PRE-SERVICE PHYSICAL EDUCATION TEACHERS' TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE, TECHNOLOGY INTEGRATION SELF-EFFICACY AND INSTRUCTIONAL TECHNOLOGY OUTCOME EXPECTATIONS

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ABSTRACT

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SELF-EFFICACY AND INSTRUCTIONAL TECHNOLOGY OUTCOME
EXPECTATIONS

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The purposes of this study were (1) to identify the Technological Pedagogical
Content Knowledge (TPACK), Technology Integration Self Efficacy (TISE) and
Instructional Technology Outcome Expectations (ITOE) of pre-service physical
education teachers, (2) to examine the relationships among "TPACK", "TISE" and
"ITOE", and (3) to examine the differences between pre-service physical education
teachers who perceived and who did not perceive technology integration by their
university instructors on "TPACK", "TISE", and "ITOE" scores. Seven hundred
sixty pre-service physical education teachers from 14 randomly selected universities
representing seven geographical regions in Turkey participated in the study. Data
were collected by validated versions of "TPACK", "TISE", and "ITOE" surveys.
Descriptive Analysis, Canonical Correlation Analysis, MANOVA, Independent t
Test, and Qualitative Content Analysis were used for data analysis. Findings
indicated that TPACK, TISE and ITOE perceptions of pre-service physical education
teachers were at good level. University instructors were not good role models in
technology integration for the pre-service teachers in general. According to the pre-

service teachers' report, integration of physical education and sport related emerging technologies were almost did not exist in the teaching practices of university setting. TPACK, TISE, and ITOE were moderately related with each other ($p<0.05$). Pre-service teachers' self perceptions on TPACK, TISE, and ITOE were positively influenced by their perception of university instructors' technology integration into teaching in university courses ($p<0.05$). Based on the findings, it is recommended to provide professional development programs for the teacher education program instructors in technology integration, in teaching and in emerging physical education and sport related technologies. In addition, using technology integrated teaching models by both university instructors and pre-service teachers should be encouraged.

Keywords: TPACK, Technology Integration, Self-Efficacy, Pre-service Teachers, Physical Education.

ÖZ

BEDEN EĞİTİMİ ÖĞRETMEN ADAYLARININ TEKNOLOJİK PEDAGOJİK
ALAN BİLGİLERİ, TEKNOLOJİ İLE BÜTÜNLEŞİK ÖZGÜVENLERİ VE
ÖĞRETİM TEKNOLOJİLERİNDEN SONUÇ BEKLENTİLERİ

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Bu çalışmanın amacı (1) beden eğitimi öğretmen adaylarının Teknolojik Pedagojik Alan Bilgilerini (TPAB), Teknoloji ile Bütünleşik Öz-Yeterliliklerini (TBÖ) ve Sonuç Beklentilerini (SB) tanımlamak, (2) "TPAB", "TBÖ" ve "SB" arasındaki ilişkileri incelemek ve son olarak (3) aldıkları eğitim esnasında eğitim teknolojileri kullanılan beden eğitimi öğretmeni adayları ile eğitim teknolojileri kullanılmayanlar arasındaki "TPAB", "TBÖ" ve "SB" farklarını incelemektir. Yedi coğrafi bölgeden rastgele seçilen ondört üniversiteden yediyüz altmış beden eğitimi öğretmeni adayı çalışmaya katılmıştır. Veri toplama için geçerliliği yapılmış "TPAB", "TBÖ" ve "SB" anketleri kullanılmıştır. Veri analizleri için; Betimleyici Analiz, Kanonik Korelasyon Analizi, MANOVA, Bağımsız t Testi ve Nitel İçerik Analizi kullanılmıştır. Sonuçlara gore beden eğitimi öğretmen adaylarının "TPAB", "TBÖ" ve "SB" algıları iyi düzeyde çıkmıştır. Beden Eğitimi öğretmeni adaylarının algılarına göre, öğretim elemanlarının beden eğitimi öğretmeni adaylarına teknolojiyi entegre etmede iyi bir rol model olmadıkları görülmüştür. Aynı zamanda, üniversite eğitiminde beden eğitimi ve sporla ilgili yeni teknolojilerin neredeyse hiç kullanılmadığı bulunmuştur. "TPAB", "TBÖ" ve "SB" nin orta derecede birbirleriyle

ilişkileri vardır (p<0.05). Öğretim elemanlarının derslerde teknoloji kullanmaları öğretmen adaylarının "TPAB", "TBÖ" ve "SB" için öz algılarını pozitif yönde etkilemiştir (p<0.05). Bu sonuçları baz alarak, öğretmen eğitimi öğretim elemanları için, teknolojiyi eğitimlerine entegre etmeleri yönünde ve beden eğitimi ve sporla iligili yeni teknolojiler hakkında profesyonel gelişim programları sağlanması tavsiye edilmektedir. Ayrıca, teknoloji ile bütünleşik öğretme modellerini kullanarak, hem öğretim elemanlarını hem de öğretmen adaylarını teşvik edilmelidir.

Anahtar Kelimeler: Teknolojik Pedagojik Alan Bilgisi, Teknoloji Destekli Eğitim, Öz-Yeterlilik, Öğretmen Adayları, Beden Eğitimi.

To my family that made me who I am

and

To my beloved Beyhan who is my future

ACKNOWLEDGMENTS

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ABBREVIATIONS

Survey of TPACK: Survey of Teaching with technology

TK: Technological Knowledge

CK: Content Knowledge

PK: Pedagogical Knowledge

PCK : Pedagogical Content Knowledge

TPK : Technological Pedagogical Knowledge

TCK: Technological Content Knowledge

TPCK : Technological Pedagogical Content Knowledge

TISE: Survey of Technology Integration Self Efficacy

ITOE: Survey of Instructional Technology Outcome Expectations

M: Mean

SD: Standard Deviation

PE: Physical Education

PETE : Physical Education Teacher Education

ICT : Information Communication Technologies

CHAPTER 1

INTRODUCTION

Technology makes life easier, quicker and more comfortable. Besides, it is like a living organism that always grows and develops and like a virus that easily spreads. The recent rapid advances in technology have been creating new interests and new tools for its educational use. There are many technological devices used for educational purposes such as computers, PDAs, smart boards, digital cameras and videos.

Technological advances also influence the physical education as a school subject which mainly uses the movement content to develop the psychomotor, affective-social and cognitive characteristics of the students (Cennamo et al., 2010). Recent researches have indicated potential of using different instructional, sport and physical education related technologies in teaching physical education (Roblyer & Doering, 2009). Especially, the development of wireless technology, computer projection systems, physical activity monitoring systems, and active gaming (using video games for physical activity) devices and softwares provide new opportunities in the gym (NASPE, 2009).

More specifically, technological devices that have potential to be used in physical education include computers and laptops, LCD projectors, digital video and digital photo cameras, audio equipments, heart rate monitors, pedometers, handheld (PDAs,

GPS) and video game consoles (Mohnsen, 2008). Besides technological devices, educational sport softwares and internet are also considered within the technology supported physical education course. Kretschmann (2010) lists three kinds of sport softwares to use in teaching sports and physical education. The first group are the videos of the specific sport techniques and game tactics, second group are the softwares to analyze game play (e.g. Simi Scout) or to analyze human movement (e.g. Simi Motion), and third group are the commercial gaming softwares that have a potential for the motivation power in educational affairs. Internet provides easy access to the knowledge about everything including scientific and nonscientific information. It also provides different platforms for easy and cheap communication with the others (e.g. e-mail, video conferencing, group discussion opportunities). Macdonald and Hay (2010) identify the use of above mentioned technology in physical education under four main purposes in Australia context. These purposes are 1) to facilitate the integration of movement principles with movement performances, 2) to generate information for application and evaluation of movement principles, 3) formative assessment processes, 4) summative assessment evidences for movement performances.

Briefly, based on previous examples, it can be easily understood that technology is becoming an inseparable part of physical education day after day. Therefore, teachers' knowledge has become very important for successful integration of technology in education (Jeong So & Kim, 2009). In the teaching process, it is important not only how you teach (pedagogy) and what you teach (content), but also which materials (technology) you use while teaching (Jones & Moreland, 2004).

Shulman (1987) claims that instead of being treated content knowledge and pedagogical knowledge as separated domains of teacher knowledge bases, they should be considered to have mutual relationships with each other. Therefore, the idea of Pedagogical Content Knowledge (PCK) born as the definition of *"the ways of representing and formulating the subject that make it comprehensible to others"*. Later, Mishra and Koehler (2006) built a theoretical framework over the Shulman's PCK. In addition to pedagogical knowledge and content knowledge, technological knowledge is combined and this new framework called as Technological Pedagogical Content Knowledge (TPACK).

Following the Mishra and Koehler's (2006) conceptualization of TPACK, several researchers applied interventions or course designs to improve teachers' level of TPACK (Niess, 2005; Cavin, 2007; Terpstra, 2009). Some researches also inspected the relationship between the level of TPACK and other variables like self-efficacy (Lee & Tsai, 2008; Perkmen, 2008; Nathan, 2009) and instructional technology outcome expectations (Niederhauser & Perkmen, 2010). However, studies connected with technology and physical education is few and limited to being discrete in Turkey.

Studies in Turkey were mainly focused the attitudes or thoughts on technology, ICT usage of teachers (Mavi, 2007; Yılmaz, Ulucan & Pehlivan, 2010), computer usage of pre-service teachers (Yaman, 2007b), attitudes of pre-service teachers toward internet, ideas and thoughts of students about distance education (Yaman, 2008) and internet (Yaman, 2007a). The role of research assistants while using Synchronous

Distance Education (Karal, Çebi & Turgut, 2010) and attitudes of university instructors towards technology (Yılmaz, 2008) were studied, as well.

Teacher education programs are the places where the prospective teachers are equipped with the necessary skills to teach the future generations. Therefore, pre-service teachers should develop technological literacy to 1) facilitate and inspire student learning and creativity, 2) design and develop digital-age learning experiences and assessments, 3) model digital-age work and learning, 4) promote and model digital citizenship and responsibility, and 5) engage in professional growth and leadership (ISTE, 2008) during their teacher education experiences. Thus, qualified teacher education programs can improve the TPACK, technology integration self-efficacy and instructional technology outcome expectations of the pre-service teachers. However, there is limited information about those characteristics of the pre-service physical education teachers in Turkey.

1.1 Purpose of the Study

The purposes of the current study were 1) to identify the Technological Pedagogical Content Knowledge (TPACK), Technology Integration Self-Efficacy (TISE), and Instructional Technology Outcome Expectations (ITOE) of pre-service physical education teachers in Turkish context, 2) to examine the relationships among "TPACK", "TISE", and "ITOE", and 3) to examine the differences between pre-service physical education teachers who perceived and who did not perceive technology integration throughout their university education by their instructors on "TPACK", "TISE", and "ITOE".

1.2 Research Questions

This section specifies the research questions to be investigated as follow:

1. What are the "TPACK", "TISE" and "ITOE" levels of pre-service physical education teachers?
2. Is there a significant relationship between "TPACK", "TISE" and "ITOE" variables?
3. Is there a significant difference between pre-service PE teachers who perceived and who did not perceive technology integration throughout their university education by their instructors on "TPACK", "TISE" and "ITOE"?

1.3 Significance of the Study

Use of technology in education has become more and more important as the time goes on. However, some studies indicated that teachers are not clear about how to use technology to assist their teaching. Sometimes they use the Web to attract students' attention but they do not know how to use it to facilitate students' development (Lee & Tsai, 2008). Teachers' level of TPACK is the determinant that they can successfully integrate technology into education. Besides, their confidence on integrating technology in education (self-efficacy) and their motivation while they are teaching (outcome expectations) are critical (Niederhauser & Perkmen, 2010).

There is lack of research on teachers' TPACK, technology integration self-efficacy and instructional technology outcome expectation levels in physical education settings. Role of physical education teacher education programs on development of these variables are not clear, either. Therefore, studying these technology-related

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perceptions of the pre-service physical education teachers can improve our understanding of the strengths and weaknesses of those programs in preparation of future teachers who are expected to educate digital natives. Based on this information, necessary improvements can be realized in the physical education teacher education programs.

1.4 Definition of Terms

The operational definitions of the variables investigated in this study are presented as follows:

Technological Knowledge (TK) is the mean score which is measured with TPACK scale (Schmidt, et al., 2009) to determine the physical education teachers' knowledge about technology.

Content Knowledge (CK) is the mean score which is measured with TPACK scale (Schmidt, et al., 2009) to determine the physical education teachers' knowledge about their subject area.

