kullanabilmek
( ) 9. Sağlıklı fiziksel bir görünüme sahip olmak ( ) 10. Sağlıklı bir ruhsal yapıya sahip olmak
( ) 11. Yeterli fen ve matematik bilgisine sahip olmak ( ) 12. Diğer (……..……....)

4.2. Şu anki sistem öğrencilerde aranması gereken bu niteliklerden hangilerini ölçebiliyor? (Lütfen numaraları yazınız)
……
4.3. Şu anki sistemin ölçemediği, öğrencilerde aranması gereken nitelikleri nasıl ölçebiliriz?
……
……
……

5.1. Fizik öğretmenliği bölümünün öğrenci kontenjanı azaltılırsa daha iyi fizik öğretmenleri yetiştirebilir miyiz?
( ) Evet ( ) Kısmen ( ) Hayır
5.2. Kontenjan sayısının kaç olması gerekir? ( )1-10 ( )10-20 ( )20-30 ( )……
5.3. Neden?
……
……
……

6. Fizik alan bilginizin aşağıda yazılı olan hangi konularda yetersiz olduğunu düşünüyorsunuz?
   - ( ) Madde ve özellikleri
   - ( ) Dalgalar
   - ( ) Mekanik
   - ( ) Termodinamik
   - ( ) Lise seviyesinde fizik
   - ( ) Elektrik ve Manyetizma
   - ( ) Optik
   - ( ) Modern Fizik
   - ( ) Astronomi
   - ( ) Lise seviyesinde fizik laboratuar uygulamaları
   - ( ) Diğer (……..……..…….)

7. Eğitim alan bilginizin aşağıda yazılı olan hangi konularda yetersiz olduğunu düşünüyorsunuz?
   - ( ) Öğrenciyi tanıma
   - ( ) Öğretim yapma
   - ( ) Materyal geliştirme
   - ( ) Rehberlik yapma
   - ( ) Öğretimi planlama
   - ( ) Öğretim ve sınıf yönetimi
   - ( ) Başarıyı ölçme ve değerlendirme
   - ( ) Diğerleri(…….)

8. Genel kültür bilginizin aşağıda yazılı olan hangi konularda yetersiz olduğunu düşünüyorsunuz?
   - ( ) Türkçe/Edebiyat
   - ( ) Tarih
   - ( ) Sosyoloji
   - ( ) Güzel Sanatlar
   - ( ) Güzel Konuşma/Hitabet
   - ( ) Felsefe
   - ( ) Psikoloji
   - ( ) Diğer (……..……....)

9. Kendinizi yetersiz bulduğunuz konularda başarısız olmanızın nedenleri nelerdir?

Öğrencilerin başarısız olma nedenleri	Fizik Alan Derslerinde	Eğitim Derslerinde	Genel Kültür Derslerinde
Derslerin konuları çok soyut, anlamıyorum			
Anlamadığım konuları ezberlemeye çalışıyorum			
Dersler çok teorik işleniyor			
Derslerde uygulamaya yeterli zaman ayrılmıyor			
Deneyimli öğretmenler sınıf ortamına davet edilmiyor ve örnek uygulamalar sınıf içinde yapılmıyor			
Derslerde farklı öğretim yöntemleri ve teknikleri kullanılmıyor			
Derslerde farklı ölçme-değerlendirme yöntemleri kullanılmıyor			
Konu anlatılırken günlük yaşamdan örneklere yer verilmiyor			
Dersleri başarabilmek için yeterli matematik bilgisine sahip değilim			
Analitik düşünme yeteneğine sahip değilim			
Üç boyutlu çizimleri anlayamıyorum			
Grafikleri yorumlayamıyorum			
Dersleri başarabilmek için yeterli fizik bilgisine sahip değilim			
Kavram yanılgıları var fakat bunları düzeltemiyorum			
Yabancı dille eğitim yapıldığı için konuyu anlayamıyorum			
Derslerin içeriği çok yoğun			
Derslerin,fizik öğretmeni olmak için gerekli olduğuna inanmıyorum			
Derslere gereken önemi vermiyorum			
Diğer (……)			
Diğer (……)			
Diğer (……)			

10. Fizik öğretmenliği programında zorunlu derslere ek olarak yer almasını istediğiniz konular aşağıdaki zorunlu derslerin hangilerinin içeriğinde yer alabilir?
    - ( ) Bilim Tarihi
    - ( ) İlkyardım
    - ( ) Eğitim Psikolojisi
    - ( ) Eğitim Felsefesi
    - ( ) Lise Seviyesinde Fizik Lab. Uyg.
    - ( ) Bilim Felsefesi
    - ( ) Türk Eğitim Tarihi
    - ( ) Eğitim Sosyolojisi
    - ( ) Güzel Konuşma ve Diksiyon
    - ( ) Lise Seviyesinde Fizik
    - ( ) Araştırma teknikleri
    - ( ) Fen/ Fizik Eğitimi Tarihi
    - ( ) Eğitim Yönetimi
    - ( ) İnsan Hakları ve Demokrasi
    - ( ) Sağlık
    - ( ) Diğer (……..……)

11. Fizik öğretmenliği programında açılan seçmeli dersler hakkında ne düşünüyorsunuz?
    - 11.1. Nitelikli, içeriği dolgun olan dersler mi? ( ) Evet ( ) Kısmen ( ) Hayır
    - 11.2. Sayısı yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
    - 11.3. Öğrencilerin ihtiyaç duyduğu konuları içeriyor mu? ( ) Evet ( ) Kısmen ( ) Hayır
    - 11.4. Seçmeli derslerin içeriğinde yer almasını istediğiniz konular nelerdir?

……
……
……

12. Fizik öğretmenliği programı öğretmen adaylarına iyi bir fizik öğretmeninin sahip olması gereken aşağıdaki yeterlilikleri kazandırabiliyor mu?

