RE-STRUCTURING A UNIVERSITY HEALTH RELATED PHYSICAL ACTIVITY COURSE WITH TECHNOLOGY: A DESIGN BASED RESEARCH

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Prof. Dr. Tülin GENÇÖZ
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

Prof. Dr. Settar KOÇAK
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy.

Prof. Dr. Mustafa Levent İNCE
Supervisor

Examining Committee Members

Prof. Dr. Gıyasettin DEMİRHAN	(HU, FSS)	
Prof. Dr. Soner YILDIRIM	(METU, CEIT)	
Prof. Dr. Mustafa Levent İNCE	(METU, PES)	
Assoc. Prof. Dr. Sadettin KİRAZCI	(METU, PES)	
Assist. Prof. Dr. Mutlu CUĞ	(SCU, BESYO)	

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name: Kıvanç SEMİZ

Signature :

ABSTRACT

RE-STRUCTURING A UNIVERSITY HEALTH RELATED PHYSICAL ACTIVITY COURSE WITH TECHNOLOGY: A DESIGN BASED RESEARCH

Semiz, Kıvanç
Ph.D., Department of Physical Education and Sports
Supervisor: Prof. Dr. Mustafa Levent İNCE

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The purpose of this study was to investigate the restructuring process of a university health-related physical activity course with technology and its impact on teaching & learning practices. Using Design-based Research approach, data were collected in 5 semesters with applying the technology integration strategies iteratively. Beginning with Needs Assessment (Spring 2012-13), it continued with First Pilot (Fall 2013-14) and Second Pilot (Spring 2013-14), and the process ended with Improvements of Design (Summer 2013-14) and Implementation (Fall 2014-15). Data were collected through class observations, field notes, and interviews with the students and the instructor. Thematic content analyses were done with Nvivo software. Data and researcher triangulation were done for reliability and validity. As a result, five themes emerged which the technology-enhanced design had an impact on Classroom Management (1), Data Management (2), Motivation (3), Workload (4) and Differentiated Learning (5). Findings indicated that technology enhancement would

contribute the quality of health-related physical activity courses and the impact of technology integration was documented in detail.

Keywords: Technology integration, Health Related Fitness, Design-Based Research

ÖZ

BİR ÜNİVERSİTE SAĞLIKLA İLİŞKİLİ FİZİKSEL AKTİVİTE DERSİNİN TEKNOLOJİYLE YENİDEN YAPILANDIRILMASI: TASARIM TEMELLİ BİR ARAŞTIRMA

Semiz, Kıvanç
Doktora, Beden Eğitimi ve Spor Bölümü
Tez Yöneticisi: Prof. Dr. Mustafa Levent İNCE

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Bu araştırmanın amacı bir üniversitede sunulan sağlıkla ilişkili fiziksel aktivite dersinin teknoloji ile yeniden tasarlanması sürecini ve bunun ders uygulamalarına olan etkilerini incelemektir. Çalışmada, Tasarım Tabanlı Araştırma deseni kullanılmıştır. İhtiyaç Analizi (2012-2013 İlkbahar Dönemi) ile başlayan tasarım süreci, İlk Pilot Çalışma (2013-2014 Sonbahar Dönemi) ve İkinci Pilot Çalışma (2013-2014 İlkbahar Dönemi) ile devam etmiş, Tasarım İyileştirilmesi (2013-2014 Yaz Okulu) ve Son Uygulama (2014-2015 Sonbahar Dönemi) ile son halini almıştır. Veriler ders gözlemleri, saha notları, öğrenciler ve öğretim üyesi ile yapılan görüşmeler aracılığıyla toplanmıştır. Elde edilen veriler Nvivo programı ile tematik içerik analizi kullanılarak gözden geçirilmiştir. Analizlerde veri ve araştırmacı üçlemesi kullanılmıştır. Sonuç olarak, teknoloji destekli tasarımın dersin niteliğine etki yaptığı beş farklı tema saptanmıştır. Bunlar, teknoloji destekli ders tasarımının

sınıf yönetimi, veri yönetimi, öğrenci motivasyonu, öğretim üyesi iş yükü ve öğrenciye özgü farklılaştırılmış öğrenme için yarattığı etkilerdir. Bu çalışma bulguları, üniversitelerde sunulan sağlıkla ilişkili fiziksel aktivite derslerinin teknoloji destekli tasarımlarla sunulduğunda dersin niteliğine olumlu katkı yapacağını göstermektedir ve bu dersin etkisi de detaylıca belgelendirilmiştir.

Anahtar Kelimeler: Teknoloji, Sağlıkla ilişkili fiziksel uygunluk, Tasarım tabanlı araştırma

To my family;

Şükrü Semiz,

Fatma Semiz,

&

Ayşegül Semiz

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LIST OF ABBREVIATIONS

TPACK	Technological Pedagogical Content Knowledge
ISTE	International Society for Technology in Education
HRF	Health Related Fitness

CHAPTER 1

INTRODUCTION

This chapter provides a general outlook of the study under five topics. Firstly, a background of the problem is presented. It continues with the purpose of the study and research questions. Finally, the chapter is ended with the significance of the study, and related terminology about the context.

1.1. Background of the Problem

For a couple of decades, universities have included Health-Related Fitness (HRF) courses and physical activity classes in their curriculum encouraging undergraduate students to develop healthy lifestyles and positive attitudes for lifelong physical activity (Hensley, 2000; Kulinna, Warfield, Jonaitis, Dean, & Corbin, 2009). A HRF course usually focuses on providing students with the knowledge and skills related to four components: (1) body composition, (2) cardiovascular endurance, (3) muscular strength & endurance, and (4) flexibility (ACSM, 2014). HRF university courses are often used to extend the knowledge base of fitness concepts provided to students within physical education courses offered in high school (Dale & Corbin, 2000). Some studies indicated that university students have lower physical activity levels (Cengiz, İnce, & Çiçek, 2009; Freudenberg, Manzo, Mongiello, Jones, Boeri, & Lamberson 2013; Ullrich-French, Cox, & Bumpus, 2014). Offering HRF classes in university settings can play a crucial role for physical activity participation of students. Consequently, students must often obtain a physical education credit by taking one or multiple physical activity courses. Research supported that gaining HRF knowledge improved physical activity levels of university students (Ferkel, Judge, Stodden, & Griffin, 2014). Taking a HRF course also improved students' physical, psychological and emotional well-being (Li, Lu, & Wang, 2009). Adams, Graves, and Adams (2006) research showed similar results and found that a HRF

course helped students develop HRF knowledge and also allowed students to recall that knowledge four years later. Nicole, Leenders, Sherman, and Ward (2003) stated that students take the physical activity classes mainly to have fun, learn a new physical activity or develop a new skill. Jenkins, Jenkins, Collums, and Werhonig (2006) indicated that students perceived physical tests, meeting new people and completing homework positively in their physical activity classes because these support systems allowed them to be accountable and identify their personal fitness and wellness goals.

Since offering HRF courses in university are essential, the content and design of these courses should be evaluated. Keating, Wallace, Schafer, O'Connor, Shangguan, and Guan (2012) investigated the content of HRF course syllabi offered at 86 American colleges and universities and found that the focus of such courses remained on mastering HRF knowledge. The research suggested that for students to implement fitness into their daily lives, teaching HRF skills should also be a focus. The Society of Health and Physical Education (SHAPE), formerly known as NASPE (National Association for Sport and Physical Education) constructed an instructional framework for fitness education in physical education to provide teachers with content guidelines related to the knowledge and skills students should gain from a HRF course (NASPE, 2002). According to this framework, all students (K-12 and higher education) should be able to demonstrate skills and knowledge within eight different domains: technique, knowledge, physical activity, health-related fitness, responsible for personal and social behaviors, values and advocates, nutrition, and lastly consumerism. University HRF courses can be designed in the lights of these gains.