Pedagogical Knowledge (PK) is the mean score which is measured with TPACK scale (Schmidt, et al., 2009) to determine the physical education teachers' knowledge about pedagogy.

Technological Pedagogical Knowledge (TPK) is the mean score which is measured with TPACK scale (Schmidt, et al., 2009) to determine the PE teachers' knowledge about technology and pedagogy.

Technological Pedagogical Content Knowledge (TPACK) is the mean score which is measured with TPACK scale (Schmidt, et al., 2009) to determine the PE teachers'

knowledge about content, pedagogy and technology (the tools that used while teaching).

Technology Integration Self- Efficacy is the mean score which is measured with Survey of Technology Integration Self-Efficacy (TISE) (Perkmen, 2008) to assess confidence and capability of pre-service PE teachers while they are teaching with technology.

Instructional Technology Outcome Expectations is the mean score which is measured with Survey of Instructional Technology Outcome Expectations (ITOE) (Niederhauser & Perkmen, 2010) to assess individuals' motivation using technology.

Pre-service Physical Education Teachers are the third and fourth grade undergraduate students who are enrolled in Department of Physical Education Teacher Education programs.

CHAPTER 2

REVIEW OF LITERATURE

This chapter contains the technology in education and physical education, ISTE standards, the information and evolution of Technological Pedagogical Content Knowledge (TPACK) and its elements, the collection of studies related with TPACK, and also the information about Technology Integration Self-Efficacy and Instructional Technology Outcome Expectations derived from literature.

2.1 Technology and Education

In recent years, technology has been increasingly utilized for educational settings. Students are substantially involved in technology in and out of the classrooms. In the environmental conditions that the speed and substructure of internet grows, and digital technologies rapidly changes and improves, technology cannot be considered separated from education. In 2001, Prensky dubbed the people who born into this digital world as "Digital natives". Today's students, who the pre-service teachers have been preparing to teach, are living with the cell phones, computers and game consoles e.g. The designs of the lessons and teaching strategies should be adapted according to these special conditions. More recently, Tablet PC's (El-Gayar et al, 2011), Interactive White Boards (Lee, 2010), computer simulations (Khan, 2011), and even Short Message Services (SMS) (Brett, 2011) have been used to support student learning. The conventional paper-based education that everyone are used to is gradually expiring. Technology integrated education has been consolidated day by

day. The role of teachers in the classroom has been changing in this process. Teachers should enhance students' creativity, and let them apply, analyze and evaluate with technology. In his article named From Dewey to Gates, Salinas (2008) emphasizes that "*using technology as a fully instructional tool instead of an aid to teach or toy to fun, will conceive students who learn exploring and creating new knowledge, and be ready to the problems which await them in 21st century*". The fact that technological devices such as computers and projectors e.g. get cheaper and more easily accessible, enables educators to integrate technologies into teaching processes more.

In the last decade, when curriculum authorities were preparing educational programs, technology opportunities had been taken into consideration for supporting the activities that curriculums offer for collecting, analyzing and interpreting data. National Curriculum of England can be given as an example for that (1999). Also, in the latest curriculum prepared by Turkish Ministry of National Education (MoNE) in 2007, technology was emphasized and teachers were encouraged to use technology in their teachings. Globally, an international association [The International Society for Technology in Education (ISTE)] sets Educational Technology standards (ISTE, 2008) to determine the competencies that teachers and students should have.

2.1.1 Education through the Standards

For improving learning and teaching by technology, International Society for Technology in Education (ISTE) set standards in 2000 which were updated later in 2008. By announcing these standards namely National Educational Technology

Standards for Teachers (NETS-T), ISTE declared the expectations from all contemporary teachers from all branches. These are:

1. Facilitate and Inspire Student Learning and Creativity

   By using knowledge of subject matter, teaching and learning, and the technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.

2. Design and Develop Digital-Age Learning Experiences and Assessments

   Teachers design, develop, and evaluate authentic learning experiences and assessments incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes.

3. Model Digital-Age Work and Learning

   Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.

4. Promote and Model Digital Citizenship and Responsibility

   Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.

5. Engage in Professional Growth and Leadership

   Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources.

These standards imply that physical education teachers as well as the other subject matter teachers should have technology competency, integration and facilitation characteristics in educational setting.

2.2 Technology and Physical Education

In the teaching process, creating rich environments for learners is very crucial. Teachers can easily achieve meaningful learning by the help of instructional technologies. Therefore, teachers' competency in use of technology, integration of technology into the teaching and better facilitation of student learning by technology have been expected from physical education teachers (İnce et al, 2006).

Technological devices generaly used in physical education include computers and laptops, LCD projectors, digital video and digital cameras, audio equipment, heart rate monitors, pedometers, handheld devices including mobile phones, PDA's, GPS, video game consoles including exergame dance mats (Mohnsen 2008). Integration of these technologies in physical education is accepted as the first step for turning traditional physical education into a more technologised form (Kretschmann, 2010).

Use of sport and physical education softwares and internet resources also provide great opportunities to stimulate the learner engagement in physical education. Each day, the number and quality of the softwares in sport and physical education, and the breadth and depth of knowledge that can be reached via internet have been increased. Kretschmann (2010) underlines a critical role of using the emerging technological devices, software and internet in changing teacher-centered pedagogy to learner

centered one in physical education setting. These technologies increase learner engagement, open new communication lines with the teacher as well as the peers, and extend the instruction beyond the class hours.

The technology enhanced lessons which students have a center role and teacher as a guide, can have a big impact on students' improvements on specific goals. Roblyer and Doering (2005), give an example of three-week technology integrated instructional design that was prepared for three subjects; biology, technology, and physical education. In first week, the teacher assigned projects and collected information. In biology class, teacher hold class discussion about body systems with a couple of sofwares (InerBody Works, Muscle Flash e.g.) and assigned the students readings. In Physical Educaion class, the teacher showed the video about personal fitness and analyze the impact of diet with simulations. He also analyzed fitness performance and prepared plans using Healt-Related Fitness (Bonnie's Fitware). In technology class, the teacher showed how to design a video structure and formed small groups assigning them to work on a video about each student. In the second week, students worked on their simulations and gathered materials to answer questions for biology, worked on appropriate fitness plans for physical education, lastly worked on video editing software for technology class. In the third and last week, students presented their videos for each classes. The traditional Physical education is considered to be Physical Education 1.0, in which the teacher has a role of direct instruction without technology. On the other hand, in Physical Education 2.0 means integrating media and technologies, teacher's role shifts from instructor to advisor (Kretschmann, 2010).

2.3 Technological Pedagogical Content Knowledge (TPACK)

Theory of TPACK was constructed by Mishra and Koehler (2006) over Shulman's (1986) Pedagogical Content Knowledge (PCK). In his model, Schulman proposes that there is a certain domain of knowledge including both an understanding of pedagogy (teaching methods, student needs and readiness, etc.) and an understanding of the content which is taught (Cox, 2008).

Pedagogical Content Knowledge of teachers is crucial for interpreting the specific subject matter and for using different ways to represent it to make it comprehensible for learners (Mishra & Koehler, 2006). After 1980's, the constant developments in technology changed the conjuncture of the education. Cox (2008) explains this situation as *"technologies have come to the forefront of educational discourse primarily because of the availability of a range of new, primarily digital, technologies and requirements for learning how to apply them to teaching. These new technologies incorporate hardware and software such as computers, educational games, and the Internet and the myriad applications supported by it."* In 2006, Mishra and Koehler introduced technological knowledge as a teacher's skill that has to be learned for meaningful teaching. Consequently, the relationship between technological knowledge and pedagogical content knowledge form the Technological Pedagogical Content Knowledge (TPACK). The elements of this theory are as follows:

2.3.1 Technological Knowledge (TK)

Technological knowledge (TK) is the knowledge about analogue technologies, such as books, pens, blackboard etc., and digital technologies, such as computers, internet and digital videos. This includes the skills required for using particular technologies in teaching activities (Mishra & Koehler, 2006). Technology is constantly developing and changing, hence, Technological Knowledge (TK) which involves the skills for learning and adapting to new technologies should be ready for transforming, too. In physical education area, a teacher who has sufficient technological knowledge can use appropriate tools and devices in his/her teaching. For instance, a computer-based teacher observation system can be used for rating the specific skill or a video analysis of teaching can be used while giving feedbacks to students.

2.3.2 Content Knowledge (CK)

Content knowledge (CK) refers knowing the major facts, concepts and the relationships of a field. Most importantly, this knowledge is independent of any pedagogical activities or how one might use methods or strategies to teach (Cox, 2008). More clearly, teachers should know and understand the subjects that they teach, including knowledge of central facts, concepts, theories, and procedures within a given field; knowledge of explanatory frameworks that organize and connect ideas; and knowledge of the rules of evidence and proof (Mishra & Koehler, 2006). For example, a physical education teacher should know the basic understandings of motor learning & control, anatomy, sport physiology etc. According to Turkish Physical Education Curriculum (2007), a teacher should have

adequate structures about Movement Knowledge and Skills and Active Participation and Healthy Life.

2.3.3 Pedagogical Knowledge (PK)

Pedagogical knowledge (PK) refers to techniques or methods of teaching, strategies for evaluating student understanding (Mishra & Koehler, 2006). A teacher should know how a student constructs knowledge, acquires skills, and develops habits of mind and positive dispositions toward learning. Pedagogical knowledge requires an understanding of cognitive, social, and developmental theories of learning in order to applying students in their classroom. PK focuses on a teacher's knowledge of the general pedagogical activities and strategies for motivating students, communicating with students and parents, presenting information to the students, and classroom management among many other things (Cox, 2008). When teaching a skill or a movement in physical education, a teacher should consider child development, student needs, behaviors and motivation all of which require a sufficient PK.

2.3.4 Pedagogical Content Knowledge (PCK)

PCK, proposed by Shulman (1987), is combining the knowledge of teaching strategies and concepts to be taught (Jang, 2011). PCK means knowing the teaching strategies for a specific subject matter. A teacher with a good PCK presents a subject matter with appropriate instruction strategies. For instance, a basketball course cannot be given to the third grade pupils with same instruction methods given to the sixth grade pupils. Different appropriate instructional strategies should be determined according to age & grade of the students.

2.3.5 Technological Pedagogical Knowledge (TPK)

Technological Pedagogical Knowledge (TPK) is the knowledge of the various technologies which can be integrated and used in educational settings. A teacher should be aware of how learning might be changed by the help of using particular technologies (Mishra & Koehler, 2006). Cox (2008) explains this element as *"a knowledge of the technologies that may be used in a equivalent pedagogical context, including the affordances and constraints of those technologies, and how those technologies influence or are influenced by the teacher's pedagogical strategies and student learning".* A physical educator who has high TPK can easily select the appropriate tool or device by taking into consideration of children's age or readiness level to use in teaching.

2.3.6 Technological Content Knowledge (TCK)

Technological Content Knowledge is *" a knowledge of appropriate technologies that may be utilized in a specific discipline and how the use of those technologies transforms the content of that discipline through representation or the generation of new content or how the content of that discipline transforms or influences technology."* (Cox, 2008). Besides, being aware of the technology, knowing how to use it and understanding the purpose for doing it in the content of the specific subject matter are very important for a teacher. According to Mishra & Koehler (2006), technology has got a lot of potential and a teacher with a good Technological Content Knowledge **(**TCK) should understand this potential of a specific technology for his/her particular subject area. In physical education, choosing and using a proper

technology for teaching a specific subject like a sport or a skill can be very crucial. Therefore, this competence of a teacher requires high TCK.

2.3.7 Technological Pedagogical Content Knowledge (TPCK)

Khan (2011) explains TPCK *as "how different concepts can be represented using technologies, pedagogical techniques that employ technologies to teach content, what makes concepts difficult or easy to learn, students' prior understanding and skill set, and how technology can help redress some of the problems that students face."* (Khan, 2011). For instance, using video cameras to record certain dance moves in a dance class and giving feedbacks with the videos of these to the students using question and answer method reflects a good TPCK in physical education.

2.4 TPACK Studies

After being introduced by Mishra and Koehler (2006) to the academic world, TPACK has become one of the hot topics nowadays. However, even the originators of this theory think that there are some difficulties of integrating technology to education. For example, the rapid change rate of technology can make it quickly outdated. Also, inappropriate design of softwares may cause some difficulties for integrating them to education because most of the technologies are designed for the world of business and work, not for education. And lastly, they claim that introducing technology to the educational process is not enough because teachers need to know the appropriate incorporate technology in their teaching. Recent studies related with pre-service and in-service teachers' level of TPACK are summarized below.