Genel Yeterlilikler	Evet	Kısmen	Hayır
1. Temel fizik bilgilerini, kavramlarını ve ilkelerini değişik şekillerde ifade etme ve açıklama			
2. Fizik alanında araştırmalar yaparak bilgi üretme			
3. Öğretme kaynaklarını ve malzemelerini değerlendirme ve seçme			
4. Öğrencileri alanla ilgili sorular sormaya teşvik edecek programları kullanma			
5. Öğrencileri alanla ilgili düşünceleri farklı perspektiflerden görmeye teşvik edecek programları kullanma			
6. Öğrencileri alanla ilgili bilgi üretmeye teşvik edecek programları kullanma			
7. Farklı öğrenme yollarını açıklama			
8. Farklı araştırma ve inceleme yöntemlerini açıklama			
9. Alana ilişkin problemleri tanıma			
10. Alana ilişkin problemlere çözüm yolları arama			
11. Alana ilişkin problemlere uygun çözüm yolunu seçme			
12. Alana ilişkin problemlere uygun çözüm yolunu uygulama			
13. Alana ilişkin problemlere uygun çözüm yolunu değerlendirme			
14. Öğrencinin, gerekli bilgi ve becerileri başka alanlarla ilişkilendirmesine olanak verecek disiplinler arası öğretim deneyleri yaratma			
15. Öğrencilerin fiziksel, zihinsel, duygusal, psiko-motor özelliklerini tanıma			
16. Öğrencilerin öğrenme stillerini tanıma			
17. Öğretimin amacını, içeriğini ve uygun öğretim yöntemini belirleme			
18. Öğretim materyalini belirleme ve hazırlama			
19. Yıllık plan, ünite planı, ders planı ve deney planı yapma			
20. Farklı öğretim yöntemlerini kullanma			
21. Öğretim ortamını düzenleme ve gerekli güvenlik önlemlerini alma			
22. Öğretim hızını öğrenciye göre ayarlama ve zamanı yönetme			
23. Amaca uygun ölçme ve değerlendirme yöntemini belirleme ve uygulama			
24. Öğrencilerin bireysel gelişimlerini izleme ve sorunlarını çözmede yardımcı olma			
25. Öğrencilere fizik dersindeki başarıları konusunda rehberlik yapma			
26. Olay ve olguları farklı disiplinlerin kavramlarını kullanarak açıklayabilme, tanımlayabilme			
27. Farklı disiplinlere ilişkin bilgilerin konu alanı (fizik) ile bağını kurma			
28. Öğretim sürecinde öğrenciyi derse hazırlama, güdüleme			
29. Öğretim sürecinde örnekleme yapmada diğer disiplinlerin bilgilerinden yararlanma			
30. Öğretim sürecinde benzetme-ayırt etme yapmada diğer disiplinlerin bilgilerinden yararlanma			
31. Öğretim sürecinde analiz yapmada diğer disiplinlerin bilgilerinden yararlanma			
32. Öğretim sürecinde sentez yapmada diğer disiplinlerin bilgilerinden yararlanma			
33. Bir sorunla karşılaştığında sorunu çeşitli boyutlarıyla ele alabilme			
34. Bir sorunla karşılaştığında çözümle ilgili seçenekleri belirleme ve en uygun seçeneği duruma uygulama			
35. Bir sorunla karşılaştığında süreci izleme ve değerlendirme yapabilme			
36. Kendi başına yargılara varabilme			

13. Fizik öğretmenliği programındaki **fizik** alan derslerinde,
    - 13.1. Hangi öğretim yöntemleri kullanılıyor?.....
    - 13.2. Sizce hangi yöntemler kullanılmalı?.....
    - 13.3. Hangi ölçme-değerlendirme yöntemleri kullanılıyor?.....
    - 13.4. Sizce hangi yöntemler kullanılmalı?.....

14. Fizik öğretmenliği programındaki **eğitim** derslerinde,
    - 14.1. Hangi öğretim yöntemleri kullanılıyor?.....
    - 14.2. Sizce hangi yöntemler kullanılmalı?.....
    - 14.3. Hangi ölçme-değerlendirme yöntemleri kullanılıyor?.....
    - 14.4. Sizce hangi yöntemler kullanılmalı?.....

15. Fizik öğretmenliği programındaki **genel kültür** derslerinde (Türkçe, Atatürk İlkeleri ve İnkılap Tarihi,…)
    - 15.1. Hangi öğretim yöntemleri kullanılıyor?.....
    - 15.2. Sizce hangi yöntemler kullanılmalı?.....
    - 15.3. Hangi ölçme-değerlendirme yöntemleri kullanılıyor?.....
    - 15.4. Sizce hangi yöntemler kullanılmalı?.....

16. Öğrencilerin kişisel gelişimi için, üniversitenizin sağladığı imkanların yeterlilik düzeyi hakkında ne düşünüyorsunuz?

Olanaklar (İmkanlar)	Yok	Yeterli Değil	Yeterli	Çok Yeterli
Kütüphane				
Sinema salonu				
Tiyatro salonu				
Kültür-Sanat merkezi				
Spor merkezi				
Öğrenci toplulukları				
Eğitici kurslar				
Diğer (…….)				

17. Öğrencilerin akademik gelişimi için, üniversitenizin sağladığı imkanların yeterlilik düzeyi hakkında ne düşünüyorsunuz?

İmkanlar	Yok	Yeterli Değil	Yeterli	Çok yeterli
Derslik				
Dersliklerin teknolojik araç-gereçlerle donanımı				
Dersliklerdeki donanımın, farklı öğretim yöntemlerini uygulamak için değiştirilebilir (yeniden düzenlenebilir) nitelikte olması				
Fizik laboratuarı				
Bilgisayar laboratuarı				
Teknoloji sınıfı				
Sürekli İnternet erişim fırsatı				
Diğer……				

18.1. Fizik öğretmenliği bölümündeki öğretim elemanlarının sayısı yeterli midir?
( ) Evet ( ) Kısmen ( ) Hayır

18.2. Cevabınız hayır ise, üniversitenizin fizik öğretmenliği bölümünde hangi alanlarda, hangi akademik ünvanda öğretim elemanlarına ihtiyaç vardır?
…….
……
……

19.1. Mezun olduktan sonra fizik öğretmeni olarak iş bulabileceğinize inanıyor musunuz?
( ) Evet ( ) Kısmen ( ) Hayır

19.2. Bu sizin daha iyi bir fizik öğretmeni olmak için harcadığınız performansı nasıl etkiliyor?
……
……..

20.1. KPSS öğretmen adaylarının, iyi bir fizik öğretmeni olabilmek için gerekli niteliklere sahip olup olmadığını ölçebiliyor mu? ( ) Evet ( ) Kısmen ( ) Hayır

20.2. Size göre bu nitelikler nasıl ölçülmelidir?
…….
…….
…….

21.1. Adayların iyi bir fizik öğretmeni olarak yetiştirilmesinde karşılaşılan en önemli üç sorun nedir?
……
……
……

21.2. Bu sorunlara çözüm önerileriniz nelerdir?
……
……
……

22. Fizik öğretmenliği programındaki

22.1. Fizik alan dersleri kuramsal (teorik) açıdan yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
22.2.Neden?.....
…….
…….
22.3. Fizik alan dersleri uygulama açısından yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
22.4. Neden?.....
……
……
22.5. Eğitim alan dersleri kuramsal (teorik) açıdan yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
22.6. Neden?.....
……
……
22.7. Eğitim alan dersleri uygulama açısından yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
22.8. Neden?.....
……
……
22.9. Genel kültür dersleri kuramsal (teorik) açıdan yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
22.10 Neden?.....
……...
……...
22.11. Genel kültür dersleri uygulama açısından yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
22.12 Neden?.....
……...
....……

Pre-service Physics Teacher Questionnaire-2

ÖĞRETMEN ADAYI ANKETİ

Değerli öğretmen adayı,

Bu anket fizik öğretmenliği bölümünde okuyan öğrencilerin eğitimle ilgili problemlerini belirlemek amacı ile hazırlanmıştır. ODTÜ Fen Bilimleri Enstitüsü bünyesinde 'Türkiye deki Fizik Öğretmenliği Öğrencilerinin Eğitim-Öğretimle İlgili Sorunlarının Analizi' adıyla yürütülmekte olan yüksek lisans tez çalışmasında kullanılacak olan bu ankete vereceğiniz tutarlı cevaplar, çalışmanın verimliliği açısından önem taşımaktadır. Bu çalışmadan elde edilecek bulgular, Milli Eğitim Bakanlığı'nın,Yüksek Öğretim Kurumu'nun ve ilgili eğitim-öğretimi veren üniversitelerin 'Türkiye de neden iyi fizik öğretmenleri yetiştiremiyoruz?' sorusuna yanıt bulmalarına yardımcı olacak ve Fizik Öğretmenliği Programında yapılacak yeniliklere ışık tutacaktır. Araştırmanın geçerliliği cevaplarınızın samimiyetine bağlıdır. **Sorularda birden fazla seçeneği işaretleyebilirsiniz**. Anket formuna adınızı yazmanız gerekmemektedir. Değerli vaktinizi ayırarak araştırmama yapacağınız katkıdan dolayı teşekkür ederim.