The design of HRF courses have been influenced by emerging health-related fitness technologies and instructional technologies increasingly. For example, heart rate monitors, pedometers, accelerometers, GPS watches, multimedia technologies (Mohnsen, 2012) and recently mobile apps have provided physical education teachers a wide range of options to enrich their classes and create authentic learning experiences (Roth, 2014). Physical activity monitors offer opportunities for students

to track and monitor their fitness levels (Ransdell, Rice, Snelson, & Decola, 2008). Also, web-based tools have been evolved in the last decade to a more collaborative and efficient form. At first, the World Wide Web, also called web 1.0, was used to provide information. Later on, web 2.0 emerged, a platform where people could collaborate, create, and publish their information using social media, blogs, wikis, and other media platforms (Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, 2013). This innovation in web technologies leads teachers to use web 2.0 tools within their classrooms, often to enhance learning and teaching (Wankel & Blessinger, 2013).

Integrating online learning experiences with face-to-face class meetings has provided rich environments for meaningful learning (Garrison & Vaughan, 2008). This type of instructional design is also called web-enhanced instruction or blended learning. With appropriate planning and support, blended learning could lead an encouraging transformation for faculty development and students' satisfaction with their learning experiences (Moskal, Dziuban, & Hartman, 2013). Research showed that web-enhanced instruction and online homework assignments can increase students' HRF knowledge (Keating, et al., 2009). In 2010, Strand, Egeberg, & Mozumdar found that more than half of the schools in the USA provide web-enhanced HRF courses. Research indicated that students, who have higher perceived psychological, emotional, intellectual, and social wellness prefers online and blended HRF courses rather than face-to-face HRF courses (Milroy, Orsini, D'Abundo, & Sidman, 2013). Online HRF courses also benefited students by decreasing classroom seat time and increasing the opportunity to use the time to be more active in the class (Strand, Egeberg, & Mozumdar, 2010). To effectively organize and administer online course information and assignments, universities provide online delivery mediums also referred to Learning Management Systems (LMS) (Luke & Morrissey, 2014).

Designing, developing, implementing, and testing technology enhanced lessons can be a substantial challenge. In her study with nationally recognized Physical Education Teacher Education (PETE) programs in the USA, Baert (2011) found that PETE faculty did not feel confident in using technology, they often have low proficiency and integration levels, and they used mostly traditional computer

technologies. The technology coaches have an essential role in supporting the instructional environments. Sugar (2005) found that technology coaches helped teachers to gain confidence in using technology in their classrooms. Baran and her colleagues (2013) mentioned that to re-shape the higher education teachers' perspectives on technology integration, listening to their views, giving the teachers a participatory role, and using their experiences appeared to be critical when enhancing their online teaching practices. Consequently, the process of technology integration can be improved when considering the perceptions of the faculty about their knowledge and use of technology and how they experience teaching with technology.

The benefits and necessity of implementing technology in learning and teaching are well acknowledged; however, this process of technology integration affords particular challenges. Kim, Choi, Han and Jeong So (2012) investigated the use of technology in Korean schools, and found that teachers have difficulties integrating and remixing various media to represent new ideas and design contexts for their class activities and projects. Ertmer and her colleagues (2015) found that existing attitudes and beliefs toward technology and current levels of knowledge and skills are the strongest barriers to prevent teachers using technology.

Until quite recently, technology integration "was" an option for teachers, however, with the enhancements that educational technology can bring to students, teachers are encouraged to integrate technology (Roth, 2014). At the beginning of the new millennium, Tinning (2000) was farseeing these days as "New Times" to be discussed and theorized for its context and consequences. During and after these 15 years, it is expected that teachers have the necessary skills to integrate technology in their classes. There is a common tendency in education that due to the affordability and accessibility of technology, teachers often try to make the learner fit the technology while researchers have indicated that the students' needs and the learning goals should be identified first within a lesson plan. After that, the appropriate technologies with related activities should be selected to support learning (Niess, 2005; Hofer & Harris, 2009; Juniu, 2011).

Creating effective technology enhancement solutions for specific contexts requires making connections between certain pedagogical strategies to teach content with relevant instructional technologies (Koehler & Mishra, 2009). In recent years, the Technological Pedagogical Content Knowledge framework (Mishra & Koehler, 2006) for teaching a specific subject matter with the proper use of technology in suitable pedagogical perspectives has been widely studied. In essence, TPACK explained as the knowledge formed by three domains: Technology Knowledge (TK), Pedagogy Knowledge (PK) and Content Knowledge (CK) for teachers to integrate technology into their teaching.

The researcher of this study selected a physical activity course in a metropolitan university and questioned the extent to which online instruction should be combined with traditional instruction, how technology could support course activities, and which technology should be selected when deciding appropriate instructional strategies. The university physical activity course that is mentioned focused on developing healthy behaviors and promoting lifelong physical activity and it has shown positive effects towards undergraduate students. Various theoretical perspectives were used to investigate the impact of this course such as a social cognitive theory-based intervention (Ince, 2008), the exercise stages of change model (Ince & Ebem, 2009), and the trans-contextual model (Muftuler & Ince, 2015). The results showed increased health-promoting behaviors (nutrition behavior, health responsibility, social support, stress management, etc.), physical activity engagement, and perceived autonomous support for leisure time physical activity.

To implement the appropriate strategies based on students' needs and to be able to design a technology-enhanced HRF course, a framework such as Technological Pedagogical Content Knowledge (TPACK) can be used (Koehler & Mishra, 2006). For monitoring and evaluating the process of designing technology-enhanced course, a design-based research (DBR) approach was believed to be the perfect fit. A design-based research approach can gain an insight into how technology has influenced the university HRF course, the teacher, and the students. Even though understanding, evaluating, and developing TPACK skills of teachers have been studied

substantially, knowledge for which design principles should be taken into consideration to re-structure and develop a university physical activity course remains scarce. The flexibility offered by the DBR can provide insight on which elements should be noted for technology integration, what impact do they have on this process, and which barriers do they create.

1.2. Purpose of the Study

The purpose of this study was to investigate the design process and the impact of restructuring a university Health-Related Fitness course with technology.

Based on the experiences of a university instructor about the issues he faced with in a current HRF course; this research used a design based research approach that focused on restructuring the design of a university HRF course with technology. The main focus of the study was to offer the instructor solution-oriented strategies that met his teaching needs and investigated the impact of technology integrated HRF course on students and instructor experiences.

1.3. Research Questions

The first two questions addressed the instructional design of the HRF course while the last question focused on the impact of technology integration on the students and the instructor.

1. What are the design principles for restructuring a university HRF course with technology?

2. What were the challenges when restructuring a university HRF course with technology?
3. What was the impact of restructuring the University HRF course with technology on students and instructor?

1.4. Significance of the study

According to Strand, Egeberg, & Mozumdar (2010), nearly half of the HRF courses offered in universities are web-enhanced in the USA and the effectiveness of such courses should be investigated. Melton & Burdette (2011) stated that using Learning Management Systems helps to increase organization and effectiveness of university physical activity programs. However, the impact of technology integration into a university physical activity course and the in-depth understanding of this process is yet to be investigated. Therefore, this study offered an opportunity to see how employing various pedagogical uses of technology reshaped a university HRF course and provided different experiences for students and instructor.

According to a review study investigating TPACK-related studies from 2002 to 2011 (Wu, 2013), it was seen that most of the sample groups were selected from pre-service teachers (54.2 %) and in-service teachers from elementary and high schools (37.5 %). University or college teachers were included in only a few studies (8 %). Therefore, a TPACK-based study including educators in higher education can be a valuable contribution to the literature.

Subjects such as Math, Science, Social studies, and language have been investigated the use of the TPACK framework within their context (Wu, 2013). To the researcher's knowledge, the studies connected TPACK and university physical education classes (such as physical activity or HRF courses) are limited or non-existing and should be researched deeper. This study used the TPACK framework to re-structure a HRF course by aligning digital tools, learning outcomes, and assessments. Therefore, this study may provide a valuable contribution to the TPACK literature in higher education.