Koh, Chai & Tsait (2010) have recently examined the profile of 1185 Singaporean pre-service teacher in terms of their TPACK level. According to their findings, pre-service teachers rated themselves as slightly above average in each factor of TPACK. They also reported the non-significant effect of age and teaching level on TPACK variables in their study.

In a study (Lee & Tsai, 2008) conducted with 558 teachers, it is found that older & more experienced teachers have low self-efficacy with respect to TPACK. On the other hand, teachers with more experience of using web, have high levels of self-efficacy with respect to TPACK.

Pre-service teachers' perceptions of TPACK and their cognitive difficulties in applying TPACK were examined in another study (Jeong So & Kim, 2009). After 97 subjects enrolled in a 12-week module on the ICT (Information Communication Technologies) integration for teaching and learning, it is asserted that teachers have difficulties to find appropriate ICT tools and resources relevant for the target students and to design tasks and learning activities.

Another study was conducted with 215 first & second-year pre-service primary education teachers in an Instructional Technology Course for developing their TPACK (Angeli & Valanides, 2009). In the middle and at the end of the course, teachers were expected to conduct an Instructional Design for ICT-enhanced learning. According to the results, teachers had better performance on second design

and during the course their TPACK competency developed and significantly improved.

A framework named Learning Technology by Design was proposed by Mishra and Koehler (2006). In their study, they offered 28 teachers to make a movie about educational psychology and technology to provide them additional insight into the fields. Learning by doing was their focuses with an aim to have teachers learn some concrete advanced technology skills. At the end of the study, they identified that subjects learned the programs like movie maker and photo shop.

In brief, the above mentioned 5 studies indicated that TPACK level of pre-service teachers were slightly above the average (Koh, Chai & Tsait, 2010), pre-service teachers had certain weaknesses in technology integration (Jeong So & Kim, 2009), younger teachers and teachers with more experience with technology have better TPACK scores (Lee & Tsai, 2008), and if the learning environment for technology integration competency is well established both pre-service and in-service teachers can improve their TPACK scores (Angeli & Valanides, 2009; Mishra and Koehler, 2006).

To the authors' information, there is no study that directly examining the use of technology characteristics of the pre-service and in-service physical education teachers with TPACK framework in abroad and in Turkey. Most of the technology integration related studies in physical education literature focus on the competency in technological device use and integration of certain technologies in teaching with pre-

service and in-service physical education teachers (Russell, 2007; Woods et.al, 2008; Strand et.al., 2011). There are also limited numbers of studies dealing with effects of technology interventions on pre-service and in-service physical education teachers' related characteristics (Ince, Goodway, Ward & Lee, 2006; Cote et.al., 2008; McCaughtry et.al., 2008; Muhammed & El Reheem, 2010). Summary of these studies are presented in Table 2.1.

Table 2.1

Recent Studies about Technology Integration with Pre-service and In-service Physical Education Teachers

Author (Year)	Instruments	Participants	Results
Russell (2007)	Questionnaire	36 in-service PE teachers	Teachers with less teaching experience had greater knowledge of, comfort with, and anticipated use for certain Interactive Video Game Technology applications than more experienced teachers. As a whole, teachers had very little knowledge, experience, or comfort with technology.
Woods et al (2008)	Questionnaire	114 in-service PE teachers	Teachers have a high level of perceived competency with many forms of technology but differences based on gender, teaching level, and years of experience. Low competency levels were found for website creation, PDAs, heart rate monitors, and body composition analyzers.
Strand et al (2011)	Questionnaire	380 in-service PE teachers	A high majority of the physical education teachers were knowledgeable about appropriate and inappropriate instructional strategies.
McCaughtry et al (2008)	Observations and interviews	26 in-service PE teachers	Teachers anticipated that pedometers would motivate primarily higher skilled students, but found that lesser skilled students connected with them more. they shifted from seeing pedometers as potential accountability tools for student learning and their teaching to identifying key limitations to using pedometers for assessment.
Ince, et al (2006)	Questionnaire, Interventions and Workshops	41 in-service PE teachers	Teachers' technology competency, integration of technology competency, and affinity to technology is increased significantly after intervention.
Cote et al (2008)	Online interactions, survey, selected interviews	55 pre-service PE teachers	Online interactions improved ability to integrate theory with practical settings. Students have high level of student satisfaction with the online mode of delivery than face to face interactions
Muhammed & El Rheem (2010)	Observations	28 pre-service teacher	It was found that the participants who used the WebQuest to learn the teaching skills, achieved significantly higher levels in their teaching performance than who were instructed using the traditional methods of modeling and lecturing.

In general, these studies indicate that younger physical education teachers have higher affinity to technology use, that most of the teachers have limited knowledge in use of technology in physical education, and that teachers are not familiar with newer technologies (Russell, 2007; Woods et al., 2008; Strand et.al, 2011). In addition, model technology interventions are effective in improving the related competencies of both pre-service and in-service physical education teachers (Ince et al, 2006; Cote et.al., 2008; McCaughtry et.al., 2008; Muhammed & El Reheem, 2010).

In Turkish physical education setting, there are few studies in the use of technology by teachers (Yaman, 2008; Mavi, 2007; Yaman, 2007a, 2007b; Yılmaz, 2008; Yılmaz, et al., 2010). Yaman (2008) examined the use of educational technology of physical education teachers with 191 teachers. According to the findings, female physical education teachers use educational technologies more than male physical education teachers. Teachers with 0 to 5 years of experience use educational technologies most while teachers with 21 and more years of experience use it less.

Computer and internet usage and attitudes toward internet were studied with 278 students from Physical Education and Sport Department (Mavi, 2007). It was found that physical education teachers' level of internet usage was low, and they mostly used internet for 33.3 % social communications. Similarly, negative attitudes of physical education students toward internet were found in another study conducted with 159 participants. (Yaman, 2007a).

Another study was conducted with 192 physical education teachers to assess their technology comptency. According to the results, the teachers who have personal computers at home are more competent in using office and multimedia programs when compared to the others (Yaman, 2007b). Yılmaz (2008) examined the attitudes of 159 instructors of physical education deparments toward technology. Results shows that instructors have high attitudes toward technology and that, there are no differences in attitude points except age variable. Attitudes and thoughts of the 35 students attending physical education teaching program about using technology in education were examined in another study. It was found that the students' usage of technological materials in education affected the students' attitude scores in a positive way (Yılmaz, 2010).

Consequently, the studies in Turkish case were focused on the attitudes or competence of physical education teachers toward technology in general. Therefore, because of giving promising possibilities to investigate level of TPACK, Technology Integration Self Efficacy and Outcome Expectations of pre-service physical education teachers, current study has an opportunity to be unique in Turkey.

2.5 Technology Integration Self-Efficacy and Outcome Expectations

Self-efficacy and outcome expectations are two of the main cognitive factors of Bandura's Social Cognitive Theory (Bandura, 1986). Self-efficacy is defined in his theory as a perception of an individual for his own capabilities to carry out any action that is wanted (1997). Therefore, technology integration self-efficacy is evolved from Bandura's theory, which means an individual's belief or confidence on performing technology related tasks (Nathan, 2009). The other domain that is used in current study is the outcome expectations defined by Bandura as the judgment of the likely

consequence that an action will produce (Bandura, 1986). Moreover, technology integration outcome expectations is defined by Niederhauser & Perkmen (2010) as the motivational force that will help to use technology in their teachings and their anticipated outcomes of using instructional technology in the classroom (Perkmen, 2008).

Perkmen (2008) claims that technology integration self-efficacy (TISE) and outcome expectation (OE) has mutual relationships that they are useful to predict technology integration performance. Correlatively, in a study conducted with 320 older adults, outcome expectations, physical activity, self-efficacy and health status were assessed (Wojcicki, White, & McAuley, 2009). One of the findings reveals that the participants who have high self-efficacy also have high social outcome expectations.

In Turkish case, Göktaş (2011) studied with 337 physical education and sport students about their self-confidence levels towards information and communication technologies (ICT). It was found that the differences of self-confidence was connected with having or not having computer at home and that PETE students have higher level of self-confidence than other PE departments.

CHAPTER 3

METHOD

The main focuses of this study were (1) to identify the Technological Pedagogical Content Knowledge (TPACK), Technology Integration Self Efficacy (TISE) and Instructional Technology Outcome Expectations (ITOE) of pre-service PE teachers, (2) to examine the relationships among "TPACK", "TISE" and "ITOE", and lastly (3) to examine the differences between pre-service physical education teachers who perceived and who did not perceive technology integration throughout their university education by their instructors on "TPACK", "TISE", and "ITOE". This chapter presents the research design, participants and sampling, instruments, procedures, data analysis and limitations for the study.

3.1 Research Design

Research design in this study was descriptive in nature. It depended on data collection by survey from randomly selected 14 universities representing the all seven geographical regions in Turkey. Survey data for the first research question was examined with descriptive methodology, the second research question was processed by correlational techniques, and the third research question was examined by comparative methodology.

3.2 Sampling and Participants

Target population was the third and fourth grade pre-service physical education teachers who are enrolled in an undergraduate program in public universities in Turkey (Table 3.1). Initially, physical education teacher education programs in

Turkey were identified from the 2006 report of Higher Education Council, Student Selection and Placement Center (ÖSYM, 2006). According to the ÖSYM (2006) report, there were 48 public universities that offer physical education teacher education programs in Turkey. Third and fourth grade students were chosen as the participants in this study because of their longer and richer experiences in the research interest of the current study topic compared to first and second grade students. ÖSYM (2006) report showed that the numbers of students studying in third and fourth grades were approximately 4100.

While selecting the sample, 48 public universities were accepted as clusters and seven geographic regions of Turkey were taken into consideration. Each region had 3 to 11 universities. Universities were selected randomly from each region with regard to multiples of 5. For example, if a region has 5 or less than 5 universities, 1 university was randomly selected among them. If there are 5 or less than 10 universities in a region, 2 universities were selected among them. Lastly, if 10 or more than 10 universities exist in a specific region, 3 universities were selected among them. Consequently, a total of 14 universities were randomly selected among 48 universities to provide the representativeness of the selected sample and to improve the generalizability of the findings (Table 3.2). The 14 universities have approximately 1090 pre-service PE teachers in third and fourth grades. All third and fourth graders of those universities were targeted as participants of the study. Of the 1090, 760 of them completed the surveys (third graders = 392, fourth graders = 368; 427 males and 323 females).

Table 3.1

Public Universities Offering Physical Education Teacher Education Programs by Geographical Location in Turkey

Regions	*Universities*
1. Mediterranean	1. Akdeniz Ün. (Antalya) Besyo 2. Çukurova Ün. (Adana) Besyo 3. Kahramanmaraş Sütçü İmam Ün. Besyo 4. Mehmet Akif Ersoy Ün. (Burdur) Eğt. Fak. 5. Mersin Ün. Besyo 6. Mustafa Kemal Ün.(Hatay) Besyo
2. Eastern Anatolia	7. Atatürk Ün.(Erzurum) Besyo 8. Erzincan Ün. Eğt. Fak. 9. Fırat Ün. (Elazığ) Besyo 10. İnönü Ün. (Malatya) Eğt. Fak. 11. Kafkas Ün. (Kars) Sarıkamış Besyo 12. Yüzüncü Yıl Ün. (Van) Eğt. Fak.
3. Aegean	13. Adnan Menderes Ün. (Aydın) Besyo 14. Kocatepe Ün. (Afyonkarahisar) Besyo 15. Celâl Bayar Ün. (Manisa) Besyo 16. Dokuz Eylül Ün. (İzmir) Buca Eğt. Fak. 17. Dumlupınar Ün. (Kütahya) Besyo 18. Ege Ün. (İzmir) Besyo 19. Muğla Ün. Besyo 20. Pamukkale Ün. (Denizli) Sbtyo
4. South Eastern Anatolia	21. Dicle Ün. (Diyarbakır) Besyo 22. Gaziantep Ün. Besyo 23. Harran Ün. (Şanlıurfa) Besyo
5. Central Anatolia	24. Ahi Evran Ün. (Kırşehir) Besyo 25. Aksaray Ün. Besyo 26. Anadolu Ün.(Eskişehir) Besyo 27. Ankara Ün. Besyo 28. Cumhuriyet Ün. (Sivas) Besyo 29. Erciyes Ün. (Kayseri) Besyo 30. Gazi Ün. (Ankara) Besyo 31. Hacettepe Ün. (Ankara) Sbtyo 32. Kırıkkale Ün. Eğt. Fak. 33. Niğde Ün. Besyo 34. Selçuk Ün. (Konya) Besyo
6. Black Sea	35. Abant İzzet Baysal Ün. (Bolu) Besyo 36. Amasya Ün. Eğt. Fak. 37. Gaziosmanpaşa Ün. (Tokat) Besyo 38. Karadeniz Teknik Ün. (Trabzon) Besyo 39. Kastamonu Ün. Besyo 40. 19 Mayıs Ün. (Samsun) Y. Doğu Besyo
7. Marmara	41. Balıkesir Ün. Besyo 42. Çanakkale Onsekiz Mart Ün. Eğt. Fak. 43. Kocaeli Ün. Besyo 44. Kocaeli Ün. Karamürsel Besyo 45. Marmara Ün. (İstanbul) Besyo 46. Sakarya Ün. Eğt. Fak. 47. Trakya Ün. (Edirne) Kırkpınar Besyo 48. Uludağ Ün. (Bursa) Eğt. Fak