ANKET SORULARI

Devam ettiğiniz programı işaretleyiniz:

( ) 5 yıllık fizik öğretmenliği programı
( ) 4+1,5 tezsiz yüksek lisans fizik öğretmenliği programı

1. Neden tezsiz yüksek lisans programına başladınız?
   ( ) Fizik öğretmeni olmayı çok istediğim için ( ) Kolay iş bulabilmek için
   ( ) Diğer (……)

2. Sizce başarılı öğrencilerin Fizik Öğretmenliği Bölümüne yönlendirilmesi için neler yapılması gerekir?
   ……
   ……
   ……

3.1. Fizik öğretmenliği bölümüne alınacak öğrencilerde aranması gereken nitelikler neler olmalıdır?
   ( ) 1. Mesleği sevmek ( ) 2. Öğrenmeyi ve öğretmeyi sevmek
   ( ) 3. İnsanları sevmek ( ) 4. Olumlu kişilik özelliklerine sahip olmak
   ( ) 5. İdealist olmak ( ) 6. Araştırmacı bir kişiliğe sahip olmak
   ( ) 7. Çalışkan olmak ( ) 8. Türkçe'yi doğru ve akıcı kullanabilmek
   ( ) 9. Sağlıklı fiziksel bir görünüme sahip olmak ( ) 10. Sağlıklı bir ruhsal yapıya sahip olmak
   ( ) 11. Yeterli fen ve matematik bilgisine sahip olmak ( ) 12. Diğer (……..)

3.2. Şu anki sistem öğrencilerde aranması gereken bu niteliklerden hangilerini ölçebiliyor? (Lütfen numaraları yazınız)
   ……...

3.3. Şu anki sistemin ölçemediği, öğrencilerde aranması gereken nitelikleri nasıl ölçebiliriz?
   ……...
   ……...
   ……...

4.1. Fizik öğretmenliği bölümünün öğrenci kontenjanı azaltılırsa daha iyi fizik öğretmenleri yetiştirebilir miyiz?
   ( ) Evet ( ) Kısmen ( ) Hayır

4.2. Kontenjan sayısının kaç olması gerekir? ( )1-10 ( )10-20 ( )20-30 ( )……

4.3. Neden?
   ……..
   ……..
   ……..

5. Fizik alan bilginizin aşağıda yazılı olan hangi konularda yetersiz olduğunu düşünüyorsunuz?
   ( ) Madde ve özellikleri ( ) Elektrik ve Manyetizma
   ( ) Dalgalar ( ) Optik
   ( ) Mekanik ( ) Modern Fizik
   ( ) Termodinamik ( ) Astronomi
   ( ) Lise seviyesinde fizik ( ) Lise seviyesinde fizik laboratuar uygulamaları
   ( ) Diğer (……..……..)

6. Eğitim alan bilginizin aşağıda yazılı olan hangi konularda yetersiz olduğunu düşünüyorsunuz?
   ( ) Öğrenciyi tanıma ( ) Öğretimi planlama
   ( ) Öğretim yapma ( ) Öğretim ve sınıf yönetimi
   ( ) Materyal geliştirme ( ) Başarıyı ölçme ve değerlendirme
   ( ) Rehberlik yapma ( ) Diğerleri(…….)

7. Genel kültür bilginizin aşağıda yazılı olan hangi konularda yetersiz olduğunu düşünüyorsunuz?

( ) Türkçe/Edebiyat ( ) Güzel Konuşma/Hitabet
( ) Tarih ( ) Felsefe
( ) Sosyoloji ( ) Psikoloji
( ) Güzel Sanatlar ( ) Diğer (……..……...)

8. Kendinizi yetersiz bulduğunuz konularda başarısız olmanızın nedenleri nelerdir?

Öğrencilerin başarısız olma nedenleri	Fizik Alan Derslerinde	Eğitim Derslerinde	Genel Kültür Derslerinde
Derslerin konuları çok soyut, anlamıyorum			
Anlamadığım konuları ezberlemeye çalışıyorum			
Dersler çok teorik işleniyor			
Derslerde uygulamaya yeterli zaman ayrılmıyor			
Deneyimli öğretmenler sınıf ortamına davet edilmiyor ve örnek uygulamalar sınıf içinde yapılmıyor			
Derslerde farklı öğretim yöntemleri ve teknikleri kullanılmıyor			
Derslerde farklı ölçme-değerlendirme yöntemleri kullanılmıyor			
Konu anlatılırken günlük yaşamdan örneklere yer verilmiyor			
Dersleri başarabilmek için yeterli matematik bilgisine sahip değilim			
Analitik düşünme yeteneğine sahip değilim			
Üç boyutlu çizimleri anlayamıyorum			
Grafikleri yorumlayamıyorum			
Dersleri başarabilmek için yeterli fizik bilgisine sahip değilim			
Kavram yanılgıları var fakat bunları düzeltemiyorum			
Yabancı dille eğitim yapıldığı için konuyu anlayamıyorum			
Derslerin içeriği çok yoğun			
Derslerin,fizik öğretmeni olmak için gerekli olduğuna inanmıyorum			
Derslere gereken önemi vermiyorum			
Diğer (……)			
Diğer (……)			
Diğer (……)			

9. Fizik öğretmenliği programında zorunlu derslere ek olarak yer almasını istediğiniz konular aşağıdaki zorunlu derslerin hangilerinin içeriğinde yer alabilir?

( ) Bilim Tarihi ( ) Bilim Felsefesi ( ) Araştırma teknikleri
( ) İlkyardım ( ) Türk Eğitim Tarihi ( ) Fen/ Fizik Eğitimi Tarihi
( ) Eğitim Psikolojisi ( ) Eğitim Sosyolojisi ( ) Eğitim Yönetimi
( ) Eğitim Felsefesi ( ) Güzel Konuşma ve Diksiyon ( ) İnsan Hakları ve Demokrasi
( ) Lise Seviyesinde Fizik Lab. Uyg. ( ) Lise Seviyesinde Fizik ( ) Sağlık
( ) Diğer (……..…….)

10. Fizik öğretmenliği programında açılan seçmeli dersler hakkında ne düşünüyorsunuz?

10.1. Nitelikli, içeriği dolgun olan dersler mi? ( ) Evet ( ) Kısmen ( ) Hayır
10.2. Sayısı yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
10.3. Öğrencilerin ihtiyaç duyduğu konuları içeriyor mu? ( ) Evet ( ) Kısmen ( ) Hayır
10.4. Seçmeli derslerin içeriğinde yer almasını istediğiniz konular nelerdir?

……
……
……

11. Fizik öğretmenliği programı öğretmen adaylarına iyi bir fizik öğretmeninin sahip olması gereken aşağıdaki yeterlilikleri kazandırabiliyor mu?