1.5. Definition of Terms

TPACK (Technological Pedagogical Content Knowledge): TPACK is the knowledge for using technology with appropriate teaching strategies for teaching a specific subject matter (Mishra & Koehler, 2006).

University Health-Related Fitness course: A university conceptual physical education course which includes (1) cardiovascular endurance, (2) muscular endurance and muscular strength, (3) flexibility, and lastly (4) body composition.

Technology: All kind of tools that were used to enhance the teaching and learning process.

Design Principles: The strategies that can be used for technology enhancement of a course design.

Challenges: The barriers that are faced with during the process of technology integration.

CHAPTER 2

LITERATURE REVIEW

This chapter includes literature related to research for health-related fitness courses in university settings, technology in physical activity settings, blended learning, and Technological Pedagogical Content Knowledge Framework.

2.1. Health-Related Fitness Courses in University Settings

The HRF courses in university settings can be understood under three topics: (1) The problem of low physical activity levels of university students and the role of HRF knowledge in this issue, (2) the design of university HRF courses, and (3) understanding the university students' and faculty members' perception about university HRF courses.

2.1.1. Health-Related Fitness Knowledge and Physical Activity of University Students

Why does the university students' health matter and what are the options for improving it?

In the constitution of the World Health Organization, health is defined as *"a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."* (WHO, 2016a). According to a report for 2030 Goals of World Health Organization for ensuring healthy lifestyles and promoting well-being at all ages; adolescent health was mentioned important because of alarming risk factors such as tobacco and alcohol uses, and obesity (WHO, 2016b). University students represent the possible future role models for leading and guiding the important organizations, policy-making groups, and crucial positions in society. Therefore,

raising healthy generations, specifically in university level is critical because those years are important to adopt healthy lifestyles and healthy behaviors (El Ansari, et al., 2011). University years also a part of a life span between high school and adulthood. Research showed why those transition years are critical such as smoking habit, unhealthy diet, and alcohol abuse was among the health risk behaviors that was found among the university students (Silva & Petrovski, 2012). Psychological distress was also found to be linked with the possible health risks factors among university students (Deasy, Coughlan, Pirinom, Jourdan & Mcnamara, 2015). The universities' campus environment and policies are, on the other hand, can be considered as an important factor for promoting healthy lifestyles. Students reported that the healthy dining and vending options were limited and the recreation services were insufficient. Therefore, universities should reconsider their policies to shape the environment they offer to students for health promotion (Olfert, Barr, Famodu, Hagedorn & King, 2016).

In recent years, the low physical activity participation among university students is considered one of the main issues leading to sedentary behaviors in adults (Bray & Kwan, 2006; Ullrich-French, Cox, & Bumpus, 2014). In an international review that outlined 19 studies with a total of 35,747 participants (20,179 females and 15,568 males) from 27 countries, Irwin (2004) found that nearly more than half of the university students was found physically inactive according to the recommended ACSM guidelines for physical activity (ACSM - American College of Sport Medicine - stated that a total of 30 minutes or more physical activity on each day of the week was recommended for health benefits). Research showed there are different reasons for inactivity levels of university students. Lack of time and heavy class schedule were perceived as barriers for participating physical activity from university students (Koçak, 2005). Also, negative behaviors that have traditionally been part of university life such as late nights studying, high levels of stress (Adams, Graves, & Adams, 2006), poor diet behaviors, and adopting a new social life (McArthur & Raedeke, 2009) were found in the literature as contributing factors to low levels of physical activity.

Research indicated a decline in physical activity levels when students' transition from high school to university (Cengiz, İnce & Çiçek, 2009; İnce & Ebem, 2009; Freudenberg et al., 2013; Ullrich-French, et al., 2014). During the first months at university, students experience a new environment with unique challenges. New social environments and different diet choices may lead to unhealthy behaviors (McArthur & Raedeke, 2009). Also, insufficient Health-Related Fitness (HRF) knowledge of K-12 physical education teachers may have influenced the limited knowledge of physical activity and health of new university students (Castelli & Williams, 2007; Hunuk, Ince, & Tannehill, 2013; Ince & Hunuk, 2013). The decline in physical activity levels continues even after graduation from university (Hirvensalo & Lintunen, 2011) due to the poor activity behaviors adopted during late adolescence (Kwan, Cairney, Faulkner, & Pullevanegun, 2012).

Thompson and Hannon (2012) investigated how 165 highs school students' self-reported physical activity related to HRF knowledge in the southwestern US. A 100-item HRF knowledge test and a physical activity survey were administered. They found that the high school students who have satisfactory health-related fitness (HRF) knowledge also have high physical activity levels. It is often expected that high school students will transfer the habits of physical activity and knowledge for HRF into their life in university. However, Kimball, Jenkins, & Wallhead (2009) examined the influence of high school physical education on 365 undergraduate students' physical activity levels. Data were collected with a questionnaire and focus group interviews. Results showed that gender was a key variable. The previous high school physical education experiences were found to have minimal influence on male university students' physical activity levels. Previous research also emphasized similar findings, as female university students' physical activity levels were lower than male university students (Savcı, et al. 2006, Cağlar & Asci, 2006). Also, female students were less active in university than in high school. High school physical education teachers are essential in conveying the HRF information to students (Kimball, Jenkins, & Wallhead, 2009). However, research showed that physical education teachers lack appropriate HRF knowledge levels (Castelli & Williams,

2007, Santiago, Disch, & Morales, 2012). Consequently, students join universities with inadequate HRF knowledge.

When looking to Turkish setting, Ince examined (2008) 62 University student's health behaviors for 12 weeks with a social cognitive theory intervention. Results showed that the physical activity levels of students were improved as well as their nutrition, health responsibility, social support, exercise, and stress management. İnce & Ebem (2009) also examined 358 university students' self-reported health promoting behaviors at the transition from high school to university. They applied Physical Activity Stages of Change Questionnaire and Adolescent Health Promotion Scale. While the Life Appreciation variable was found higher, the exercise score was found to be the lowest. A holistic development was suggested for all physically inactive students.

Cengiz, Ince, & Cicek (2009) also examined 957 Turkish university students' exercise behaviors. International Physical Activity Questionnaire and Physical Activity Stages of Change Questionnaire were used. It was indicated that most of the students were at lower stages (a total of 71,9 % for Pre-Contemplation-Contemplation and Preparation stages). Müftüler and İnce, (2015) conducted an experimental design research with a Trans-contextual model-based intervention. Having 70 students (35 in control group) participated in the study; they investigated how a physical activity course affects perceived autonomy support, autonomous motivation, determinants of leisure time physical activity behavior, and basic psychological needs satisfaction. After the 12-week period, pre and post-test scores of multiple questionnaires revealed that the intervention was successful.

2.1.2. Design of Health-Related Fitness Courses

HRF courses may provide the theoretical knowledge and practical opportunities in fitness education to university students that were missing from their K-12 education (Dale & Corbin, 2000). Corbin and his colleagues (2008) defined HRF as not only conceptual knowledge for physical education but HRF knowledge also includes self-

management skills for testing oneself, setting goals, planning own programs, and being a good consumer of health related products.

Corbin (2008) uses the terms "Fitness for life," "Health-Related Fitness," or "Conceptual Physical Education" interchangeably and offers a way to provide physical activity classes in higher education that create opportunities to raise the physical activity levels and increase the health-related fitness knowledge of university students. Corbin and Cardinal (2008) define conceptual physical education as the "basic instruction physical education classes or classes for non-major students that involve the teaching of cognitive or conceptual material, typically in a classroom setting" (p. 437).