Table 3.2

Randomly Selected Universities

Regions	Universities
1. Mediterranean	1. Mehmet Akif Ersoy Ün. (Burdur) Eğt. Fak. 2. Mersin Ün. Besyo
2. Eastern Anatolia	3. Erzincan Ün. Eğt. Fak. 4. Yüzüncü Yıl Ün. (Van) Eğt. Fak.
3. Aegean	5. Muğla Ün. Besyo 6. Adnan Menderes Ün. (Aydın) Besyo
4. South Eastern Anatolia	7. Gaziantep Ün. Besyo
5. Central Anatolia	8. Aksaray Ün. Besyo 9. Ahi Evran Ün. (Kırşehir) Besyo 10. Erciyes Ün. (Kayseri) Besyo
6. Black Sea	11. Ondokuz Mayıs Ün. (Samsun) Yaşar Doğu Besyo 12. Abant İzzet Baysal Ün. (Bolu) Besyo
7. Marmara	13. Çanakkale Onsekiz Mart Ün. Eğt. Fak. 14. Uludağ Ün. (Bursa) Eğt. Fak

3.3 Instruments

Three surveys were used after an adaptation and validation study for pre-service physical education teachers. These were (1) Survey of Pre-service Teachers' Knowledge of Teaching and Technology (TPACK) (Schmidt, et al., 2009), (2) Survey of Technology Integration Self-Efficacy (TISE) (Perkmen, 2008), and (3) Survey of Instructional Technology Outcome Expectations (ITOE) (9 items) (Niederhauser & Perkmen, 2010).

3.3.1 Adaptation and Validation of the Instruments

A study was performed for adaptation and validation of the three surveys. Surveys were applied to 435 third (n= 249) and fourth grade (n= 186) pre-service PE teachers (289 males and 146 females) in 9 different public universities at Ankara, Denizli, Eskişehir, Konya, Kütahya, Niğde, and Sivas during the December 2010. Participants' ages varied between 19-39 years ($M = 22.60$, $SD = 2.28$).

3.3.1.1 Survey of Pre-service Teachers' Knowledge of Teaching and Technology (TPACK)

The original TPACK has 58 items on 4 subject areas (Literature, Social Studies, Math, Science) with a 5-point Likert-type scale (Schmidt, et al., 2009). It has 7 subscales: Technological Knowledge (TK), Pedagogical Knowledge (PK), Content Knowledge (CK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), and lastly Technological Pedagogical Content Knowledge (TPCK) (see original version in http://mkoehler.educ.msu.edu/unprotected_readings/TPACK_Survey/Schmidt_et_al_ Survey_v1.pdf) (March 3, 2009 version). Other than the above mentioned 7 subscales, survey includes an 8-item "Models of TPACK" section with 5 point likert scale, a 3-item "Models of TPACK" section with 25% or less, 26%-50%, 51%-75%, and 76%-100% answer options scale, and two open ended questions.

In the 8-item "Models of TPACK" section, questions are structured like "*My .....* *education professors appropriately model combining content, technologies and* *teaching approaches in their teaching*". In the 3-item "Models of TPACK" section,

questions are structured like "*In general, approximately what percentage of your teacher education professors have provided an effective model of combining content, technologies and teaching approaches in their teaching?*".

Following three open ended questions are (1) <u>*Describe a specific episode where a professor or instructor*</u> *in your university effectively demostrated or modeled combining content, technologies and teaching approaches in a classroom lesson. Please include in your description what content was being taught, what technology was used, and what teaching approach(es) was implemented*, (2) <u>*Describe a specific episode where one of your PreK-6 cooperating teachers*</u> *effectively demonstrated or modeled combining content, technologies and teaching approaches in a classroom lesson. Please include in your description what content was being taught, what technology was used, and what teaching approach(es) was implemented. If you have not observed a teacher modeling this, please indicate that you have not*, (3) <u>*Describe a specific episode where you*</u> *effectively demonstrated or modeled combining content, technologies and teaching approaches in a classroom lesson. Please include in your description what content was being taught, what technology was used, and what teaching approach(es) was implemented. If you have not observed a teacher modeling this, please indicate that you have not.*

For the adaptation study, the above mentioned TPACK (Schmidt, et al., 2009) was translated into Turkish using a standard protocol (Vallerand, 1989). Firstly, two bilingual translators translated the survey from English to Turkish. After the translations were compared and the differences were identified, a final Turkish

version was prepared with the consensus of the translators. Then, the Turkish version was translated back into English by another English language expert. It was seen that the back-translated items and the original English items were similar to each other. Then the Turkish version was modified for physical education setting by a physical education expert with Ph.D degree in sports pedagogy field. During this adaptation process, number of items decreased from 58 to 37 (except open ended questions). This decline was occurred because an item on a certain topic were asked for 4 different subject areas in the original survey (see Table 3.3). After modification 4 questions on a single topic dropped to 1 question (see Table 3.4).

Table 3.3

Before Modification – PCK part of Original Survey

PCK (Pedagogical Content Knowledge)	1 is totally disagree 5 is totally agree				
27. I know how to select effective teaching approaches to guide student thinking and learning in mathematics.	1	2	3	4	5
28. I know how to select effective teaching approaches to guide student thinking and learning in literacy.	1	2	3	4	5
29. I know how to select effective teaching approaches to guide student thinking and learning in science.	1	2	3	4	5
30. I know how to select effective teaching approaches to guide student thinking and learning in social studies.	1	2	3	4	5

Table 3.4

After Modification – PCK part of Adapted Survey

PCK (Pedagogical Content Knowledge)	1 is totally disagree 5 is totally agree				
27. I know how to select effective teaching approaches to guide student thinking and learning in physical education and sports.	1	2	3	4	5

In order to understand whether the modified survey measured what it is supposed to measure, face validity was checked by conducting the survey to 20 students before administering the survey. The feedbacks from the participants showed that the surveys were appropriate. Then, surveys were applied to participants for adaptation and validation study. Confirmatory Factor Analysis (CFA) was administrated with AMOS 18 and Cronbach α coefficients were calculated with PASW Statistics 18.

Adaptation and validation of Turkish TPACK

The CFA administered with AMOS 18 showed acceptable fit indexes for TPACK as $x^2 = 889$; $df = 395$; $x^2/df = 2.25$; CFI = 0.92; TLI = 0.92 and RMSA = 0.054 (see Table 3.5 for acceptable treshold levels). On the other hand, total number of 7 subscales in the original survey decreased to 5 subscales after modification. This decline of subscales happened because while performing Factor Analysis, it was suggested that a subscale should had at least 4 items (Field, 2009). Therefore, two subscales (Pedagogical Content Knowledge and Technological Content Knowledge) which have 4 questions in the original survey were dropped to 1 question, thus, PCK was combined with Pedagogical Knowledge (PK+PCK) and TCK was combined with Technological Pedagogical Knowledge (TPK+TCK).

For the indexes to assess the fit of the models, the Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) were used. The goodness of fit ranges is between 0 and 1, which is considered a good fit when the value is equal or higher than .95 (Hu & Bentler, 1999). Root mean square error of approximation (RMSEA) is related with incremental in the model and ranges between 0 and 1. Smaller RMSEA value

indicates better model fit. Acceptable RMSEA value is 0.06 or less (Hu & Bentler, 1999). Also, the ratio between chi-square and the degrees of freedom (x^2/df) is used. The value of the ratio between 2.0 and 5.0 (Kline, 1998; Tabachnick & Fidell, 2007; Wheaton, Muthen, Alwin, & Summers, 1977) is considered to be acceptable for RMSEA. Although subject-to-item ratio for the CFA is varied in literature, most cited and widely accepted rule of thumb ratios are between 5-10:1 (Kline, 1998) 10:1 (Nunnally, 1978). In the present study, the survey has 37 items and it was administered to 435 participants. Thus 435:37 ratio which is more than 11:1 was satisfied the required ratio. After conducting the Confirmatory Factor Analysis, it was seen that all the requirements in the literature given above were met in CFA of Turkish TPACK for pre-service physical education teachers.

Table 3.5

Fit Indices And Their Acceptable Treshold Levels

Fit index	Acceptable treshold levels
Chi square/df	$x^2/df < 5$ (Wheaton, et al., 1977) $x^2/df < 3$ (Kline, 1998) $x^2/df < 2$ (Tabachnick & Fidell, 2007)
CFI	0.90 < CFI acceptable (Maruyama, 1998; Schumacher & Lomax, 1996) 0.95 < CFI (Hu & Bentler, 1999)
TLI	0.90 < TLI (Maruyama, 1998; Schumacher & Lomax, 1996) 0.95 < TLI (Hu & Bentler, 1999)
RMSEA	RMSEA < 0.08 (Hu & Bentler, 1999)

Internal consistency coefficients (Cronbach Alpha) for TPACK subscales were found 0.85 for Technological Knowledge (TK), 0.79 for Content Knowledge (CK), 0.89 for Pedagogical Knowledge and Pedagogical Content Knowledge (PK+PCK), 0.77 for Technological Pedagogical Knowledge and Technological Content Knowledge (TPK+TCK), 0.85 for Technological Pedagogical Content Knowledge (TPCK), and lastly 0.94 for the whole TPACK Survey. Internal consistency findings for all subscales of the survey were also satisfactory.

Based on the CFA and internal consistency findings, Turkish TPACK for pre-service physical education teachers was accepted as a valid survey to assess the related characteristics of this population. Turkish TPACK Survey for pre-service physical education teachers is presented in Appendix A.

Additionally, three open-ended questions part were decreased from 3 to 2 by eliminating the second question according to interests of current research.

3.3.1.2 Survey of Technology Integration Self-Efficacy (TISE)

TISE survey which is available in Turkish, was originaly constructed for the pre-service teachers in general (Perkmen, 2008). TISE includes 16 items with a 5-point likert format and it has no subscales. Items are starting with "*I feel confident about...*" phrases and asks teachers' perception of technology integration into teaching.

Adaptation and validation of TISE

The original Turkish version of the scale applied to the 435 third and fourth grade pre-service physical education teachers. Then CFA applied to the data. Although TLI = 0.91 was found good (Maruyama, 1998; Schumacher & Lomax, 1996), CFI = 0.89 and RMSEA = 0.098 were found not acceptable (Hu & Bentler, 1999), and x^2 = 535.1; df = 104; x^2/df = 5.14 values were not satisfying (Wheaton, et al., 1977). After checking the modification indices of errors for survey of TISE, it was decided to connect the high varience error pairs which were detected. For the TISE, ε15- ε16, ε6- ε7, ε4- ε5, and ε7- ε8 were paired and analyses was run again. After this change, CFI (.94) and TLI (.95) scores represented good fit (Maruyama, 1998; Schumacher & Lomax, 1996). Also RMSEA value decreased to an acceptable value as .073 (Hu & Bentler, 1999). Lastly, chi square – degrees of freedom ratio resulted good fit x^2 = 324; df = 98; x^2/df = 3.3 (Wheaton, et al., 1977). Internal consistency of the scale was high (α = 0.95) (Nunnally, 1978).

Based on the CFA and internal consistency findings, TISE survey for pre-service physical education teachers was accepted as a valid survey to assess the related characteristics of this population. TISE survey for pre-service physical education teachers is presented in Appendix B.

3.3.1.3 Survey of Instructional Technology Outcome Expectations (ITOE)

ITOE survey which is available in Turkish, was originally constructed for the pre-service teachers in general (Niederhauser & Perkmen, 2010). ITOE includes 9 items with a 5-point likert format and it has no subscales. It includes "*Integrating*

technology into my future classroom activities will likely allow me to...” phrases to predict participants' expectations by using technology in their teachings.