Genel Yeterlilikler	Evet	Kısmen	Hayır
1. Temel fizik bilgilerini, kavramlarını ve ilkelerini değişik şekillerde ifade etme ve açıklama			
2. Fizik alanında araştırmalar yaparak bilgi üretme			
3. Öğretme kaynaklarını ve malzemelerini değerlendirme ve seçme			
4. Öğrencileri alanla ilgili sorular sormaya teşvik edecek programları kullanma			
5. Öğrencileri alanla ilgili düşünceleri farklı perspektiflerden görmeye teşvik edecek programları kullanma			
6. Öğrencileri alanla ilgili bilgi üretmeye teşvik edecek programları kullanma			
7. Farklı öğrenme yollarını açıklama			
8. Farklı araştırma ve inceleme yöntemlerini açıklama			
9. Alana ilişkin problemleri tanıma			
10. Alana ilişkin problemlere çözüm yolları arama			
11. Alana ilişkin problemlere uygun çözüm yolunu seçme			
12. Alana ilişkin problemlere uygun çözüm yolunu uygulama			
13. Alana ilişkin problemlere uygun çözüm yolunu değerlendirme			
14. Öğrencinin, gerekli bilgi ve becerileri başka alanlarla ilişkilendirmesine olanak verecek disiplinler arası öğretim deneyleri yaratma			
15. Öğrencilerin fiziksel, zihinsel, duygusal, psiko-motor özelliklerini tanıma			
16. Öğrencilerin öğrenme stillerini tanıma			
17. Öğretimin amacını, içeriğini ve uygun öğretim yöntemini belirleme			
18. Öğretim materyalini belirleme ve hazırlama			
19. Yıllık plan, ünite planı, ders planı ve deney planı yapma			
20. Farklı öğretim yöntemlerini kullanma			
21. Öğretim ortamını düzenleme ve gerekli güvenlik önlemlerini alma			
22. Öğretim hızını öğrenciye göre ayarlama ve zamanı yönetme			
23. Amaca uygun ölçme ve değerlendirme yöntemini belirleme ve uygulama			
24. Öğrencilerin bireysel gelişimlerini izleme ve sorunlarını çözmede yardımcı olma			
25. Öğrencilere fizik dersindeki başarıları konusunda rehberlik yapma			
26. Olay ve olguları farklı disiplinlerin kavramlarını kullanarak açıklayabilme, tanımlayabilme			
27. Farklı disiplinlere ilişkin bilgilerin konu alanı (fizik) ile bağını kurma			
28. Öğretim sürecinde öğrenciyi derse hazırlama, güdüleme			
29. Öğretim sürecinde örnekleme yapmada diğer disiplinlerin bilgilerinden yararlanma			
30. Öğretim sürecinde benzetme-ayırt etme yapmada diğer disiplinlerin bilgilerinden yararlanma			
31. Öğretim sürecinde analiz yapmada diğer disiplinlerin bilgilerinden yararlanma			
32. Öğretim sürecinde sentez yapmada diğer disiplinlerin bilgilerinden yararlanma			
33. Bir sorunla karşılaştığında sorunu çeşitli boyutlarıyla ele alabilme			
34. Bir sorunla karşılaştığında çözümle ilgili seçenekleri belirleme ve en uygun seçeneği duruma uygulama			
35. Bir sorunla karşılaştığında süreci izleme ve değerlendirme yapabilme			
36. Kendi başına yargılara varabilme			

12. Fizik öğretmenliği programındaki
    12.1. Eğitim alan dersleri kuramsal (teorik) açıdan yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
    12.2. Neden?.....
    ……
    ……
    12.3. Eğitim alan dersleri uygulama açısından yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
    12.4. Neden?.....
    ……
    ……

13. Fizik öğretmenliği programındaki **eğitim** derslerinde,
    13.1. Hangi öğretim yöntemleri kullanılıyor?.....
    13.2. Sizce hangi yöntemler kullanılmalı?.....
    13.3. Hangi ölçme-değerlendirme yöntemleri kullanılıyor?.....
    13.4. Sizce hangi yöntemler kullanılmalı?.....

14. Öğrencilerin kişisel gelişimi için, üniversitenizin sağladığı imkanların yeterlilik düzeyi hakkında ne düşünüyorsunuz?

Olanaklar (İmkanlar)	Yok	Yeterli Değil	Yeterli	Çok Yeterli
Kütüphane				
Sinema salonu				
Tiyatro salonu				
Kültür-Sanat merkezi				
Spor merkezi				
Öğrenci toplulukları				
Eğitici kurslar				
Diğer (…….)				

15. Öğrencilerin akademik gelişimi için, üniversitenizin sağladığı imkanların yeterlilik düzeyi hakkında ne düşünüyorsunuz?

İmkanlar	Yok	Yeterli Değil	Yeterli	Çok yeterli
Derslik				
Dersliklerin teknolojik araç-gereçlerle donanımı				
Dersliklerdeki donanımın, farklı öğretim yöntemlerini uygulamak için değiştirilebilir (yeniden düzenlenebilir) nitelikte olması				
Fizik laboratuarı				
Bilgisayar laboratuarı				
Teknoloji sınıfı				
Sürekli internet erişim fırsatı				
Diğer (…….)				

16.1. Fizik öğretmenliği bölümündeki öğretim elemanlarının sayısı yeterli midir?
( ) Evet ( ) Kısmen ( ) Hayır

16.2. Cevabınız hayır ise, üniversitenizin fizik öğretmenliği bölümünde hangi alanlarda, hangi akademik ünvanda öğretim elemanlarına ihtiyaç vardır?
……...
……...
……...

17.1. Mezun olduktan sonra fizik öğretmeni olarak iş bulabileceğinize inanıyor musunuz?
( ) Evet ( ) Kısmen ( ) Hayır

17.2. Bu sizin daha iyi bir fizik öğretmeni olmak için harcadığınız performansı nasıl etkiliyor?
……...
……...
……...

18.1. KPSS öğretmen adaylarının, iyi bir fizik öğretmeni olabilmek için gerekli niteliklere sahip olup olmadığını ölçebiliyor mu?
( ) Evet ( ) Kısmen ( ) Hayır

18.2. Size göre bu nitelikler nasıl ölçülmelidir?
……..
……..
……..

19.1. Adayların iyi bir fizik öğretmeni olarak yetiştirilmesinde karşılaşılan en önemli üç sorun nedir?
……...
……...
……...

19.2. Bu sorunlara çözüm önerileriniz nelerdir?
……...
……...
……...

LECTURER QUESTIONNAIRE

ÖĞRETİM ELEMANI ANKETİ

Değerli öğretim elemanı,

Bu anket fizik öğretmenliği bölümünde okuyan öğrencilerin eğitimle ilgili problemlerini belirlemek amacı ile hazırlanmıştır. ODTÜ Fen Bilimleri Enstitüsü bünyesinde 'Türkiye deki Fizik Öğretmenliği Öğrencilerinin Eğitim-Öğretimle İlgili Sorunlarının Analizi' adıyla yürütülmekte olan yüksek lisans tez çalışmasında kullanılacak olan bu ankete vereceğiniz tutarlı cevaplar, çalışmanın verimliliği açısından önem taşımaktadır. Bu çalışmadan elde edilecek bulgular, Milli Eğitim Bakanlığı'nın,Yüksek Öğretim Kurumu'nun ve ilgili eğitim-öğretimi veren üniversitelerin 'Türkiye de neden iyi fizik öğretmenleri yetiştiremiyoruz?' sorusuna yanıt bulmalarına yardımcı olacak ve Fizik Öğretmenliği Programında yapılacak yeniliklere ışık tutacaktır. Araştırmanın geçerliliği cevaplarınızın samimiyetine bağlıdır. **Sorularda birden fazla seçeneği işaretleyebilirsiniz**. Anket formuna adınızı yazmanız gerekmemektedir. Değerli vaktinizi ayırarak araştırmama yapacağınız katkıdan dolayı teşekkür ederim.