HRF has four main components: cardiovascular endurance (1), muscular strength and endurance (2), body composition (3), and flexibility (4) (ACSM, 2014). Research showed that, conceptual physical education and HRF courses that are offered in universities gradually increased in last decades (Trimble & Hensley, 1990; Hensley, 2000; Strand et al., 2010). Since the 1960s, universities in the USA offer physical activity classes and most of them even require such classes as a condition for graduation (Hensley, 2000). However, university physical activity courses were based on teaching a variety of sports and lifetime physical activities. Teaching health and wellness dimension of fitness in universities have become very important for those who need to be physically active. (Adams, Graves, & Adams, 2006; Strand, Egeberg, & Mozumdar, 2010).

In a metropolitan university in Turkey, an elective physical activity course has been offered to university students for ten years in HRF focus. The instructor designed this course at the beginning with the instructional framework of SHAPE (formerly known as NASPE) for fitness education with Corbin's Fitness for Life concept. In 2008, he improved the course with a Social Cognitive Theory intervention (Ince, 2008) as the self-regulatory skills, social support, and self-assessment added to course's focus. In 2015, Muftuler improved the course with Ince (Muftuler & Ince, 2015), with a Trans-contextual model view. Autonomous motivation and support for

basic psychological needs satisfaction and leisure time physical activity behavior were the other focuses that added to the core of the course.

2.1.3. University Health-Related Fitness Courses

Nicole, Lenders, Sherman and Ward (2003) investigated the primary reason to select a physical activity course and measured the health behavior characteristics of 2155 university students enrolled in 41 physical activity courses of a mid-western university. The findings revealed that the top three reasons to enroll in a physical activity class were to learn a new activity (20%), to have fun (18%), and to improve physical skills (18%). The health behavior statistics showed that every one student out of four (25%) was considered overweight or obese. Jenkins, Jenkins, Collums, and Werhonig (2006) analyzed 157 undergraduate students' answers towards the following question: "Describe a specific incident that you have experienced in the conceptual physical education course that you believe has had a positive and negative influence on you, your education, or future career" (p. 212). Data collected to identify which characteristics were perceived as negatively and positively by the participants. The findings showed that the students perceived the physical fitness testing and wellness assignments, instructional techniques, and lastly meeting with people positively. On the other hand, the students perceived classroom meeting time, classroom management, and lack of team cohesion negatively.

In their review study for HRF knowledge, Keating, Harrison, Chen, Xiang, Lambdin, Dauenhauer, Rotich, and Pinero (2009) found that the amount of HRF knowledge students should demonstrate at different grades and which teaching strategies should be used to increase HRF knowledge of students was not clear. They also indicated that the web-based instruction and homework assignments increased the HRF knowledge of students. In another review study, Ferkel, Judge, Stodden, and Griffin (2014) examined the relationship between HRF knowledge, physical activity and physical fitness. The results indicated that the HRF knowledge level of students was low from elementary school to university. The authors claim that high levels of HRF knowledge often lead to high physical activity and physical fitness levels. And

finally, HRF interventions can have longitudinal effects on physical activity and physical fitness levels. In another study about HRF knowledge, Adams, Graves, and Adams (2006) examines the effectiveness of HRF course on HRF knowledge of university students. A total of 277 students grouped six following groups: 1st group, not having the HRF course; 2nd group, currently taking the HRF course, and 3rd group through 6th group were created according to time passed since they completed the HRF course. Results showed that after completing the HRF course, students develop an above average HRF knowledge. It was also found that the students present significantly higher levels of HRF knowledge even after four years when comparing the students who have never taken a HRF course.

Kulinna, Warfield, Jonaitis, Dean, & Corbin, (2009) surveyed 161 US faculty members about the availability, progression, and characteristics of their CPE classes. The results showed that there is a meaningful increase in providing CPE courses in US university settings. In an attempt to understand how CPE classes were taught in higher education, Keating, Wallace, Schafer, O'Connor, Shangguan, and Guan (2012) examined the 86 syllabi from 37 colleges and 49 universities in the USA. The results showed that the CPE courses mostly offered as an elective course (83.7%). It was also found that only less than 10% of the schools include social support for physical activity in CPE courses. While contents like basic concepts, nutrition, and weight management were mostly taught, physical activity goal setting and planning were only included in approximately one-third of the schools. The study emphasized that the CPE courses remained on mastering knowledge. However, the focus of such courses should be strengthening the skill teaching and learning to let students for solving their daily life problems. In another study examining the characteristics of HRF and physical activity classes in US higher education, Strand, Egeberg, and Mozumbar (2010) collected data from 116 colleges and universities. The findings revealed that nearly half of the schools provide the web-enhanced HRF courses and more than one-third offers online HRF classes.

Milroy, Orsini, D'Abundo, & Sidman, (2013) investigated the perceived wellness of 378 college students who selected online, hybrid, or face-to-face formats of a

required university HRF course. The results indicated that students with higher psychological, emotional, intellectual, and social wellness prefer online or hybrid course formats rather than face-to-face. Therefore, the instructors may consider that these students as optimistic and having a high self-image. On the other hand, face-to-face students might be motivated for intrapersonal characteristics. There was also a significant difference in age and students' status. Researchers considered this normal, as online learning students were older and had a job. Sidman, Fiala, and D'Abundo (2011) have similar findings. They examined exercise motivation among 607 university students for online and face-to-face delivery formats of a physical activity course. The results showed no significant difference in exercise motivation. However, there was a significant difference in age and employment status between the online and face-to-face course formats. The researchers interpreted this finding as students select online physical activity course to balance the social responsibilities and work.

While approximately more than half of the universities and colleges had HRF courses in their curriculum in 25 years ago (Trimble & Hensley, 1990), nearly the same amount of schools offers web-enhanced HRF courses in their curriculum until five years ago (Strand, Egeberg, & Mozumbar, 2010). What happened in those 20 years is exciting. Not only educators understood the relevance of university HRF courses, but also they understood the rapid developments in technology during that time, and they embraced the necessity of technology integration.

Table 2.1. *Studies related with Health-Related Fitness*

Author(s)-Year	**Purpose**	**Participants**	**Data Collection Tools**	**Findings**
Adams, Graves, & Adams (2006)	Effectiveness of HRF course on HRF knowledge	277 University students	80-item, multiple-choice test for HRF knowledge	Students develop an above average level of HRF knowledge and can recall it even after four years
Nicole, Lenders, Sherman & Ward (2003)	Determining the reasons to select physical activity courses and health behaviors of students	2155 University students	1. Yes/no questions (16 item) 2. Descriptive part Open-ended questions (6 item)	Learn a new activity (20%), have fun (18%), improve the skills (18%). One in four students are overweight
Jenkins, Jenkins, Collums, & Werhonig (2006)	Identifying CPE course characteristics that contributed to positive and negative student perceptions	157 undergraduate students in 10 different CPE classes	The Coelho critical incident Form (2000) and two semi structured interviews	Participants viewed physical fitness testing and wellness assignments, instructional techniques, and meeting people positively. Class meeting time, Classroom management, and lack of team cohesion perceived negatively.
Keating, Wallace, Schafer, O'Connor, Shangguan, & Guan (2012)	Understanding how CPE classes were taught in higher education	86 syllabi from 37 colleges and 49 universities in US	Institution websites, e-mails, phones	Focus of the courses was mastering the knowledge. Skill teaching and learning should be the focus for students to be able to solve practical problems in their daily lives.