Adaptation and validation of ITOE

The original Turkish version of the scale was applied to the 435 third and fourth grade pre-service physical education teachers. Then CFA was run. CFA resulted unsatisfactory fit indexes, $x^2 = 442.5$; $df = 27$; $x^2/df = 16.3$; CFI = 0.82; TLI = 0.77 and RMSA = 0.189 (see Table 3.5 for acceptable treshold levels). After checking the modification indices of errors for survey of ITOE, the high varience error pairs were $\varepsilon7$- $\varepsilon8$, $\varepsilon3$- $\varepsilon7$, $\varepsilon2$- $\varepsilon7$ and $\varepsilon1$- $\varepsilon2$. After connecting the related errors, analysis was performed again. When item "9" with low factor loadings is excluded from the model, the CFA findings for ITOE are acceptable, $x^2 = 47.2$; $df = 14$; $x^2/df = 3.3$; CFI = 0.98; TLI = 0.97 and RMSA = 0.074. Internal consistency of the scale was high (α = 0.91) (Nunnally, 1978).

Based on the CFA and internal consistency findings, modified ITOE survey for pre-service physical education teachers was accepted as a valid survey to assess the related characteristics of this population. ITOE survey for pre-service physical education teachers is presented in Appendix C.

3.4 Data Collection Procedures

Initially, permission to use TPACK (Schmidt et al., 2009), TISE (Perkmen, 2008), and ITOE (Niederhauser & Perkmen, 2010) was granted from the authors of original

surveys. Then, permission of the Research Center for Applied Ethics of Middle East Technical University was provided for the current study.

After obtaining the instructors' and heads of the deparments' consent from randomly selected universities, the surveys were administered to the participants in 2010-2011 fall semester in classroom setting. Participants were told that their answers would remain anonymous and confidential. They were also informed that they had the right to withdraw from the study at any time. The completion of survey finished approximately within 20 minutes.

3.5 Data Analysis

Before the data analysis, firstly the data were screened to confirm whether any incorrect or missing data existed. Missing values were founded that exceeding 5 percent and also it was understood that the missing data were random by performing Little's MCAR Test (Little & Rubin, 1987). Thus, it was considered to estimate the missing values with Expectation Maximization (Tabachnick & Fidell, 2007). Among 760 participants, 4 of them were detected with missing values more than 5 percent and deleted. Rest of the missing data which were less than 5 percent were replaced with the mean of the specific variable. Skewness and Kurtosis test was also checked for the normality of the distribution and no values was found higher or smaller than $\pm$ 3 for regarding as an outlier to be excluded. (Tabachnick & Fidell, 2007). Therefore, analyses were carried out with 756 subjects. Moreover, as usual for the social sciences, the level of significance was set as .05 while analyzing the results (Gravetter & Wallnau, 2004).

Descriptive and inferential statistics were used to analyze the collected data by perfoming the software program PASW Statistics 18. Descriptive statistical procedures (central tendency, frequency distributions and variability) were performed to organize and to demonstrate the demographic characteristics of the participants by grade level, age, university, region and gender. Besides, inferential statistics to interpret the results of the three surveys (TPACK, TISE and ITOE) were also used.

More specifically, first research question was analysed by descriptive statistics, second research question was analysed by the application of canonical correlation to identify the relationships among "TPACK", "TISE" and "ITOE".

In the third research question, firstly, participants were categorized under two groups; pre-service physical education teachers (1) who perceived and (2) who did not perceive technology integration throughout their university education by their instructors. For this categorization, participants' answers to three items in "Models of TPACK" (item 31, 32, and 33; See Appendix A) were used. If a participant's mean of the answer to these three questions was lower than 3, s/he was categorized as "*did not perceive technology integration throughout their university education by their instructors*", and If a participant's mean of the answer to above mentioned three questions was higher than 3, s/he is categorized as "*perceived technology integration throughout their university education by their instructors*". After the categorization, "TPACK" data were analyzed by Multivariate Analysis of Variance (MANOVA) for all subscales. Three-item "Models of TPACK" section with 25% or less, 26%-50%,

51%-75%, and 76%-100% answer options scale, and three open ended questions were analysed by using descriptive statistics. "TISE" and "ITOE" data were analysed by independent t-test for the third research question.

3.6 Limitations

Since this study was a descriptive research, the reason for the relationships cannot be revealed. However, the results can lead future causal or experimental studies. There are some internal validity threats for the current study. Although some threats regarded as history, maturation or implementation are irrelevant since no intervention or manipulation occurs, there might have some threats to internal validity in correlational studies regarded as subject characteristics in current study (Fraenkel & Wallen, 2008).

Most possible threat for the current study can be considered to be subject characteristics. When the participants are asked to fill a questionnaire, they can easily be prone to choose the desired ones instead of what they really want. They can be focused on the nature of the study and unnoticed about their actual perceptions on the subject. Doubts about the confidentiality of the responses and possible pressure about the feeling of incompetence can cause biased answers that mentioned. Additionally, there can be some extraneous variables that cannot be controlled such as cultural differences, unique past experiences of the participants and socioeconomic level/status of the participants' families. To prevent subject characteristics threat, before administering the questionnaires, it was emphasized that the answers would

be anonymous and confidential, and the answers would be used for scientific purposes.

Participants of the current study were selected from third and fourth grades of the physical education teacher education departments. Therefore, when generalizing the findings to the population, it should be taken into consideration that the first and second grades were not included in the study.

CHAPTER 4

RESULTS

This chapter contains the results of data analysis. Findings for each research question are presented in order.

4.1 Research Question 1

What are the "TPACK", "TISE" and "ITOE" levels of pre-service PE teachers?

In an attempt to answer this question, participants' scores of "TPACK" "TISE" and "ITOE" were examined by using descriptive statistics methods including mean, standard deviation, frequency and content analysis.

TPACK

TPACK findings were analyzed for the whole scale and related 5 sub-scales. Additional questions on the TPACK survey "Models of TPACK (TBAP Örnekleri 1)" section (this part is related with pre-service PE teachers' perception for their university instructors' instructional technology use, See Appendix A, item 31, 32, 33) with a 5-point likert scale, and "Models of TPACK (TPAB Örnekleri 2)" section (this part included 2 questions related with pre-service PE teachers' perception by percentage, See Appendix A, item 34, 35) with a percentage scale, and two open ended questions were analyzed separately.

TPACK whole scale and related 5 sub-scale findings indicated that whole TPACK scale mean was 3.90 (*SD* =.46) in a range of 1 to 5 (See Table 4.1). The highest mean

subscale score was in PK+PCK ($M = 4.05$, $SD = .49$) while the lowest mean subscale score was in TK ($M = 3.71$, $SD = .68$).

Table 4.1

Mean TPACK Scores

Survey	Subscales	*M*	*SD*	Perception				
				Low				*High*
TPACK	Whole scale	3.90	.46	1	2	3	**X**4	5
	TK	3.71	.68	1	2	3 **X**	4	5
	CK	3.92	.63	1	2	3	**X**4	5
	PK+PCK	4.05	.49	1	2	3	4**X**	5
	TPK+TCK	3.84	.55	1	2	3	**X** 4	5
	TPCK	3.96	.59	1	2	3	**X**4	5

Pre-service physical education teachers' mean scores on "Models of TPACK 1" section was 3.54 ($SD = .96$) in a 5-point likert scale. Frequency for perceived percentage findings of the two questions in "Models of TPACK 2" section were presented in Table 4.2 below.

Table 4.2

Frequency of Responses for the Two Questions In "Models Of TPACK 2" Section

Question	25% or less	26%-50%	51%-75%	76%-100%
In general, <u>approximately what percentage of your teacher education instructors</u> have provided an effective model of combining content, technologies and teaching approaches in their teaching?	207 (27.2%)	239 (31.4%)	200 (26.3%)	35 (4.6%)
In general, <u>approximately what percentage of your instructors outside of teacher education</u> have provided an effective model of combining content, technologies and teaching approaches in their teaching?	198 (26.1%)	275 (36.2%)	155 (20.4%)	40 (5.3%)

According to the findings, instructional use of technology modeling by both teacher education professors and professors outside of teacher education were similar. Most of the pre-service physical education teachers reported that both groups of professors' role modeling in use of instructional technology were lower than 50%.

Among the 760 participants in this study, 343 (45%) of them completed at least one of the 2 open ended questions. Responses to these questions were included criticisms to university instructors to be insufficient to use technology in education, and to the lack of technology that their schools offer ($f = 36$). In addition, use of computer and projection device ($f = 196$), overhead projector ($f = 66$), videos ($f = 23$), and smart boards ($f = 11$) in the courses by the university instructors were reported. Pre-service physical education teachers reported that they were using computer and projection

device (f = 139), overhead projectors (f = 16) and videos (f = 10) when they presented or taught the others.

Pre-service physical education teachers mostly reported the use of direct instruction approach or teacher centered approaches in their university courses by the university instructors (f = 130). Pre-service teachers reported also their use of direct instruction (f = 45) and demonstration (f = 20) methods in their teaching experiences.

TISE & ITOE

Pre-service physical education teachers mean TISE scores were 3.96 (*SD* = .56) in a 5-point likert scale. Mean ITOE scores were 4.09 (*SD* = .68).

4.2.1 Research Question 2

Is there a significant relationship between "TPACK" (TK, CK, PK+PCK, TPK+TCK, TPCK) "TISE" and "ITOE" variables?

In order to answer this question, canonical correlation was used. Multicollinearity assumption was checked by looking at the correlations among variables from bivariate correlations. (Table 4.3). It was indicated that the correlations among TPACK and Sense of Self (TISE and ITOE) variables did not exceed the critical value of .90 for multicollinearity (Field, 2009). It can be understood from the bivariate correlations that all the variables have positive and significant relationships with each other.

Table 4.3

Bivariate Correlations among TPACK and Sense of Self (TISE and ITOE) variables

	1	2	3	4	5	6	7
TK	1.00						
CK	.36*	1.00					
PK+PCK	.39*	.37*	1.00				
TPK+TCK	.51*	.44*	.58*	1.00			
TPCK	.49*	.45*	.60*	.71*	1.00		
TISE	.67*	.41*	.48*	.62*	.63*	1.00	
OE	.31*	.28*	.33*	.36*	.37*	.50*	1.00

*p<0.05 (2-tailed)

Then, canonical correlation analysis was run between the TPACK (TK, CK, PK+PCK, TPK+TCK and TPCK) and Sense of Self Scales (TISE and ITOE).
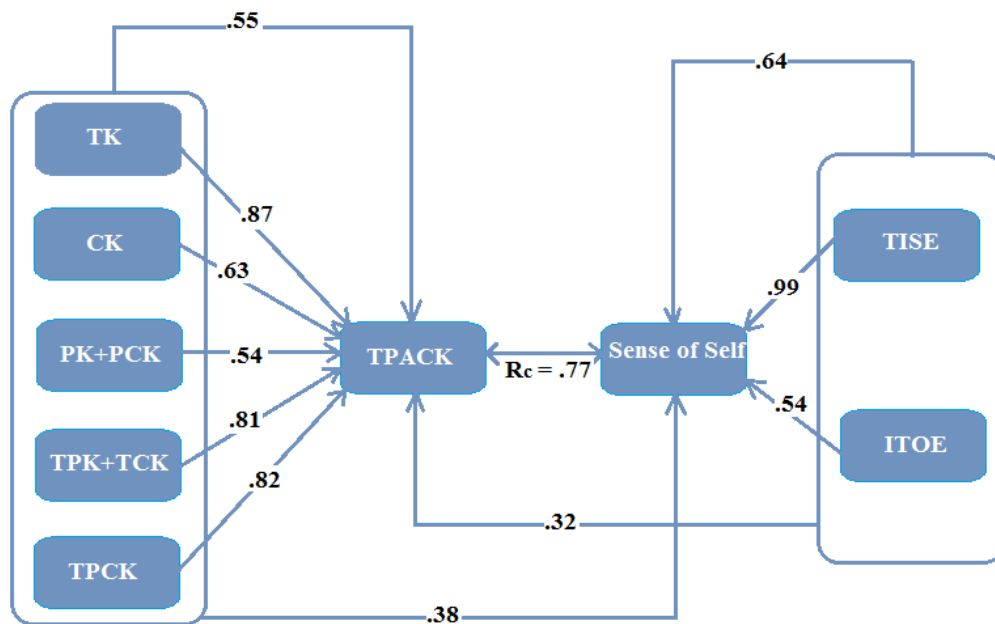
Figure 4.1 *General view of Canonical Correlation Analysis*

The canonical correlation coefficient (Rc) was found .77 which indicated high and positive correlation between TPACK and Sense of Self scales (Tabachnick & Fidell, 2007). When the association between first canonical variate and second canonical variate was considered, it was found that the value of first canonical variate is .55 for the first set of variables and the value for the second canonical variate is .64 for the second set of variables (Figure 4.1). Therefore, it can be alleged that the first canonical variate interprets 55 % of the variance from TPACK variables; on the other hand, second canonical variate interprets 64 % of the variance from Sense of Self variables. Nonetheless, while 38 % of the total variance of Sense of Self variables

was explained by TPACK variables, 32 % of the total variance of TPACK variables was explained by Sense of Self variables.