ANKET SORULARI

1. Ünvanınız:
   ( ) Araştırma Görevlisi ( ) Öğretim Görevlisi ( ) Dr. Öğretim Görevlisi
   ( ) Yrd. Doç. Dr. ( ) Doç. Dr. ( ) Prof. Dr.

2.1. Lisans Eğitiminizi hangi bölümde ve alanda yaptınız?.....
……...
2.2. Yüksek Lisans Eğitiminizi hangi bölümde ve alanda yaptınız?.....
……
2.3. Doktora Eğitiminizi hangi bölümde ve alanda yaptınız?.....
……...

3. Öğretim elemanı olarak deneyiminiz kaç yıl? (asistanlık dahil)
   ( ) 1-5 yıl ( ) 6-10 yıl ( ) 11-15 yıl ( ) 16-20 yıl ( ) 21-25 yıl ( ) 26-30 yıl ( ) 31 yıl ve üstü

4. Daha önce öğretmenlik yaptıysanız deneyiminiz kaç yıl?
   ( ) Böyle bir deneyimim yok ( ) 1 ay- 12 ay ( ) 1 yıl- 5 yıl ( ) 5 yıl- 10 yıl ( ) 10 yıl- 15 yıl

5.1. Kaç saat ders anlatıyorsunuz? :
   ( ) Ders anlatmıyorum ( ) 1-5 saat ( ) 5-10 saat ( ) 10-15 saat ( ) 15-20 saat ( ) 20-25 saat
5.2. Gece ders anlatıyor musunuz?:
   ( ) Ders anlatmıyorum ( ) 1-5 saat ( ) 5-10 saat ( ) 10-15 saat ( ) 15-20 saat ( ) 20-25 saat
5.3. Yüksek lisans öğrenciniz var mı? Cevabınız evet ise kaç tane?
   ( ) Evet ……. ( ) Hayır
5.4. Doktora öğrenciniz var mı? Cevabınız evet ise kaç tane?
   ( ) Evet ……. ( ) Hayır

6.1. Yönetim göreviniz var mı?
   ( ) Evet ( ) Hayır
6.2. Cevabınız evet ise, göreviniz nedir?
   ( ) Dekan ( ) Dekan yardımcısı ( ) Bölüm başkanı ( ) Bölüm başkan yardımcısı
   ( ) Başka (……...……..)

7. Hakemli dergilerde yayınlanmış çalışmalarınız var mı? Cevabınız evet ise sayısı kaçtır ve hangi alanda yayınlanmıştır?
   ( ) Evet …….. tane Fizik alanında Türkiye de yayınlanan dergilerde ( ) Hayır
   ……. tane Fizik Eğitimi alanında Türkiye de yayınlanan dergilerde
   ……. tane Fen Eğitimi alanında Türkiye de yayınlanan dergilerde
   ……. tane Fizik alanında yurt dışında yayınlanan dergilerde
   ……. tane Fizik Eğitimi alanında yurt dışında yayınlanan dergilerde
   ……. tane Fen Eğitimi alanında yurt dışında yayınlanan dergilerde

8. Fizik eğitimi alanında ilgi alanınıza giren, araştırma yaptığınız konular nelerdir?
   ……
   ……
   ……

9.1. Fizik eğitimi alanındaki çalışmaları takip edebiliyor musunuz
( ) Evet ( ) Kısmen ( ) Hayır
9.2. Cevabınız kısmen veya hayır ise bunun nedenleri nedir?
( ) Akademik çalışmaları takip edebilecek düzeyde yabancı dilim yok
( ) Konferans, toplantı ve seminerlerin belirli şehirlerde yapılması
( ) Konferans, toplantı ve seminerlere katılabilmek için gerekli maddi desteğin sağlanmaması
( ) Bölümdeki ders yükümün fazla olması
( ) Bölümde yönetim görevimin olması
( ) Bölüm tarafından verilen ek görevler
( ) Diğerleri (……..……)

10.1. Akademik çalışmalarınızı başarıyla sürdürebilmeniz için çalıştığınız üniversitede aşağıdaki imkanlardan hangilerine sahipsiniz?
( ) Bilgisayar ( ) Yazıcı ( ) Sürekli internet erişimi ( )Telefon
10.2. Üniversitedeki çalışma odanızı sizinle birlikte kaç kişi paylaşıyor? .....

11. Öğrenciler Fizik Öğretmenliği Bölümünü isteyerek ve bilinçli olarak mı tercih ediyorlar?
( )Evet ( ) Kısmen ( )Hayır

12. Sizce başarılı öğrencilerin Fizik Öğretmenliği Bölümüne yönlendirilmesi için neler yapılması gerekir?
……..…..
……...
……...

13.1. Fizik öğretmenliği bölümüne alınacak öğrencilerde aranması gereken nitelikler neler olmalıdır?
( ) 1. Mesleği sevmek ( ) 2. Öğrenmeyi ve öğretmeyi sevmek
( ) 3. İnsanları sevmek ( ) 4. Olumlu kişilik özelliklerine sahip olmak
( ) 5. İdealist olmak ( ) 6. Araştırmacı bir kişiliğe sahip olmak
( ) 7. Çalışkan olmak ( ) 8. Türkçe'yi doğru ve akıcı kullanabilmek
( ) 9. Sağlıklı fiziksel bir görünüme sahip olmak ( ) 10. Sağlıklı bir ruhsal yapıya sahip olmak
( ) 11. Yeterli fen ve matematik bilgisine sahip olmak ( ) 12. Diğer (……..)
13.2. Şu anki sistem öğrencilerde aranması gereken bu niteliklerden hangilerini ölçebiliyor? (Lütfen numaraları yazınız)
……..
13.3. Şu anki sistemin ölçemediği, öğrencilerde aranması gereken nitelikleri nasıl ölçebiliriz?
……..
……..
……..

14.1. Fizik öğretmenliği bölümünün öğrenci kontenjanı azaltılırsa daha iyi fizik öğretmenleri yetiştirebilir miyiz?
( ) Evet ( ) Kısmen ( ) Hayır
14.2. Kontenjan sayısının kaç olması gerekir? ( )1-10 ( )10-20 ( )20-30 ( )……
14.3. Neden?
……..
……..
……..

15. Öğrencilerin fizik alan bilgilerinin aşağıda yazılı olan hangi konularda yetersiz olduğunu düşünüyorsunuz?
( ) Madde ve özellikleri ( ) Elektrik ve Manyetizma
( ) Dalgalar ( ) Optik
( ) Mekanik ( ) Modern Fizik
( ) Termodinamik ( ) Astronomi
( ) Lise seviyesinde fizik ( ) Lise seviyesinde fizik laboratuar uygulamaları
( ) Diğer (……..……..….)

16. Öğrencilerin eğitim alan bilgilerinin aşağıda yazılı olan hangi konularda yetersiz olduğunu düşünüyorsunuz?
( ) Öğrenciyi tanıma ( ) Öğretimi planlama
( ) Öğretim yapma ( ) Öğretim ve sınıf yönetimi
( ) Materyal geliştirme ( ) Başarıyı ölçme ve değerlendirme
( ) Rehberlik yapma ( ) Diğerleri(…… ……..)

17. Öğrencilerin genel kültür bilgilerinin aşağıda yazılı olan hangi konularda yetersiz olduğunu düşünüyorsunuz?
( ) Türkçe/Edebiyat ( ) Güzel Konuşma/Hitabet
( ) Tarih ( ) Felsefe
( ) Sosyoloji ( ) Psikoloji
( ) Güzel Sanatlar ( ) Diğer (……..…...)