Table 2.1. *Continued*

Strand, Egeberg, & Mozumbar (2010)	Determining the prevalence and characteristics of (HRF) and physical activity (PA) courses at U.S. institutions of higher learning.	16 two- and four-year colleges and universities	25-item survey	Nearly half of the schools provide web enhanced HRF courses and more than one third offers online HRF classes.
Milroy, Orsini, D'Abundo, & Sidman, (2013)	Understanding the relationship between course delivery format and perceived wellness	378 college students	The Perceived Wellness Survey	Students with higher perceived wellness prefers online and hybrid course formats rather than face-to-face
Sidman, Fiala, & D'Abundo (2011)	Assessing exercise motivation among college students for self-selected online and face-to-face physical activity and wellness course delivery formats.	607 college students	Behavioral Regulation in Exercise Questionnaire (BREQ-2).	No significant difference in exercise motivation for students across course delivery formats, but there was a significant difference in age and employment status between the completely OL and F2F course formats
Kulinna, Warfield, Jonaitis, Dean, & Corbin, (2009)	To describe the availability, progression, and characteristics of CPE courses in American higher education.	161 faculty members	CPE course instrument	Offered and required CPE classes increased in US

Table 2.1. *Continued*

İnce (2008)	Examine the effects of a 12-week social cognitive theory based intervention on health-promoting behaviors	62 university students	The Adolescent Health Promotion Scale and International Physical Activity Questionnaire	Students' nutrition, health responsibility, social support, exercise, stress management, and overall health from pre- to post intervention were improved. And students' physical activity levels got improved.
Müftüler & İnce (2015)	Examine the effectiveness of a Trans-Contextual Model-based physical activity course on the perceived autonomy support, autonomous motivation, determinants of leisure time physical activity behavior, and basic psychological needs satisfaction.	70 university students	The Perceived Autonomy Support Scale for Exercise, Perceived Locus of Causality Scale, Behavioral Regulations of Exercise Questionnaire, The three-item intention subscale, Basic Psychological Need Satisfaction in Exercise Scale, International Physical Activity Scale, Physical Activity Stages of Change Questionnaire.	Perceived autonomy support from instructor and peers, autonomous motivation in leisure-time physical activity setting, positive intention and perceived behavioral control over leisure-time physical activity behavior were significantly higher. The intervention was successful.

2.2. Technology in Physical Activity Settings

While the physical activity courses for university students are on demand, providing such courses with a sufficient content and creating rich learning environments with appropriate materials are very important. Using materials, technology became an essential part of it. Technologies to promote physical activity can be listed as pedometers, accelerometers, GPS (Global Positioning Systems) devices, heart rate monitors, and interactive video games / exergaming (Mohnsen, 2008). Additionally, smart phone applications provide a variety of opportunities for promoting physical activity (Martin, Ameluxen-Coleman & Heinrichs, 2015). Some studies related to physical activity and technology have been done until quite recently:

Pedometer: Cayir, Aslan, and Akturk (2015) investigated the impact of using the pedometer on 84 obese women as a motivational technique for promoting physical activity in the Turkish setting. Results showed that the weight, body mass index and waist circumference measurements of participants were decreased and the mean number of steps per day of participants was increased during the three-month follow-up plan. Using pedometer was recommended to promote weight loss, to monitor and increase the level of physical activity in obese women.

GPS (Global Positioning Systems): The feasibility of using a GPS device for perceived acceptability, barriers, and ease of use were investigated with 170 adult participants for seven days (Zenk, Schulz, Odoms-Young, Angela, Wilbur, Matthews, Gamboa, Wegrzyn, Hobson, & Stokes, 2012). The results showed that acceptability and ease of use rates were high, and wear related concerns were low. The young participants with higher education background found that the GPS device made the study interesting.

Heart rate monitor: Ignico, Corson and Vidoni (2006) investigated the effect of heart rate monitor on running performance of 175 4th and 5^{th}-grade students. The results showed that there is a significant increase in student's mile-run time, percentage of

time in the zone, and recovery heart rates. Providing concrete feedbacks and evidence help teachers to motivate students for physical activity.

Smartphone applications: Bort-Roig, Gilson, Puig-Ribera, Contreras and Trost (2014) reviewed a total of 26 articles for last seven years for smartphones' viability for measuring and influencing on physical activity. High potential for promoting physical activity was mentioned as smartphones have built-in accelerometers, and their measurement accuracy is average to excellent levels. Smartphone applications were found to encourage goal setting, real-time feedback, and social support.

Exergaming: The impact of exergaming on class physical activity and motivation on physical education were investigated with 4-week units. It was found that although its effect on increasing physical activity of children was questionable, exergaming could help to improve for motivation for physical activity (Sun, 2012).

Social Media: West and his colleagues (2016) gave a 9-week social media-based (Facebook) weight gain prevention intervention for 58 college students. Even though there was no significant difference between groups, certain behavioral improvements were seen such as increasing in weight control strategies.

Accelerometer: In a review study, 273 articles were examined which was conducted with accelerometers (Cain, Sallis, Conway, Van Dyck, & Calhoon, 2013). It was stated that researchers were mostly worked with children and those studies were almost doubled from 2005 to 2010. It was found that ActiGraph was the most used accelerometer.

Physical Activity Tracker: Wearable technologies especially smart wristbands' popularity has been increased in last years. Fitbit, one of the most popular one investigated in research with ten males. Results showed that the device met reasonable validity and reliability standards for following medical patients' physical activity levels (Diaz et al., 2015).

Table 2.2. *Studies related with technology and physical activity*

Author(s)-Year	Purpose	Participants	Data Collection Tools	Findings
Magoc, Tomaka, and Bridges-Arzaga, (2011)	Effectiveness of a web based delivery physical activity course	104 University students	Physical Activity Readiness Questionnaire, International Physical Activity Questionnaire	Moderate and vigorous physical activity levels of sedentary college students were increased
Bort-Roig, Gilson, Puig-Ribera, Contreras and Trost (2014)	Smartphones' viability for measuring and influencing on physical activity.	26 articles beginning from year 2007	Online databases: web of knowledge, PubMed, ebscohost, science direct, psych info	Smartphone applications were found to encourage goal setting, real time feedback, and social support.
Cayir, Aslan, and Akturk (2015)	The impact of using pedometer on 84 obese women as a motivational technique for promoting physical activity in Turkish setting.	84 obese women	Pedometers	The weight, body mass index, and waist circumference measurements of participants were decreased and the mean number of steps per day of participants were increased
Zenk, Schulz, Odoms-Young, Angela, Wilbur, Matthews, Gamboa, Wegrzyn, Hobson, and Stokes (2012)	Feasibility of using a GPS device for perceived acceptability, barriers, and ease of use	170 urban adults	GPS Open ended questions	Acceptability and ease of use rates were high, and wear related concerns were low. The young participants with higher education background found that the GPS device made the study interesting.
Ignico and Corson (2006)	Investigating the effect of heart rate monitor on running performance	175 4th and 5th grade students	Heart rate monitors	The group wearing heart rate monitors improved more than the control group.

2.3. Blended Learning

In recent years, advancements in technology have been leaping forward substantially. Especially, emerging developments in the information and communication areas through Internet causes a dramatic shift in society (Schmidt & Cohen, 2013). Becoming widespread globally, technology is happened to be easily accessible by society. Internet connectivity rates have been increasing day by day. It was estimated that approximately 3.1 billion people were using the Internet in 2014 ("Internet Users", 2014). Field of education is benefited from this state of affairs. Turkish government recently has been conducting a project named "Movement of Enhancing Opportunities and Improving Technology," known as FATİH since 2010 (FATİH, 2015). With a goal to create "smart" classes, tablet PCs and LCD Interactive Boards delivered to a total of 42.000 schools and 570.000 classes. In one of the most expensive projects of its history, as Turkey is about the finish the process, considerable drawbacks and difficulties have been experienced. Researchers indicated that there are certain considerations about pedagogical and professional development issues in the schools which FATIH project are implemented (Karakaya, 2013; Pamuk et al., 2013). Still, such efforts are important to keep up with the digital age.