The first canonical variate indicated that canonical variate for physical education teachers' TPACK variables were significantly correlated with the canonical variate for physical education teachers' Sense of Self (TISE and OE) variables, x^2 (10) = 675, p = .001. As it can be seen on the Table 4.4, the first set of canonical variate consisted of Technological Knowledge (TK) (.87), Content Knowledge (CK) (.54), Pedagogical Knowledge and Pedagogical Content Knowledge (PK+PCK) (.63), Technological Pedagogical Knowledge and Technological Content Knowledge (TPK+TCK) (.81), and lastly Technological Pedagogical Content Knowledge (TPCK) (.82) were significantly associated with the second set of canonical variate variables which were TISE (.99) and ITOE (.54) as all the variables exceeding the value of .30 (Tabachnick & Fidell, 2007).

Table 4.4

Canonical Correlations, Correlations, Standardized Canonical Coefficients, Percentages of Variance, And Redundancies Between Teachers' TPACK and Sense of Self Variables.

	First Cannonical Variate	
	Correlations	Coefficients
TPACK		
TK	.87	.55
CK	.54	.09
PK+PCK	.63	.03
TPK+TCK	.81	.24
TPCK	.82	.32
Percentage of variance	.55	
Redundancy	.38	
Sense of Self		
TISE	.99	.97
ITOE	.54	.06
Percentage of variance	.64	
Redundancy	.32	
Canonical correlation	.77	

4.2.2 Research Question 3

Is there a significant difference between pre-service PE teachers who perceived and who did not perceive technology integration throughout their university education by their instructors on "TPACK", "TISE" and "ITOE"?

In order to answer this question, the data were grouped as who perceived technology integration and who did not perceive technology integration by their university instructors based on the answer of the participants into the item 31, 32, 33. "TPACK"

scale (TK, CK, PK+PCK, TPK+TCK, TPCK) scores of these two groups were analyzed by using MANOVA. "TISE" and "ITOE" scores were analyzed by independent t-test.

TPACK

According to the MANOVA findings, there was a significant difference on TPACK scores between pre-service physical education teachers who perceived technology integration and who did not perceive technology integration throughout their university education by their instructors, $\lambda= 0.87$, $F = (5, 750) = 22.27$, $p <.05$. Following univariate analysis indicated that all the TPACK variables were significantly higher in pre-service physical education teachers group who perceived the technology integration by the university instructors ($p < .05$.) (See Table 4.5 and Table 4.6).

Table 4.5

Univariate Analysis Results for Group Differences on TPACK Subscales

Source	Dependent Variables	df	Mean Square	F	Sig
	TK	1	15.035	33.624	.000
	CK	1	18.683	49.607	.000
Group	PK+PCK	1	7.372	31.290	.000
	TPK+TCK	1	25.948	95.100	.000
	TPCK	1	20.108	61.724	.000
	TPACK	1	15.771	84.333	.000

$p < .05$

Table 4.6

Group Means and Standard Deviations for TPACK and its Subscales

Scale	who DID NOT perceive technology integration by the university instructors		who perceived technology integration by the university instructors	
	M	*SD*	*M*	*SD*
TK	3.48	.74	3.80	.64
CK	3.67	.71	4.02	.57
PK+PCK	3.90	.59	4.11	.44
TPK+TCK	3.54	.64	3.96	.47
TPCK	3.70	.72	4.06	.50
TPACK	3.67	.54	3.99	.38

TISE

According to the independent t-test results, there was a significant difference between the scores of who perceived technology integration (*M* = 4.06, *SD* = .49) and who did not perceive technology integration (*M* = 3.72, *SD* = .68) throughout their university education by their instructors on TISE; t (754) = 7.78, p = .05 in favor of the first group (Table 4.7).

Table 4.7

Group Differences for Technology Integration Self Efficacy and Instructional Technology Outcome Expectations

Survey	Group	N	M	SD	df	t
TISE	who perceived technology integration	542	4.06	.49	754	7.78
	who DID NOT perceive technology integration	214	3.72	.68		
ITOE	who perceived technology integration	542	4.16	.59	754	4.35
	who DID NOT perceive technology integration	214	3.92	.85		

p < .05

ITOE

According to the independent t-test results, there was a significant difference between the scores of who perceived technology integration (*M* = 4.16, *SD* = .59) and who did not perceive technology integration (*M* = 3.92, *SD* = .85) throughout their university education by their instructors on ITOE; t (754) = 4.35, p = .05, in favor of the first group (Table 4.7).

Table 4.8

Summary of the Results

Research Questions	Instruments	Participants	Data Analysis	Results

1. What are the "TPACK", "TISE" and "ITOE" levels of pre-service PE teachers?	Survey of Turkish TPACK, Survey of TISE, Survey of ITOE	Pre-service PE teachers	Descriptive Analysis	▪ TPACK (*M* =3.90, *SD* = .46)
				  - Highest PK+PCK (*M* = 4.05, *SD* = .49)
				  - Lowest TK (*M* = 3.71, *SD* = .68).
				▪ TISE (*M* = 3.96, *SD* = .56)
				▪ ITOE (*M* = 4.09, *SD* = .68).

2. Is there a significant relationship between "TPACK" (TK, CK, PK+PCK, TPK+TCK, TPCK) "TISE" and "ITOE" variables?	Survey of Turkish TPACK, Survey of TISE, Survey of ITOE	Pre-service PE teachers	Canonical Correlation Analysis	▪ High and positive correlation between TPACK and Sense of Self scales (TISE & ITOE) (Rc = .77) ▪ As all the variables exceeding the value of .30, they are significantly associated to each other. ▪ While 38 % of the total variance of Sense of Self variables was explained by TPACK variables, 32 % of the total variance of TPACK variables was explained by Sense of Self variables.
3. Is there a significant difference between pre-service PE teachers who perceived and who did not perceive technology integration throughout their university education by their instructors on "TPACK", "TISE" and "ITOE"?	Survey of Turkish TPACK, Survey of TISE, Survey of ITOE	Pre-service PE teachers	Independent t test, Multivariate Analysis of Variance (MANOVA)	▪ Significant difference on TPACK scores between pre-service PE teachers who perceived technology integration and who did not perceive technology integration. ▪ Significant difference between the scores of who perceived technology integration and who did not perceive technology integration on TISE scores ▪ Significant difference between the scores of who perceived technology integration and who did not perceive technology integration on ITOE scores

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CHAPTER 5

DISCUSSION

In this section, firstly the findings of the study are discussed for each research question. Then, recommendations for the physical education teacher education programs and future research are presented.

5.1 Research Question 1

According to the TPACK findings, pre-service physical education teachers perceive their technological pedagogical content knowledge at good level in general. Considering the specific subscale mean scores, it can be said that pre-service teachers' perception of technology knowledge, technological pedagogical knowledge and technological content knowledge are slightly lower than their perception scores on other subject matter content knowledge related TPACK variables (content knowledge, pedagogic content knowledge). Moreover, pre-service teachers' perception of their university instructors' integration of technology in the courses are at moderate level, and a higher percentage of pre-service teachers perceive that their instructors are not a good model of integrating technology into teaching. According to the open ended question findings, university instructors mostly use power point presentations and projectors as a means of technology integration into their instruction. In addition, university instructors' preference of traditional teaching approaches including direct instruction approaches (e.g. lecturing) instead of learner

centered-technology integrated approaches are the main criticism by pre-service teachers for the teaching practices of university instructors.

Technology integration self-efficacy perceptions and instructional technology integration outcome expectation findings indicate a moderately high perception on these variables. Based on these findings, it can be said that the pre-service physical education teachers' perception of self-efficacy and their awareness on the benefits of instructional technologies are at good level.

Current study findings on technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations indicate that pre-service physical education teachers' technology related perceptions are not lower than the previously reported perceptions of other subject matter pre-service teachers in other countries (Koh, Chai & Tsait, 2010; Niederhauser & Perkmen, 2006). Even the perception of technological pedagogical content knowledge of the current study participants is slightly higher than the findings of Koh, Chai & Tsait (2010) on Singaporean pre-service teachers. This study extends the knowledge on these variables by identifying the technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations of pre-service physical education teachers from Turkish context.

Previous studies that indicate the positive influence of intervention programs on improving the technological pedagogical content knowledge perception of in-service and pre-service teachers (Mishra & Koehler, 2006; Angeli & Valanides, 2009) also

imply that if quality intervention programs are prepared for integration of technology in physical education teaching, pre-service physical education teachers can be improved even at a higher level.

An interesting finding in the current study is the perception of university instructors' poor modeling on integration of technology into teaching by pre-service teachers. This implies that university instructors should be a better role model on the technology integrated teaching for pre-service teachers. In addition, pre-service teachers' answers to the open ended questions were very interesting. Their reports on integration of technology by the university instructors were mainly the use of power point presentations, computers and projectors. Use of physical education and sport specific technologies such as sport specific video were reported quite low, and use of pedometer, heart rate monitors, specific softwares for analyzing movement, and emerging technologies as exergame were reported by none of the participants. This implies that emerging physical education and sport specific technologies are not present in the education of pre-service physical education teachers. Therefore, physical education teacher education programs should consider the integration of physical education and sport specific technologies as well as the other general instructional technology tools in the curricula.

5.2 Research Question 2

According to Canonical Correlation Analysis results, it can be said that technological pedagogical content knowledge variables have significant and positive relationships with technology integration self-efficacy and instructional technology outcome

expectations. Additionally, it was found that technology integration self-efficacy has a considerably higher relationship with technological pedagogical content knowledge than instructional technology outcome expectations. These relationships are moderate and positive. Similarly, Nathan (2009) found moderate relationships between technological pedagogical content knowledge and technology integration self-efficacy of pre-service teachers in four different subject areas (Math, Science, Literacy and Social Studies). In another study conducted with pre-service teachers (including mostly elementary education and early childhood education), Perkmen and Pamuk (2010) found significant relationship between technology integration self-efficacy and instructional technology outcome expectations. More specifically, having high self-efficacy to integrate technology means having high technology integration outcome expectations and high technological pedagogical content knowledge. Therefore, these three variables are very crucial for understanding a teacher's technology integration perception in their teachings. It was also seen that technological knowledge has a central role in having a high level of technological pedagogical content knowledge among other variables. Thus, it can be alleged that awareness on selecting appropriate technologies is a determinant for pre-service teachers' technological pedagogical content knowledge in Turkish setting.

5.3 Research Question 3

According to the findings, pre-service physical education teachers, who perceived technology integration by their university instructors, also perceived higher technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations as compared to the pre-service teachers who did not perceive technology integration by the university instructors.

This finding implies an important point related with the qualification of teacher education program instructors in technology integration into teaching. Interestingly, a study which was conducted by Yılmaz (2008) and which examines the perception of physical education teacher education program instructors, indicates positive attitudes toward using technology in teaching in Turkish context. However, current study found out that university instructors' positive attitude toward technology integration in teaching does not necessarily mean that they integrate technology into their teaching, and that they will be a good role model for the pre-service teachers.

A study by İnce and Ok (2005), examining the effects of learner centered and teacher centered teaching methods course on the practice teaching of pre-service teachers, clearly indicates that when pre-service teachers have a chance to observe contemporary approaches in teaching from their instructors in the university, they internalize these approaches, and they accept their instructors as a role model. Findings of the current study support their finding in terms of positive effect of perceived technology integration of university instructors on pre-service teachers' technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations.