18. Öğrencilerin derslerde başarısız olmalarının nedenleri nelerdir?

Öğrencilerin başarısız olma nedenleri	Fizik Alan Derslerinde	Eğitim Derslerinde	Genel Kültür Derslerinde
Derslerin konuları çok soyut, anlamıyorlar			
Anlamadıkları konuları ezberlemeye çalışıyorlar			
Dersler çok teorik işleniyor			
Derslerde uygulamaya yeterli zaman ayrılmıyor			
Deneyimli öğretmenler sınıf ortamına davet edilmiyor ve örnek uygulamalar sınıf içinde yapılmıyor			
Derslerde farklı öğretim yöntemleri ve teknikleri kullanılmıyor			
Derslerde farklı ölçme-değerlendirme yöntemleri kullanılmıyor			
Konu anlatılırken günlük yaşamdan örneklere yer verilmiyor			
Dersleri başarabilmek için yeterli matematik bilgisine sahip değiller			
Analitik düşünme yeteneğine sahip değiller			
Üç boyutlu çizimleri anlayamıyorlar			
Grafikleri yorumlayamıyorlar			
Dersleri başarabilmek için yeterli fizik bilgisine sahip değiller			
Kavram yanılgıları var fakat bunları düzeltemiyorlar			
Yabancı dille eğitim yapıldığı için konuyu anlayamıyorlar			
Derslerin içeriği çok yoğun			
Derslerin,fizik öğretmeni olmak için gerekli olduğuna inanmıyorlar			
Derslere gereken önemi vermiyorlar			
Diğer (……)			
Diğer (……)			
Diğer (……)			

19. Fizik öğretmenliği programında zorunlu derslere ek olarak yer almasını istediğiniz konular aşağıdaki zorunlu derslerin hangilerinin içeriğinde yer alabilir?

( ) Bilim Tarihi ( ) Bilim Felsefesi ( ) Araştırma teknikleri
( ) İlkyardım ( ) Türk Eğitim Tarihi ( ) Fen/ Fizik Eğitimi Tarihi
( ) Eğitim Psikolojisi ( ) Eğitim Sosyolojisi ( ) Eğitim Yönetimi
( ) Eğitim Felsefesi ( ) Güzel Konuşma ve Diksiyon ( ) İnsan Hakları ve Demokrasi
( ) Lise Seviyesinde Fizik Lab. Uyg. ( ) Lise Seviyesinde Fizik ( ) Sağlık
( ) Diğer (……..……)

20. Fizik öğretmenliği programında açılan seçmeli dersler hakkında ne düşünüyorsunuz?

20.1. Nitelikli, içeriği dolgun olan dersler mi? ( ) Evet ( ) Kısmen ( ) Hayır
20.2. Sayısı yeterli mi? ( ) Evet ( ) Kısmen ( ) Hayır
20.3. Öğrencilerin ihtiyaç duyduğu konuları içeriyor mu? ( ) Evet ( ) Kısmen ( ) Hayır
20.4. Seçmeli derslerin içeriğinde yer almasını istediğiniz konular nelerdir?

……
……
……

21. Fizik öğretmenliği programı öğretmen adaylarına iyi bir fizik öğretmeninin sahip olması gereken aşağıdaki yeterlilikleri kazandırabiliyor mu?

Genel Yeterlilikler	Evet	Kısmen	Hayır
1. Temel fizik bilgilerini, kavramlarını ve ilkelerini değişik şekillerde ifade etme ve açıklama			
2. Fizik alanında araştırmalar yaparak bilgi üretme			
3. Öğretme kaynaklarını ve malzemelerini değerlendirme ve seçme			
4. Öğrencileri alanla ilgili sorular sormaya teşvik edecek programları kullanma			
5. Öğrencileri alanla ilgili düşünceleri farklı perspektiflerden görmeye teşvik edecek programları kullanma			
6. Öğrencileri alanla ilgili bilgi üretmeye teşvik edecek programları kullanma			
7. Farklı öğrenme yollarını açıklama			
8. Farklı araştırma ve inceleme yöntemlerini açıklama			
9. Alana ilişkin problemleri tanıma			
10. Alana ilişkin problemlere çözüm yolları arama			
11. Alana ilişkin problemlere uygun çözüm yolunu seçme			
12. Alana ilişkin problemlere uygun çözüm yolunu uygulama			
13. Alana ilişkin problemlere uygun çözüm yolunu değerlendirme			
14. Öğrencinin, gerekli bilgi ve becerileri başka alanlarla ilişkilendirmesine olanak verecek disiplinler arası öğretim deneyleri yaratma			
15. Öğrencilerin fiziksel, zihinsel, duygusal, psiko-motor özelliklerini tanıma			
16. Öğrencilerin öğrenme stillerini tanıma			
17. Öğretimin amacını, içeriğini ve uygun öğretim yöntemini belirleme			
18. Öğretim materyalini belirleme ve hazırlama			
19. Yıllık plan, ünite planı, ders planı ve deney planı yapma			
20. Farklı öğretim yöntemlerini kullanma			
21. Öğretim ortamını düzenleme ve gerekli güvenlik önlemlerini alma			
22. Öğretim hızını öğrenciye göre ayarlama ve zamanı yönetme			
23. Amaca uygun ölçme ve değerlendirme yöntemini belirleme ve uygulama			
24. Öğrencilerin bireysel gelişimlerini izleme ve sorunlarını çözmede yardımcı olma			
25. Öğrencilere fizik dersindeki başarıları konusunda rehberlik yapma			
26. Olay ve olguları farklı disiplinlerin kavramlarını kullanarak açıklayabilme, tanımlayabilme			
27. Farklı disiplinlere ilişkin bilgilerin konu alanı (fizik) ile bağını kurma			
28. Öğretim sürecinde öğrenciyi derse hazırlama, güdüleme			
29. Öğretim sürecinde örnekleme yapmada diğer disiplinlerin bilgilerinden yararlanma			
30. Öğretim sürecinde benzetme-ayırt etme yapmada diğer disiplinlerin bilgilerinden yararlanma			
31. Öğretim sürecinde analiz yapmada diğer disiplinlerin bilgilerinden yararlanma			
32. Öğretim sürecinde sentez yapmada diğer disiplinlerin bilgilerinden yararlanma			
33. Bir sorunla karşılaştığında sorunu çeşitli boyutlarıyla ele alabilme			
34. Bir sorunla karşılaştığında çözümle ilgili seçenekleri belirleme ve en uygun seçeneği duruma uygulama			
35. Bir sorunla karşılaştığında süreci izleme ve değerlendirme yapabilme			
36. Kendi başına yargılara varabilme			

22. Öğrencilerin kişisel gelişimi için, üniversitenizin sağladığı imkanların yeterlilik düzeyi hakkında ne düşünüyorsunuz?

Olanaklar (İmkanlar)	Yok	Yeterli Değil	Yeterli	Çok Yeterli
Kütüphane				
Sinema salonu				
Tiyatro salonu				
Kültür-Sanat merkezi				
Spor merkezi				
Öğrenci toplulukları				
Eğitici kurslar				
Diğer (…….……)				

23. Öğrencilerin akademik gelişimi için, üniversitenizin sağladığı imkanların yeterlilik düzeyi hakkında ne düşünüyorsunuz?