The Horizon Report (Johnson, Adams, Cummins, Estrada, Freeman, & Ludgate, 2013) stated that with growing usage of tablet computing and mobile apps, the open content, which can be used for educational purposes on the web, would be one of the main key trends in education. Using technology always does not change the learning experience. Transforming the hardcopy materials produces just the digital versions of traditional ones. It does not make a meaningful effort. However, appropriate uses of technology can change the learning experience in a different way (Culatta, 2013). Increasing learners' engagement can be achieved by engaging social media, wikis, blogs, multimedia technologies, and online technologies. Speaking of online learning experiences, blended learning plays an important role to combine online materials with the face-to-face setting.

The effort to enrich the delivery of instruction with online technology was named blended learning (Graham, 2006). Garrison & Vaughan (2008) defined the combination of face-to-face and online learning experiences in blended learning as a "thoughtful fusion." A couple of studies that cited most could be given as examples to effectiveness of blended learning environment in an undergraduate in contexts of "Teaching Methods in Information Science" course (Hoic-Bozic & Mornar, 2009), "Human Anatomy" course (Pereira et al., 2007) and "English" course (Wang, Shen, Novak, & Pan, 2009). Considering the technology integration into education in this study, the traditional and face-to-face learning environments were intended to combine with the online learning environment.

Essentially, it should not be expected that putting a new technology into class and expect it to work and make an impact instantly. It is crucial to know that the important thing is not the technology but how to integrate it to enhance learning (Reeves, 2006). Technological Pedagogical Content Knowledge (TPACK) is brought forward in this place for determining the pedagogy of a course combined with technology and courses' content.

2.4. Technological Pedagogical Content Knowledge

Integrating technology in education has been a hot research topic in recent decades. After its emergence in the literature of education in the mid 2000s, Technological Pedagogical Content Knowledge (TPACK) framework has been continuously drawing attention among educational researchers (Angeli & Valanides, 2005; Koehler, Mishra & Yahya, 2007; Tee & Lee, 2011; Semiz & Ince, 2012; Chai, Koh, & Tsai, 2013).

TPACK is originally built over Shulman's Pedagogical Content Knowledge (Shulman, 1987). In 80's, there was a shift of focus in teacher education from content knowledge to pedagogical knowledge. Firstly, it was believed that teachers should know better than students. Then, there was a tendency to concentrate on more how to teach a specific subject matter. Shulman (1987) claimed that these two

knowledge bases (pedagogical knowledge and content knowledge) should not be thought separately. On the contrary, they have mutual relationships. He proposed a theory named Pedagogical Content knowledge and defined it as "the ways of formulating and representing the subject that make it comprehensible to others" (Shulman, 1987, p.9.).

After a couple of decades, with the rapid development of technology and its indispensable inclusion to the education, Mishra and Koehler (2006) came up with a new framework named Technological Pedagogical Content Knowledge with the addition of technology domain to the pedagogical content knowledge. TPACK is a knowledge that is expected from teachers of nowadays. In this framework, technology, pedagogy, and content has both individually and in concurrently work (See Figure 2.1.).

Koehler and Mishra (2009, p. 66) define TPACK as;

"*... the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones."*

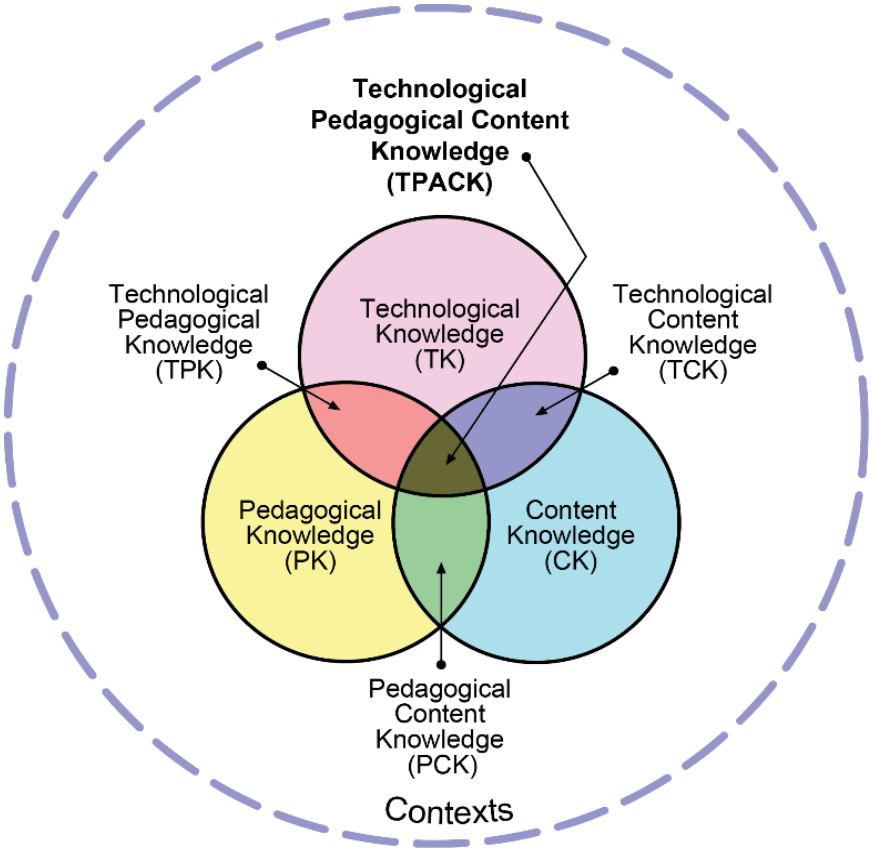

Figure 2.1. Technological Pedagogical Content Knowledge

There are fruitful of research on TPACK recently. The recent studies connected with

- Understanding the level and the perception of teachers' TPACK (Chai et al., 2013; Horzum, 2013; Lin et al., 2013)
- TPACK-based lessons (Deng & Yuen, 2013; Han et al., 2013; Mouza & Karchmer-Klein, 2013; Tokmak, 2013)
- Developing teachers' TPACK (Benson & Ward, 2013; Rienties, Brouwer, & Lygo-Baker, 2013; Canbazoğlu Bilici, Guzey, & Yamak 2016)

To evaluate teaching expertise in higher education, Benson & Ward (2013) used TPACK framework to create profiles with three university professors. With the interviews and observations, they found that technology knowledge cannot be

enough to develop a high TPACK and Knowledge Integration should be the base for Professional Development. In another research concentrated on developing TPACK skills of higher education teachers, a pre-posttest design with modules from 8 to 12 weeks was conducted with 33 academics. As a result, it was found that TPACK skills of participants increased. Institutional culture, disciplines, time investment and lastly beliefs towards employability have effects for training (Rienties, Brouwer, & Lygo-Baker, 2013). To develop TPACK within Design-Based Learning context, eight design principles were developed by Baran & Uygun (2015) and put in action with a graduate course with ten students. As a result of a thematic content analysis of reflection reports, design guides, and researcher observation notes, students offered a four-dimensional understanding of TPACK-DBL: theory-practice connection, readiness for practice, technological proficiency, and sustainable learning of TPACK. As an example for developing TPACK skills of pre-service teachers, Canbazoglu Bilici, Guzey, and Yamak, 2016 administered a case study with lessons plans and microteaching with 27 pre-service science education teachers. It was found that TPACK course was successful to develop skills for using technological tools effectively.

Yeh and his colleagues (2014) conducted research with participants of 6 researchers and 54 science-related educators. Using a Delphi survey technique, a total of 8 TPACK indicators were identified: 1. Using technology to assess students, 2. Using technology to understand students, 3. Using technology to understand content, 4. Planning Technology-infused curriculum 5. Using Physical Activity Technology 6. Using Technology integrated teaching strategies 7. Applying Technology to instructional management 8. Infusing Technology into teaching context.