In conclusion, current study indicates that technological pedagogical content knowledge, technology integration self-efficacy, and instructional technology outcome expectation perceptions of pre-service physical education teachers are at good level. University instructors are not good role models in technology integration

for the pre-service physical education teachers in general. According to the pre-service teachers' report, integration of physical education and sport related emerging technologies almost did not exist in the teaching practices of university setting. Technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectation variables are moderately related with each other according to the pre-service physical education teacher perceptions in Turkey. Moreover, pre-service teachers' perception of their university instructors' technology integration into teaching in university has a positive effect on their own perceptions of technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations.

5.4. Recommendations for the Physical Education Teacher Education Programs

Based on findings, the following recommendations are stated for physical education teacher education programs;

- Professional development programs for teacher education program instructors in technology integration in teaching and in emerging physical education and sport related Technologies should be provided.
- Teacher education departments should be supported with up-to-date physical education related technologies (exergame mats, softwares etc).
- Using technology integrated teaching models by both university instructors and pre-service teachers should be encouraged.
- Universities should evaluate teacher education program instructors' technology integration performance.

5.5 Recommendations for the Future Research

Following recommendations are stated for future studies;

- Teacher education programs instructors and pre-service physical education teachers' technology integration in teaching should be observed by direct observation tools.

- Technology integration interventions should be prepared, and their effects on the teacher education programs instructors and pre-service teachers' technology integration in teaching performances should be examined.

- Technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations of in-service physical education teachers should be examined.

- The reason beyond the low use of emerging physical education and sport related technologies in teacher education programs should be examined.

REFERENCES

Angeli, C., & Valanides, N. (2009). Epistemological and methodological issues for the conceptualization, development, and assessment of ICT–TPCK: Advances in technological pedagogical content knowledge (TPCK). *Computers & Education, 52*(1), 154-168.

Bandura, A. (1986). *Social foundations of thought and action: A Social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York, NY: Freeman.

Beden Eğitimi Dersi (1.-8. Sınıflar) Öğretim programı ve klavuzu (2007). Devlet Kitapları Müdürlüğü, Ankara.

Brett, P. (2011). Students' experiences and engagement with SMS for learning in higher education. *Innovations in Education and Teaching International, 48*(2), 137-147.

Campbell, P. H., Milbourne, S., Dugan, L. M., & Wilcox, M. J. (2006). A review of evidence on practices for teaching young children to use assistive technology devices. *Topics in Early Childhood Special Education, 26*(1), 3–13.

Cavin, R. M. (2007). Developing technological pedagogical content knowledge in pre-service teachers through microteaching lesson study. (Doctoral Dissertation, Florida State University, 2007) *Dissertation Abstracts International, 69*(02)*,* 185.

Cennamo, K., Ross, J., & Ertmer, P. (2010). *Technology Integration for Meaningful Technology Use : A Standards-Based Approach.* Belmont, USA: Wadsworth.

Creswell, J. W. (2008). *Educational Research : Planning, Conducting, and Evaluating Quantitative and Qualitative Research.* Upper Saddle River, New Jersey: Pearson.

Cox, S. (2008). *A conceptual analysis of technological Pedagogical content knowledge.* Unpublished Doctoral Dissertation, Brigham Young University.

El-Gayar, O., Moran, M., & Hawkes, M. (2011). Students' acceptance of tablet PCs and implications for educational institutions. *Educational Technology & Society, 14*(2), 58-70.

Field, A. (2009). *Discovering Statistics Using SPSS* (3rd Ed.)*.* London: Sage.

Fraenkel, J. R., & Wallen, N. E. (2008). *How to design and evaluate research in education* (7th Ed.). New York: McGraw Hill.

Göktaş, Z. (2011). The Self- Confidence Levels Of Physical Educatıin And Sport Students Towards Information and Communication Technologies (ICT). *Nigde University Journal of Physical Education And Sport Sciences, 5*(1).

Gravetter, F. J., & Wallnau, L. B. (2004). *Statistics for the Behavioral Sciences.* (7th Ed.). Belmont, CA: Thomson Wadsworth.

Hu, L., & Bentler, P. M. (1999). Cut off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

İnce, M. L., Goodway, J. L., Ward, P., & Lee, M. A. (2006). The effects of professional development on technological competency and the attitudes urban physical education teachers have toward using technology. *Journal of Teaching in Physical Education, 25*, 428-440.

İnce, M. L., & Ok, A. (2005). Moving prospective physical education teachers to learner centered teaching: Can it be stimulated in a traditional context? *Journal of International Council for Health, Physical Education, Sport and Dance, 41*(1), 6-12.

ISTE. (2008). International Society for Technology in Education - National Educational Technology Standards. Retrieved May 14, 2011, from *http://www.iste.org*.

Jones, A., & Moreland, J. (2004). Enhancing practicing primary school teachers' pedagogical content knowledge in technology. *International Journal of Technology and Design Education, 14*, 121-140.

Jeong So, H., & Kim, B. (2009). Learning about problem based learning: Student teachers integrating technology, pedagogy and content knowledge. *Australasian Journal of Educational Technology, 25*(1), 101-116.

Karal, H., Çebi, A., & Turgut, Y. E. (2010). Live authority in the classroom in video conference-based synchronous distance education: The teaching assistant. *Turkish Online Journal of Distance Education, 11*(3).

Khan, S. (2011). New pedagogies on teaching science with computer simulations. *Journal of Science Education and Technology, 20,* 215–232.

Kline, R. B. (1998). P*rinciples and practice of structural equation modeling.* New York, NY: Guilford Press.

Koh, Chai & Tsait (2010). Examining the technological pedagogical content knowledge of Singapore pre-service teachers with a large-scale survey. *Journal of Computer Assisted Learning, 26*(6), 563-573.

Kretschmann, R. (2010). Physical education 2.0. In Ebner, M. & Schiefner, M. (Eds.) *Looking toward the future of technology-enhanced education:* Ubiquitous learning and the digital native, p. 432-454. Hershey, USA: IGI Global.

Lee, M. (2010). Interactive whiteboards and schooling: The context. *Technology, Pedagogy and Education, 19*(2), 133–141.

Lee, M. H., & Tsai, C. C. (2008). Exploring teachers' perceived self efficacy and technological pedagogical content knowledge with respect to educational use of the world wide web. *Instructional Science, 38*(1), 1-21.

Little, R. J. A., & Rubin, D. B. (1987). *Statistical analysis with missing data.* New York: John Wiley.

MacDonald, D., & Hay, P. (2010). Health & physical education as/and technology: An australian perspective. P*resented at Global Forum for Physical Education Pedagogy 2010, Iowa, USA.*

Maruyama, G. M. (1998). *Basics of structural equation modeling.* Thousand Oaks, CA: Sage.

Mavi, H. F. (2007). The informatics technology usage of undergraduate students in physical education and sport department. *Presented at 7th International Educational Technology Conference, 2007, Near East University - North Cyprus.*

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054.

Mohnsen, B. (2008). *Using technology in physical education* (6th ed.). Cerritos, CA: Bonnie's Fitware Inc.

NASPE (2009). Appropriate Use of Instructional Technology in Physical Education. Position Statement. Retrieved May 21, 2011, from www.aahperd.org/naspe.

Nathan, E. J. (2009). An examination of the relationship between pre-service teachers' level of Technology Integration Self Efficacy (TISE) and technological pedagogical content knowledge (TPACK). Unpublished Doctoral Dissertation, University of Houston.

NCE. (1999). The National Curriculum for England - Physical Education. Retrieved May 16, 2011, from www.nc.uk.net.

Niederhauser, D. S., & Perkmen, S. (2006). Academic performance in an introductory instructional technology course. Presented at American Educational Research Association (AERA) Conference 2006, Francisco, CA.

Niederhauser, D. S., & Perkmen, S. (2010). Beyond self-efficacy: Measuring pre-service teachers' instructional technology outcome expectations. *Computers in Human Behavior, 26*(3), 436-442.

Niess, M. L. (2005). Preparing teachers to teach science and mathematics with technology: Developing a technological pedagogical content knowledge. *Teaching and Teacher Education, 21*(5), 509-523.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGrawHill.

ÖSYM. (2006). Yükseköğretim Programları ve Kontenjanları Kılavuzu. Retrieved January 16, 2011 from http://www.osym.gov.tr.

Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon MCB University Press 5* (1).

Perkmen, S. (2008). Factors that influence pre-service teachers' technology integration performance. (Doctoral Dissertation, Iowa State University, 2008) *Dissertation Abstracts International, 69*(06)*, 109.

Roblyer, M. D., & Doering, A. H. (2005). *Integrating educational technology into teaching.* Lebanon: Pearson.

Rolnick, S. J., Calvi, J., Heimendinger, J., McClure, J. B., Kelley, M., Johnson, C., & Alexander, G. L. (2009). Focus groups inform a web-based program to increase fruit and vegetable intake. *Patient Education and Counseling, 77*(2), 314-318.

Salinas, M.F. (2008). From Dewey to Gates: A model to integrate psychoeducational principles in the selection and use of instructional technology. *Computers & Education, 50,*652–660.

Schmidt, D., Baran, E., Thompson, A., Koehler, M. J., Shin, T., & Mishra, P. (2009). Technological Pedagogical Content Knowledge (TPACK): The Development and Validation of an Assessment Instrument for Preservice teachers. *Presented at the annuanl meeting of American Educational Research Association, April 13-17, San Diego, CA.*

Schumacher, R. E., & Lomax, R. G. (1996). *A beginner's guide to structural equation modeling.* New Jersey: Erlbaum.

Shpigelman, C. N., Weiss, P. L., & Reiter, S. (2009). E-Mentoring for All. *Computers in Human Behaviour, 25*, 919-928.

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1–22.

Strand, B., & Bender, V. (2011). Knowledge and use of appropriate instructional strategies by physical education teachers. *Physical Educator, 68* (1).

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). New York: Allyn and Bacon.

Tearle, P., & Golder, G. (2008). The use of ICT in the teaching and learning of physical education in compulsory education: How do we prepare the workforce of the future? *European Journal of Teacher Education, 31*(1), 55-72.

Terpstra, M. A. (2009). Developing technological pedagogical content knowledge: Preservice teachers' perceptions of how they learn to use educational technology in their teaching. Unpublished Doctoral Dissertation, Michigan State University.

Vallerand, R. J. (1989). Toward a methodology for the transcultural validation of psychological questionnaires - Implications for Studies in the french language. *Canadian Psychology-Psychologie Canadienne, 30*(4), 662-680.

Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. (1977). Assessing reliability and stability in panel models. *Sociological Methodology, 8*(1), 84-136.

Wojcicki, T. R., White, S. M., & McAuley, E. (2009). Assessing outcome expectations in older adults: The multidimensional outcome expectations for exercise scale. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 64B*(1), 33-40.

Yaman, Ç. (2008). The abilities of physical education teachers in educational technologies and multimedia. *Turkish Online Journal of Educational Technology, 7*(2).

Yaman, M. (2007a). The attitudes of the physical education students towards internet. *Turkish Online Journal of Educational Technology, 6*(3).

Yaman, M. (2007b). The competence of physical education teachers in computer use. *Turkish Online Journal of Educational Technology, 6*(4).

Yılmaz, İ. (2008). Beden eğitimi ve spor öğretim elemanlarinin teknolojiye ilişkin tutumlarinin değerlendirilmesi. *Türkiye Sosyal Araştırmalar Dergisi, 12*(1), 135–147.

Yılmaz, İ., Ulucan, H., & Pehlivan, S. (2010). Beden Eğitimi Öğretmenliği Programında Öğrenim Gören Öğrencilerin Eğitimde Teknoloji Kullanımına İlişkin Tutum ve Düşünceleri. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi, 11*(1), 105-118.

APPENDICES

APPENDIX A

Sayın katılımcı, Bu çalışma, Yüksek Lisans öğrencisi Kıvanç Semiz tarafından yürütülmektedir. Çalışmanın amacı, Türkiye'deki 14 devlet üniversitesindeki Beden Eğitimi ve Spor Öğretmenliği Bölümlerinin 3. ve 4. sınıflarında öğrenim gören Öğretmen Adaylarının; Teknolojik Pedagojik Alan Bilgileri (TPAB), Teknoloji ile Bütünleşik Özgüvenleri (TBÖ) ve Teknoloji ile Bütünleşik Sonuç Beklentileri'nin (TBSB) incelenmesidir. Katılım gönüllük esasına dayanır, istediğiniz zaman çalışmayı bırakabilirsiniz. Cevaplarınız gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilecek bilgiler bilimsel yayımlarda kullanılacaktır. Çalışmanın sonuçlarını öğrenmek ya da bu araştırma hakkında daha fazla bilgi almak isterseniz aşağıdaki iletişim adresinden bize ulaşabilirsiniz. Araştırmaya katıldığınız için çok teşekkür ederiz.