İmkanlar	Yok	Yeterli Değil	Yeterli	Çok yeterli
Derslik				
Dersliklerin teknolojik araç-gereçlerle donanımı				
Dersliklerdeki donanımın, farklı öğretim yöntemlerini uygulamak için değiştirilebilir (yeniden düzenlenebilir) nitelikte olması				
Fizik laboratuarı				
Bilgisayar laboratuarı				
Teknoloji sınıfı				
Sürekli İnternet erişim fırsatı				
Diğer (……..)				

24.1. Fizik öğretmenliği bölümündeki öğretim elemanlarının sayısı yeterli midir?
( ) Evet ( ) Kısmen ( ) Hayır

24.2. Cevabınız hayır ise, üniversitenizin fizik öğretmenliği bölümünde hangi alanlarda, hangi akademik ünvanda öğretim elemanlarına ihtiyaç vardır?
…….
…….
…….

25.1. Eğitim-öğretim yılı içinde fizik öğretmenliği bölümünde öğrencilerin eğitimle ilgili problemlerini çözmek için idareci ve öğretim elemanı olarak öğrencilere yeterli zaman ayırabiliyor musunuz ?
( ) Evet ( ) Kısmen ( ) Hayır

25.2. Bu problemlerle diğer öğrencilerin karşılaşmaması için bölüm içinde ne tür etkinlikler/çalışmalar yapılabilir?
……
……
……

26. Üniversite/Eğitim Fakültesi araştırma fonunca, fizik öğretmeni eğitimi araştırma ve projelerine ne ölçüde destek veriliyor?
( ) Hiç ( ) Az ( ) Kısmen ( ) Çok ( ) Oldukça çok

27.1. Eğitim Fakültesi /Fizik öğretmenliği Bölümü ulusal/ uluslar arası kurum ve kuruluşlarla daha iyi fizik öğretmenleri yetiştirebilmek ve öğrencilerin başarılarını arttırabilmek için ortak çalışmalar yapıyor mu?
( ) Evet ( ) Hayır

27.2. Cevabınız evet ise, bu çalışmalar nelerdir?
……...
……
……..

28.1. Fakülteniz/ Fizik Öğretmenliği Bölümünüz kendisini (YÖK ziyaret ekibi raporları, öğrenci ders değerlendirmesi, öğrencilerin yönetimde temsil edilmeleri, öğretim elemanlarının problem çözme oturumları yapmaları vb. yöntemler ile) düzenli ve sistemli olarak değerlendiriyor mu?
( ) Evet ( ) Kısmen ( ) Hayır

28.2. Bu değerlendirme sonuçları, derslerin içeriğine yansıtılıyor mu?
( ) Evet ( ) Kısmen ( ) Hayır

29.1. Daha iyi fizik öğretmeni yetiştirebilmek için Milli Eğitim Bakanlığı ile Eğitim Fakülteleri etkili bir işbirliği ve iletişim içerisinde midir?
( ) Evet ( ) Kısmen ( ) Hayır

29.2. Cevabınız hayır ise, bu işbirliği ve iletişim kopukluğu ne gibi problemlere neden olmaktadır?
……
……
……

30.1. Dört yıllık fizik öğretmenliği programının beş yıla çıkarılması, daha iyi fizik öğretmeni yetiştirilmesine ne ölçüde katkı sağlamıştır?
( ) Hiç ( ) Az ( ) Kısmen ( ) Çok ( ) Oldukça çok

30.2. Neden?.....
……..
……...
30.3. Bir buçuk yıllık tezsiz yüksek lisans programının eski öğretmenlik sertifika programından farkı var mıdır?
( ) Evet ( ) Kısmen ( ) Hayır

30.4. Size göre, farkı nedir?.....
…….…
……
30.5. Size göre hangi program daha iyi?
( ) 5 yıllık fizik öğretmenliği programı ( ) 4+1,5 tezsiz yüksek lisans programı ( ) Farkları yok
30.6. Neden?.....
……
……

31.1. KPSS öğretmen adaylarının, iyi bir fizik öğretmeni olabilmek için gerekli niteliklere sahip olup olmadığını ölçebiliyor mu?
( ) Evet ( ) Kısmen ( ) Hayır
31.2. Size göre bu nitelikler nasıl ölçülmelidir?
……
……
……
32.1. Öğrencileriniz mezun olduktan sonra fizik öğretmeni olarak iş bulabileceklerine inanıyorlar mı?
( ) Evet ( ) Kısmen ( ) Hayır
32.2. Bu durum öğrencilerinizin daha iyi bir fizik öğretmeni olmak için harcadıkları performansı nasıl etkiliyor?
……
……
……

33.1. Adayların iyi bir fizik öğretmeni olarak yetiştirilmesinde karşılaşılan en önemli üç sorun nedir?
……
……
……

33.2.Sizce, Türkiye de fizik öğretmeni olarak çalışırken karşılaşılan en önemli üç sorun nedir?
……
……
……

33.3. Bu sorunlara çözüm önerileriniz nelerdir?
……..
……..
……..
……..
……..

APPENDIX C

……ÜNİVERSİTESİ
…… EĞİTİM FAKÜLTESİ
ORTAÖĞRETİM FEN VE MATEMATİK ALANLARI EĞİTİMİ BÖLÜMÜ
FİZİK ÖĞRETMENLİĞİ ANABİLİM DALI BAŞKANLIĞINA

ODTÜ Fen Bilimleri Enstitüsü bünyesinde 'Türkiye deki Fizik Öğretmenliği Öğrencilerinin Eğitim-Öğretimle İlgili Sorunlarının Analizi' adıyla yüksek lisans tez çalışması olarak yürütülen ve eğitim fakültesi tarafından desteklenen projeler arasına alınan bu araştırma fizik öğretmenliği bölümünde okuyan öğrencilerin eğitimle ilgili problemlerini belirlemeyi amaçlamaktadır.

Bu çalışmadan elde edilecek bulgular, Milli Eğitim Bakanlığı'nın,Yüksek Öğretim Kurumu'nun ve ilgili eğitim-öğretimi veren üniversitelerin 'Türkiye de neden iyi fizik öğretmenleri yetiştiremiyoruz?' sorusuna yanıt bulmalarına yardımcı olacak ve Fizik Öğretmenliği Programında yapılacak yeniliklere ışık tutacaktır. Ayrıca bundan sonra yine bu amaçla yapılacak araştırmalar, makaleler ve tezler için kaynak olarak kullanılması beklenmektedir. Bundan dolayı gereken önemi vereceğinizden kuşkumuz yoktur.

Araştırma için, 5 yıllık fizik öğretmenliği programında son sınıfta okuyan öğretmen adaylarına, 4+1,5 yıllık tezsiz yüksek lisans fizik öğretmenliği programında okuyan öğretmen adaylarına ve dersleri veren öğretim elemanlarına olmak üzere üç farklı anket hazırlanmıştır. 'Anketler', 'Anket Uygulama Yönergesi', 'Anket Uygulama Formu' ve 'Görevlendirme ve İzin Belgesi' gönderilen zarfın içindedir. Anketi uygulayacak öğretim elemanlarının Anket Uygulama Yönergesindeki hususlara dikkat etmesi gerekmektedir. Yaptığımız pilot çalışmalarda öğretmen adaylarının 30-40 dakika arasında anketi tamamladıkları görülmüştür. Anketler, adaylara derste dağıtılarak uygulanabileceği gibi; adaylara verilip bir sonraki derse mutlaka geri getirmeleri şartıyla da katılım sağlanabilir.