To the author's knowledge, there are very limited studies related to physical education and TPACK. Firstly, in their Turkey-wide study, Semiz & Ince (2012) found that Technological Pedagogical Content Knowledge (TPACK), Technology Integration Self-Efficacy (TISE) and Instructional Technology Outcome Expectations (ITOE) of pre-service physical education teachers were at satisfactory levels, however, university instructors were not good role models in the use of

technology in their classrooms. Integration of physical education and sport-related emerging technologies were almost non-existent in the teaching practices within the university setting. Pre-service teachers were positively influenced from their university instructors' technology integration into teaching in university courses. Cengiz, (2014) conducted a 12-week intervention with 42 pre-service physical education teachers. Results showed a significant difference in CK, PK, and TPK, overall TPACK and ITOE. Arslan, (2015) examined the 108 pre-service physical education teachers TPACK competencies and found high score levels with no significant difference on gender and computer/internet background. The related studies about TPACK were listed in Table 2.3. on the following page.

Concentrating on the impact of the design, not the effectiveness of it unnecessarily in educational technology context (Russell, 1999), Design-Based Research provides flexibility and opportunity to implement technology-enhanced solutions, which is included at the beginning of the method part in next chapter.

Table 2.3. Studies related with TPACK

Author(s)-Year	Purpose	Participants	Data Collection Tools	Findings
Benson & Ward (2013)	Evaluating teaching expertise in higher education with creating TPACK profiles	3 university professors	Face-to-face interviews, observations	High TK is insufficient for developing TPCK, TPCK is leads to high PK, Knowledge Integration should be base for Professional Development
Rienties, Brouwer, & Lygo-Baker, (2013)	Developing TPACK skills of higher education teachers with an online training program.	33 academics	Teacher beliefs and intentions questionnaire	TPACK skills of academics were increased.
Yeh, Hsu, Wu, Hwang, & Lin (2014)	Organizing a research panel and an expert panel to propose and validate the framework of TPACK-practical	6 researchers and 54 science-related educators	Delphi survey technique	Eight knowledge dimensions of teachers' TPACK-practical in five pedagogical areas were proposed
Baran & Uygun, (2016)	Develop a TPACK-based Design Based Learning approach	10 graduate students	Reflection reports, design guides, and researcher observation notes	Acceptability and ease of use rates were high, and wear related concerns were low. The young participants with higher education background found that the GPS device made the study interesting.
Canbazoğlu Bilici, Guzey, & Yamak (2016)	Assessing pre-service science teachers' TPACK in a semester-long intervention	27 pre-service science teachers	TPACK-based lesson plan assessment instrument (TPACK-LpAI) and TPACK Observation Protocol (TPACK-OP)	Intervention had an impact and helped teachers gain knowledge of effective usage of educational technology tools.

CHAPTER 3

METHOD

The third chapter begins with providing information about the research design. Then the HRF course in METU context will be explained in detail before the re-structuring process. Continuing with an overview of the procedures of the design and TPACK-based HRF course, the chapter will be finished with data sources, reliability issues and data analysis, instruments and limitations.

3.1. Research Design

To understand the design elements and the impact of a technology-integrated HRF course, the re-structuring process of the instructional design should be focused. Providing opportunities to form, develop, change, and implement the instructional designs over one another, Design-Based Research (DBR) was selected as a research design for the current study. Starting from the real life teaching and learning problems, DBR offers for creating and implementing solutions in an iterative process of changing and improving until the design evolved into a satisfactory phase (Reeves, 2006).

3.1.1. Design-Based Research

As creativity and innovation are the must have skills for 21st-century people, teachers should always be in search of effective teaching practices with technology. When they considered those new practices worth to try, they surely should experience it. What if it would not work well? Should they go back to their old practices they were used to and feel safer? Or should they move on with improvements and solutions for the problems that they were faced with? These efforts to implement solutions, learn from them, and make changes over and over again called learning by design or

Design-Based Research. Reeves (2006) emphasized one of the primary advantages of Design-Based Research as follows:

"… it requires practitioners and researchers to collaborate in the identification of real teaching and learning problems, the creation of prototype solutions based on existing design principles, and the testing and refinement of both the prototype solutions and the design principles until satisfactory outcomes have been reached by all concerned."

(Reeves, 2006, p. 59)

The Design-based research is defined as "an emerging paradigm for the study of learning in context through the systematic design and study of instructional strategies and tools." (Design-Based Research Collective, 2003, p. 5). As it can be seen the figure 2.2 below, design-based research starts with an analysis of practical problems and continues with solutions and refinements of these solutions until the enhanced solutions implemented. It is an iterative process and can repeat the cycles as needed.

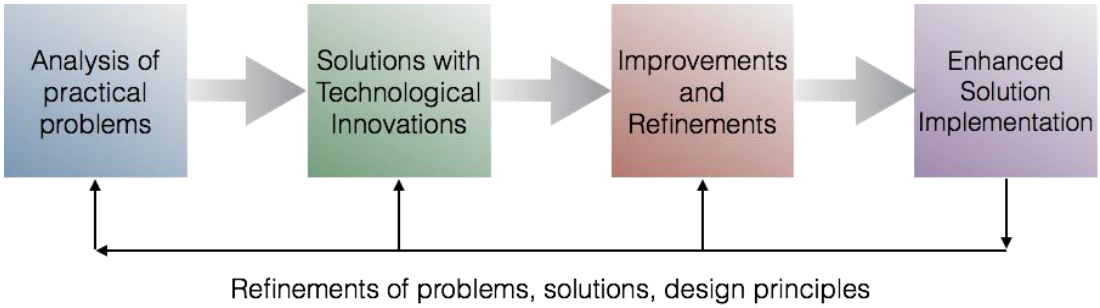

Figure 2.2. Design-Based Research (Source: Reeves, 2006, p. 59)

In effort to understand the online instruction without decreasing the quality of delivering the course, researchers have an ongoing interest on DBR (Barab & Squire, 2004; Shattuck & Anderson, 2013).

Leading the field based problems that an instructor was faced with; the current research was concentrated on re-structuring the instructional design of a HRF course.

The main focus is offering solution-oriented approaches with TPACK perspective to instructor's problems and investigating the impact of the design on students and instructor. This instructional design will lead the way for its counterparts, as it will represent an example for the HRF courses that have technology integration needs.

To be able to understand such perception and experience throughout the re-structuring process of an instructional design, Design-based Research (DBR) was thought to be the most fitting method whilst it has been projected as an emerging paradigm in the last decade to understand the instructional strategies and tools in a learning context with systematic iterative designs (Design-Based Research Collective, 2003; Reeves, 2006; Teras & Herrington, 2014). During these iterations, there are certain decisions to be made to form, improve, change, and apply the instructional designs over one after another semester respectively. The design elements emerge during and after this process (Van den Akker, et al., 2006). The literature portrays two general types of Design-Based Research (Richey, Klein, and Nelson, 2004; Wang & Hanafin, 2005). In Type I DBR, activities are performed to evaluate a specific product or a program design. On the other hand, a Type II DBR focuses on the design, development, or evaluation processes. Therefore, with a purpose of determining design principles and understanding their impact on the teaching and learning practices, this study can be categorized as a Type II DBR.

Additionally, with the focus on understanding the impact of an instructional design on students and the teacher, this study is a qualitative study in nature. In an attempt to answer questions about participants and context, understanding the participants' perspective, and in-debt analysis of an unknown phenomenon, qualitative research is considered very useful (Patton, 2002).

A question can be asked like why not experimental design? With regard to educational technology research, a debate was emerged as Russell (1999) published his highly mentioned book "No Significant Difference Phenomenon." Investigated 350 studies related to distance education, it was stated that researches emphasized equivalent, non-significant or even negative findings. This leads arguments about

comparison studies in the educational technology field. For instance, Dede, Whitehouse, & L"Bahy (2002) stated that studies which compare one single medium and traditional class could not be thought without the exception of no significant difference phenomenon. Also, Palloff & Pratt (2007) reported in their study that if online technologies integrated to a course, it changes the course environment since its unique characteristics hence make it questionable to compare two different environments. Therefore, using DBR to focus on the instructional design was thought to be more appropriate instead of using an experimental group to compare traditional class.