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1) Bu bölüm kişisel bilgilerinizden oluşmaktadır. Lütfen ilgili yerleri işaretleyiniz ve doldurunuz.

Cinsiyet		Kadın		
		Erkek		
Yaş	....			
Kayıtlı Olunan Üniversite	....			
Kayıtlı Olunan Program		Beden Eğitimi ve Spor Öğretmenliği		Antrenörlük
		Spor Yöneticiliği		Rekreasyon
Sınıfı		3. Sınıf	4. Sınıf	

2) Bu bölümün amacı Öğretmen Adaylarının Teknolojiyle Öğretme Bilgisi'ni ölçmektedir. <u>Teknoloji geniş bir içeriğe sahiptir ve farklı anlamlara gelebilir. Bu ankette, teknoloji kelimesi ile dijital teknolojileri kastediyoruz. (Bilgisayarlar, projektörler, videolar, Ipod lar, pedometreler, kalp atımı ölçüm cihazları, akıllı tahtalar, yazılım programları vb). Cevabınızdan emin değilseniz ya da bilmiyorsanız, Kararsızım (3) ' ı işaretleyiniz.

Kesinlikle Katıl<u>m</u>ıyorum 1	Katıl<u>m</u>ıyorum 2	Kararsızım 3	Katılıyorum 4	Kesinlikle Katılıyorum 5

1.Kendi teknik sorunlarımı çözebilirim.	1	2	3	4	5
2.Teknolojiyi kolayca öğrenebilirim.	1	2	3	4	5
3.Yeni ve önemli teknolojileri takip ederim.	1	2	3	4	5
4.Sık sık teknolojiyle vakit geçiririm.	1	2	3	4	5
5.Pek çok farklı teknolojiden haberdarım.	1	2	3	4	5
6.Teknolojiyi kullanabilmek için yeterli teknik beceriye sahibim.	1	2	3	4	5
7.Farklı teknolojilerle çalışmak için yeterince fırsatım oldu.	1	2	3	4	5
8.Hareket Bilgi ve Becerileri hakkında yeterli bilgiye sahibim.	1	2	3	4	5

9.Etkin katılım ve sağlıklı yaşam hakkında yeterli bilgiye sahibim.	1	2	3	4	5
10.Kinestetik / Hareketsel düşünme tarzına sahibim.	1	2	3	4	5
11.Beden Eğitimi ile ilgili mesleki gelişimimi iyileştirmek için çeşitli yollar ve stratejiler izliyorum. (Kurslar vb.)	1	2	3	4	5
12.Sınıftaki öğrenci performansını nasıl ölçeceğimi bilirim.	1	2	3	4	5
13.Öğretimimi, öğrencinin mevcut durumda neyi anlayıp anlamadığına göre uyarlayabilirim.	1	2	3	4	5
14.Öğretme tarzımı farklı öğrenenlere uyarlayabilirim.	1	2	3	4	5
15.Öğrencinin öğrendiklerini farklı yollarla ölçebilirim.	1	2	3	4	5
16.Bir sınıf ortamında çok çeşitli öğretme yaklaşımları (işbirlikçi öğrenme, doğrudan öğretim, araştırarak öğrenme, problem/proje temelli öğrenme vb) kullanabilirim.	1	2	3	4	5
17.Öğrenciler arasındaki yaygın anlayışlara ve yanlış kanılara aşinayım.	1	2	3	4	5
18.Sınıf yönetimini nasıl organize edeceğimi ve devamlılığını sağlayacağımı bilirim.	1	2	3	4	5
19.Öğrencileri Beden Eğitimi'nde düşünmeye ve öğrenmeye yönlendirecek etkili öğretme yaklaşımlarını nasıl seçeceğimi bilirim.	1	2	3	4	5
20.Beden eğitimini anlamada ve kullanmada işime yarayacak teknoljilerden haberdarım.	1	2	3	4	5
21.Bir dersteki öğretme yaklaşımlarını iyileştirecek teknolojileri seçebilirim.	1	2	3	4	5
22.Bir dersin öğrenci tarafından öğrenilmesini arttıracak teknolojileri seçebilirim.	1	2	3	4	5
23.Kayıtlı olduğum öğretmen eğitimi programı, teknolojinin sınıfta kullandığım öğretme yaklaşımlarını nasıl etkileyebileceği hakkında daha derin düşünmeme sebep oldu.	1	2	3	4	5
24.Teknolojinin sınıfta nasıl kullanılacağı hakkında eleştirel düşünüyorum.	1	2	3	4	5
25.Öğrenmekte olduğum teknolojilerin kullanımını farklı öğretme etkinliklerine uyarlayabilirim.	1	2	3	4	5
26.Beden eğitimini, teknolojileri ve öğretme yaklaşımlarını uygun bir şekilde kaynaştıran dersler işleyebilirim.	1	2	3	4	5
27.Ne öğrettiğimi, nasıl öğrettiğimi ve öğrencilerin öğrendiklerini iyileştirecek teknolojileri sınıfımda kullanmak üzere seçebilirim.	1	2	3	4	5
28.Sınıf çalışmalarında öğrendiğim içeriği, teknolojileri ve öğretme yaklaşımlarını kaynaştıran statejileri sınıfımda kullanabilirim.	1	2	3	4	5
29.Bölgemdeki ya da okulumdaki kişilere, içerik, teknoloji ve öğretme yöntemleri kullanımını düzenlemelerinde öncülük yapabilirim.	1	2	3	4	5
30.Bir dersin içeriğini iyileştirecek teknolojileri seçebilirim.	1	2	3	4	5

TPAB MODELLERİ 1. BÖLÜM					
31.Kayıtlı olduğum Beden Eğitimi öğretimi programındaki öğretim elemanları; içeriği, teknolojileri ve öğretme yaklaşımlarını derslerinde uygun bir şekilde örneklerler.	1	2	3	4	5
32.Eğitim Teknolojileri (Bilgisayar vb.) öğretim elemanları; içeriği, teknolojileri ve öğretme yaklaşımlarını derslerinde uygun bir şekilde örneklerler.	1	2	3	4	5
33.Öğretmen eğitimi programı dışındaki öğretim elemanları; içeriği, teknolojileri ve öğretme yaklaşımlarını derslerinde uygun bir şekilde örneklerler.	1	2	3	4	5

TPAB MODELLERİ 2. BÖLÜM	%25 ya da daha az	%26 - %50	%51 - %75	%76 - %100
34. Genelde yaklaşık olarak, öğretmen eğitimi programındaki öğretim elemanlarının yüzde kaçı, içeriği, teknolojileri ve öğretme yaklaşımlarını kaynaştırarak kendi derslerinde etkili bir örnek sunuyor?				
35. Genelde yaklaşık olarak, öğretmen eğitimi programı dışındaki öğretim elemanlarının yüzde kaçı, içeriği, teknolojileri ve öğretme yaklaşımlarını kaynaştırarak kendi derslerinde etkili bir örnek sunuyor?				

36. Bir öğretim elemanının, sınıf içi bir derste, içerik, teknoloji ve öğretim yöntemlerini etkili bir şekilde gösterdiği ya da örneklendirdiği bir bölümü tarif eder misiniz? Hangi içeriğin öğretildiğini, hangi teknolojinin kullanıldığını ve hangi öğretme yaklaşım (lar) ının uygulandığını yazınızda lütfen belirtiniz.

 37. Sınıf içi bir derste, içerik, teknoloji ve öğretim yöntemlerini birleştirmeyi etkili bir şekilde gösterdiğiniz ya da modellendirdiğiniz bir bölümü tarif eder misiniz? Hangi içeriği öğrettiğinizi, hangi teknolojiyi kullandığınızı ve hangi öğretme yaklaşım(lar)ını uyguladığınızı yazınızda lütfen belirtiniz. Ders verme şansınız olmadıysa, lütfen belirtiniz.

Aşağıda verilen her bir ifade için kendinize ne kadar güvendiğinizi belirtiniz.

Kesinlikle Katılmıyorum 1	Katılmıyorum 2	Kararsızım 3	Katılıyorum 4	Kesinlikle Katılıyorum 5

... konusunda kendime güvenirim.					
1.Bilgisayarı öğretim amaçlı kullanabilecek becerilere sahip olduğum	1	2	3	4	5
2.İlgili ders içeriğini uygun teknolojiyi kullanarak başarılı bir şekilde öğretebileceğim	1	2	3	4	5
3.Teknoloji tabanlı ödevler verme ve bu ödevleri notlandırma	1	2	3	4	5
4.Eğitim teknolojilerini tutarlı bir şekilde, etkili yollarla kullanabileceğim	1	2	3	4	5
5.Öğrencilerimi teknoloji tabanlı projelere katılmaları için motive edebileceğim	1	2	3	4	5
6.Bilgisayarla ilgili herhangi bir problemleri olduğunda, öğrencilerime yardım edebilme	1	2	3	4	5
7.Uygun teknoloji kullanımında öğrencilerime danışmanlık yapabileceğim	1	2	3	4	5
8.Teknoloji kullanımı sırasında, öğrencilere bireysel geri bildirim sağlayabileceğim	1	2	3	4	5
9.Bilgisayar kullanımı sırasında öğrencilerin ihtiyaçlarına cevap verebileceğim	1	2	3	4	5
10. Öğrenci öğrenmesine uygun olduğunda, teknolojiyi düzenli olarak derslerime dahil etmek	1	2	3	4	5
11.Sınıf ortamında bilgisayardan en üst düzeyde yaralanabilecek kadar	1	2	3	4	5
12.Öğretim deneyimini geliştirmek amacıyla, teknoloji kaynaklarını (hesap tabloları, elektronik belgeler vb) öğrenci sınavlarını ve ürünlerini analiz etmek için kullanma	1	2	3	4	5
13. Müfredat standartlarını temel alan öğretim için uygun teknoloji seçme	1	2	3	4	5
14. Öğretme ve öğrenme yazılımını değerlendirme yeteneğim olduğu	1	2	3	4	5
15. Öğrencilerin bilgisayar kullanımını yönetirken doğru bilgisayar terminolojisi kullanabileceğim	1	2	3	4	5
16. Sınıfımda proje gelişimi için öğrencilerin bilgisayar kullanımını etkili bir biçimde izleyebileceğim	1	2	3	4	5

Aşağıda belirtilen ifadelere ne kadar katıldığınızı belirtiniz.

Kesinlikle Katılmıyorum 1	Katılmıyorum 2	Kararsızım 3	Katılıyorum 4	Kesinlikle Katılıyorum 5

Mesleğimde Öğretim Teknolojisi kullanmamın...					
1. daha tatmin edici bir iş yapmama katkı sağlayacağını düşünüyorum.	1	2	3	4	5
2.öğretimimi daha etkili hale geticeğine inanıyorum.	1	2	3	4	5
3.meslektaşlarımın bana olan saygılarını artıracağına inanıyorum.	1	2	3	4	5
4.başarı hissimi artıracağına inanıyorum.	1	2	3	4	5
5.derslerimi daha verimli yapacağına inanıyorum.	1	2	3	4	5
6.öğretmenlikten aldığım zevki arttıracağına inanıyorum.	1	2	3	4	5
7.meslektaşlarıma mesleğimde yetenekli olduğumu göstermemde yardımcı olacağına inanıyorum.	1	2	3	4	5
8. öğretmenlik kalitemi arttıracağına inanıyorum.	1	2	3	4	5

Anket bitmiştir. Teşekkür ederiz.

Bu çalışmadan alınacak ilk verilerin Nisan 2011 'de elde edilmesi amaçlanmaktadır. Elde edilen bilgiler sadece bilimsel araştırma ve yazılarda kullanılacaktır. Çalışmanın sonuçlarını öğrenmek ya da bu araştırma hakkında daha fazla bilgi almak için bize başvurabilirsiniz.

APPENDIX D

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13 Aralık 2010

Gönderilen: Yrd. Doç. Dr. M. Levent İnce

Beden Eğitimi ve Spor Bölümü

Gönderen : Prof. Dr. Canan Özgen

IAK Başkan Yardımcısı

İlgi : Etik Onayı

"Beden Eğitimi Öğretmen Adaylarının Teknolojik Pedagojik Alan Bilgileri (TPAB), Teknoloji ile Bütünleşik Özgüvenleri ve Teknoloji ile Bütünleşik Sonuç Beklentilerinin İncelenmesi." başlığı ile yürüttüğünüz çalışmanız "İnsan Araştırmaları Etik Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

13/12/2010

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