Anketler öğretmen adayları ve öğretim elemanlarına uygulandıktan sonra toplanıp; ekteki uygulama formu doldurulmalı ve yeniden zarfa konulmalıdır. Aras Kargo'yu arayıp gönderiniz olduğunu bildirdiğinizde, kargo servisi bulunduğunuz yerden zarfı alacaktır. Gönderiyi Mehtap Tam adına aşağıdaki adrese ödemeli olarak yapınız. Anketleri en geç 26.06.2006 tarihine kadar ulaştırmanız rica olunur.

Anket veya uygulama ile ilgili soru ya da sorunlarınız için: 0 505 266 42 02 nolu telefondan Mehtap Tam'ı ve 0 312 210 40 55 nolu telefondan Yrd. Doç. Dr. Ali Eryılmaz'ı arayabilir veya mehtaptam78@yahoo.com ve eryılmaz@metu.edu.tr e-posta adreslerinden bize ulaşabilirsiniz.

Katkılarınızdan dolayı şimdiden teşekkür ederiz.

Gönderim Adresi:

Mehtap TAM

Emniyetçiler Mahallesi Kilit Sokak 2/2 Yenimahalle- ANKARA

ANKETİN UYGULANMASINA İLİŞKİN YÖNERGE

Araştırma için, 5 yıllık fizik öğretmenliği programında okuyan öğretmen adaylarına, 4+1,5 yıllık tezsiz yüksek lisans fizik öğretmenliği programında okuyan öğretmen adaylarına ve dersleri veren öğretim elemanlarına olmak üzere üç farklı anket hazırlanmıştır. Anketler gönderilen zarfın içindedir.

Fizik öğretmeni adaylarına uygulanacak anketler için 30 dakika süre verilmesi yeterli olacaktır. Anketler, adaylara derste dağıtılarak uygulanabileceği gibi; adaylara verilip bir sonraki derse mutlaka geri getirmeleri şartıyla katılım sağlanabilir. Araştırmanın amacına ulaşması açısından, katılımcılara uygulama başlangıcında araştırmanın amacı ve önemi açıklanarak anketteki soruların tümünü samimiyetle cevaplandırmaları ve verdikleri bilgilerin gizli tutulacağı hatırlatılmalı; isim yazmaları istenmemelidir. Anketler öğretmen adayları ve öğretim elemanlarına uygulandıktan sonra toplanıp; ekteki uygulama formu doldurulmalı ve yeniden zarfa konulmalıdır. Aras Kargo'yu arayıp gönderiniz olduğunu bildirdiğinizde, kargo servisi bulunduğunuz yerden zarfı alacaktır. Gönderiyi Mehtap Tam adına aşağıdaki adrese ödemeli olarak yapınız. Anketleri en geç 26.05.2006 tarihine kadar ulaştırmanız rica olunur.

Anket veya uygulama ile ilgili soru ya da sorunlarınız için: 0 505 266 42 02 nolu telefondan Mehtap Tam'ı ve 0 312 210 40 55 nolu telefondan Yrd. Doç. Dr. Ali Eryılmaz'ı arayabilir veya mehtaptam78@yahoo.com ve eryılmaz@metu.edu.tr e-posta adreslerinden bize ulaşabilirsiniz. Katkılarınızdan dolayı şimdiden teşekkür ederiz.

Mehtap TAM
e-mail: mehtaptam78@yahoo.com
Tel: 0 505 266 42 02

Yrd. Doç. Dr. Ali ERYILMAZ
e-mail: eryılmaz@metu.edu.tr
Tel: 0 312 210 40 55

Gönderim Adresi:
Mehtap TAM
Emniyetçiler Mahallesi Kilit Sokak 2/2
Yenimahalle- ANKARA

UYGULAMA FORMU

Üniversite Adı:……...

Öğretmen Adayı Sayısı (5 Yıllık Fizik Öğretmenliği Programı):…….
Öğretmen Adayı Sayısı (1,5 Yıllık Tezsiz Yüksek Lisans Fizik Öğretmenliği Programı):……..
Öğretim Elemanı Sayısı (Ortaöğretim Fen-Matematik Alanı Fizik Eğitimi Anabilim Dalı):……...

Uygulanan Öğretmen Adayı Anketi Sayısı
(5 Yıllık Fizik Öğretmenliği Programı):……..
Uygulanan Öğretmen Adayı Anketi Sayısı
(1,5 Yıllık Tezsiz Yüksek Lisans Fizik Öğretmenliği Programı):……
Uygulanan Öğretim Elemanı Anketi Sayısı
(Ortaöğretim Fen-Matematik Alanı Fizik Eğitimi Anabilim Dalı):…….....

Anket nasıl uygulandı? İşaretleyiniz

( ) Adaylara derste uygulandı
( ) Adaylara verilip bir sonraki derse getirmeleri istendi

APPENDIX D

OFFICAL PERMISSION PAPERS

O.D.T.Ü.
FEN BİLİMLERİ ENSTİTÜSÜ
YÖNETİM KURULU KARARI

Tarih: 14.03.2006
Sayı: FBE:2006/10

GÖREVLENDİRME VE İZİN

Ortaöğretim Fen ve Matematik Alanları Eğitimi EABD yüksek lisans programı öğrencisi Mehtap Tam'ın, 2005-2006 Ders Yılı II. Döneminde "Türkiye'deki Fizik Öğretmenliği Son Sınıf Öğrencilerinin Eğitimle İlgili Sorunlarının Analizi" başlıklı yüksek lisans tez çalışmasına ilişkin olarak ekte belirtilen 35 Üniversitenin Eğitim Fakültelerinin 4+1,5 Tezsiz Yüksek Lisans Fizik Öğretmenliği öğrencileri ile ilgili çalışma yapmak için görevlendirme başvurusu incelenmiş; ilgili EABD Başkanlığı'nın görüşüne dayanarak adı geçen öğrencinin isteği doğrultusunda görevlendirilmesine oybirliği ile karar verilmiştir.

Prof. Dr. Canan Özgen
FBE Müdürü

Prof. Dr. R.Sezer Aygün
FBE Müd. Yard.

Prof.Dr.Ali Kalkanlı
FBE Müd. Yard.

Prof. Dr. Cahit Eralp
Üye

Prof. Dr. Mustafa Verşan Kök
Üye

Doç.Dr.Gülden Berkman
Üye

FEN BİLİMLERİ ENSTİTÜSÜ
YÖNETİM KURULU KARARI

Tarih: 14.03.2006
Sayı: FBE:2006/3

GÖREVLENDİRME VE İZİN

Ortaöğretim Fen ve Matematik Alanları Eğitimi EABD yüksek lisans programı öğrencisi Mehtap Tam'ın, 2005-2006 Ders Yılı II. Döneminde "Türkiye'deki Fizik Öğretmenliği Son Sınıf Öğrencilerinin Eğitimle İlgili Sorunlarının Analizi" başlıklı yüksek lisans tez çalışmasına ilişkin olarak ekte belirtilen 11 Üniversitenin Eğitim Fakültelerinin 5 yıllık Fizik Öğretmenliği programı öğrencileri ile ilgili çalışma yapmak için görevlendirme başvurusu incelenmiş; ilgili EABD Başkanlığı'nın görüşüne dayanarak adı geçen öğrencinin isteği doğrultusunda görevlendirilmesine oybirliği ile karar verilmiştir.

Prof. Dr. Canan Özgen
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FBE Müd. Yard.

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FBE Müd. Yard.

Prof. Dr. Cahit Eralp
Üye

Prof. Dr. Mustafa Verşan Kök
Üye

Doç.Dr.Gülden Berkman
Üye