3.2. The Course: Health-Related Physical Activity Course

The Health-Related Fitness course that was mentioned to be integrated with technology was normally designed to make university students familiar with fundamentals of health, wellness and fitness concepts. The name of the course is Health-Related Physical Activity Course. There were 8 main intended outcomes for the course:

1. Understand the relation between health, wellness, and physical fitness.
2. List the fundamentals of health-related physical fitness.
3. Comprehend the basic anatomy, exercise physiology, and exercise psychology knowledge.
4. Practice and evaluate the health-related physical fitness tests.
5. Choose correct methods to improve physical fitness based on personal needs.
6. Practice different physical activity choices.
7. Be a critical consumer of physical education and sport.
8. Appreciate the physical fitness and healthy lifestyles.

When looking the intended outcomes and topics in tentative schedule that are given below, it is understood that the Health-Related Physical Activity course is met with the suggestions of Society of Health and Physical Educators (SHAPE) for Instructional Framework for Fitness Education in Physical Education (2012), which

are Technique, Knowledge, Physical Activity, Health Related Fitness, Responsible for Personal and Social Behaviors, Values and Advocates, Nutrition, and lastly Consumerism.

The distribution of the topics through the semester as follows:

Table 3.1. *Completed Schedule*

Weeks	***Topics***
1	First Meeting-Registration
2	Introduction to health, wellness and fitness (Classroom) Guidelines for physical activity (GYM)
3	PRE-TEST (GYM) Fundamentals of physical fitness and evaluation of pre-test scores (Classroom)
4	Body composition evaluation. Physical activity for weight management (GYM) Discussion on body composition and weight control (Classroom)
5	Testing aerobic fitness. Physical activity for cardiorespiratory fitness (GYM) Discussion on cardiorespiratory fitness and exercise physiology (Classroom. & Lab)
6	Testing muscular endurance. Physical activity for muscular fitness (GYM) Discussions on muscular fitness and basic human anatomy (Classroom)
7	Testing flexibility. Physical activity for flexibility (GYM) Discussions on flexibility and low-back fitness (Classroom)
8	Physical activity for general physical fitness (GYM)
9	Development of exercise programs for body composition (GYM) Physical activity for body composition (GYM)
10	Development of exercise programs for cardiorespiratory fitness (GYM) Physical activity for cardiorespiratory fitness (GYM)
11	Physical activity for cardiorespiratory fitness (GYM) Development of exercise programs for muscular fitness (GYM)
12	Physical activity for muscular fitness (GYM) Development of exercise programs for flexibility (GYM)
13	Physical activity for flexibility (GYM) POST-TEST (GYM)
14	Semester review (GYM)

The portfolio items are

1. Health Status Questionnaire
2. Family Health Portrait
3. Functional Status Worksheet
4. Lifestyle Worksheet
5. Resting Heart Rate and Blood Pressure
6. Body Mass Index and Waist to Hip Ratio
7. Body Composition (Fat Ratio) Measurements
8. Calculating Target Heart Rate Zone
9. Nutritional Assessments
10. Physical Activity Behavior (IPAQ, PASC-Q, PA Preferences)
11. Pre-tests and Post-tests (Sit & Reach, Push-up, Sit-up, 20m shuttle run)
12. Personal Training Programs for each HRF Component
13. Proof of an extra-curricular physical activity participation related to the course content during the semester

3.3. Design Principles and Procedures

With the possibility of the other characteristics might be recognized in different research findings, a total of five principles derived from the literature are considered the most decisive components for restructuring a university health-related physical activity course with technology. Those are Offering Differentiated Learning (1), Data Management with Technology (2), Providing Classroom Management with Technology (3), Using Physical Activity Technologies (4), and lastly Creating Opportunities for Collaboration with Technology (5). Hence, the course was re-designed and implemented according to these principles.

The first principle is offering differentiated learning. Technology integration can help teachers to differentiate or individualize the learning process according to the learners' readiness level and personal need (Harris, Mishra, & Koehler, 2009; Davies, Dean, & Ball, 2013). Relevant technologies chosen for certain pedagogical

purposes allow teachers to understand each individual with critical feedbacks. For example, Rosen and Beck-hill (2012) investigated the effects of a comprehensive teaching and learning one-to-one computing environment on a total of 476 4th and 5th-grade students. They found a positive impact on differentiating in teaching and learning, achievement on math and reading, and decreased disciplinary actions.

The second principle is data management with technology. Students gave value to learning management systems as they can monitor and control their educational progress (Chung & Ackerman, 2015). For example, Dias & Diniz, (2014) investigated 36 undergraduate students in Portugal to identify their learner profiles in a blended learning environment with LMS. They found that students valued mostly content repository feature of the LMS as a potential strength. They gave importance to LMS as it involves documents, slides, study notes, and subject contents.

The third principle is providing classroom management with technology. Educational technology skills are directly related to classroom management skills in literature (Varank & Ilhan, 2013; Bester & Brand, 2013). Technology affects classroom management in some ways as computing grades, tracking attendance, communicating with students, storing course related contents, etc. (Emmer, Sabornie, Evertson, & Weinstein, 2013).

The fourth principle is using physical activity technologies. There are lots of emerging technologies that can be used for promoting physical activity. Pedometers (Cayir, Aslan, & Akturk (2015), physical activity trackers (Diaz et al., 2015), heart rate monitors (Ignico & Corson, 2006), etc. For example, in a current study, a total of 64 free and paid applications promoting physical activity were downloaded from Itunes and Google Play and reviewed. Behavior change techniques such as self-monitoring, providing feedback on performance, and goal setting was offered most (Middelweerd, Mollee, van der Wal, Brug, & te Velde, 2014).

The fifth principle is creating opportunities for collaboration with technology. Working together for improving and gathering knowledge via technology has a great

potential (Goodyear, Jones, & Thompson, 2014; Carroll, Diaz, Meiklejohn, Newcomb, & Adkins, 2013; Junco, Elavsky, & Heiberger, 2013). Learning Management Systems also enable instructors to present course-related information to students and let them engaged in forums, discussions, chats, etc. (Romero, Ventura, & García, 2008). For instance, Islam (2014) investigates the satisfying factors of using a learning management system in Finland with 166 educators and 148 students. Educators and students identified ease of knowledge sharing and retrieving as a top satisfying factor. Whereas, sharing news and discussion forums mostly used by educators, checking the course specific content and discussion forums again mostly used by students.

As Design Based Research is an iterative process, this long-term research was spread out to five phases/semesters. These phases have formed, improved, changed and applied over previous phases respectively as it can be seen in Figure 3.1. The procedures for each phase explained as follow:

1st Phase: During the 2012-2013 Spring Semester, Health-Related Physical Activity course was observed in depth with attending all classes as a course assistant. The problems about functioning of the class that were faced were noted.

2nd Phase: During 2013-2014 Fall Semester, Facebook was used as a medium to try to communicate with students and to share podcasts, videos, and course-related information. A tablet PC with a classroom management application was used for the first time.

3rd Phase: During 2013-2014 Spring Semester, using one hub/place to share all sources not to lose the attention of students and not to make them tired, it was decided to use a Learning Management System, which is a Moodle-based web site. An online hub for the course was created in LMS. All the hard-copy forms of the course were digitalized within this hub. One lab class was recorded with the camera and shared with students with this hub. Also, an introduction video for the course was shared. Mobile application for physical activity tracking with GPS was used.

4th Phase: During 2013-2014 Summer School, forum feature was used more efficiently as "meet and greet" topic was launched at the first week that course participants explained and introduced themselves. Mobile application for classroom management was used more active and also more applications that are available for students who have smartphones were suggested. Interviews were done with five students and course instructor.

5th Phase: The TPACK-based instructional design was applied this semester, which was developed over previous semesters. Webinars were administered with small groups divided according to their physical activity levels.

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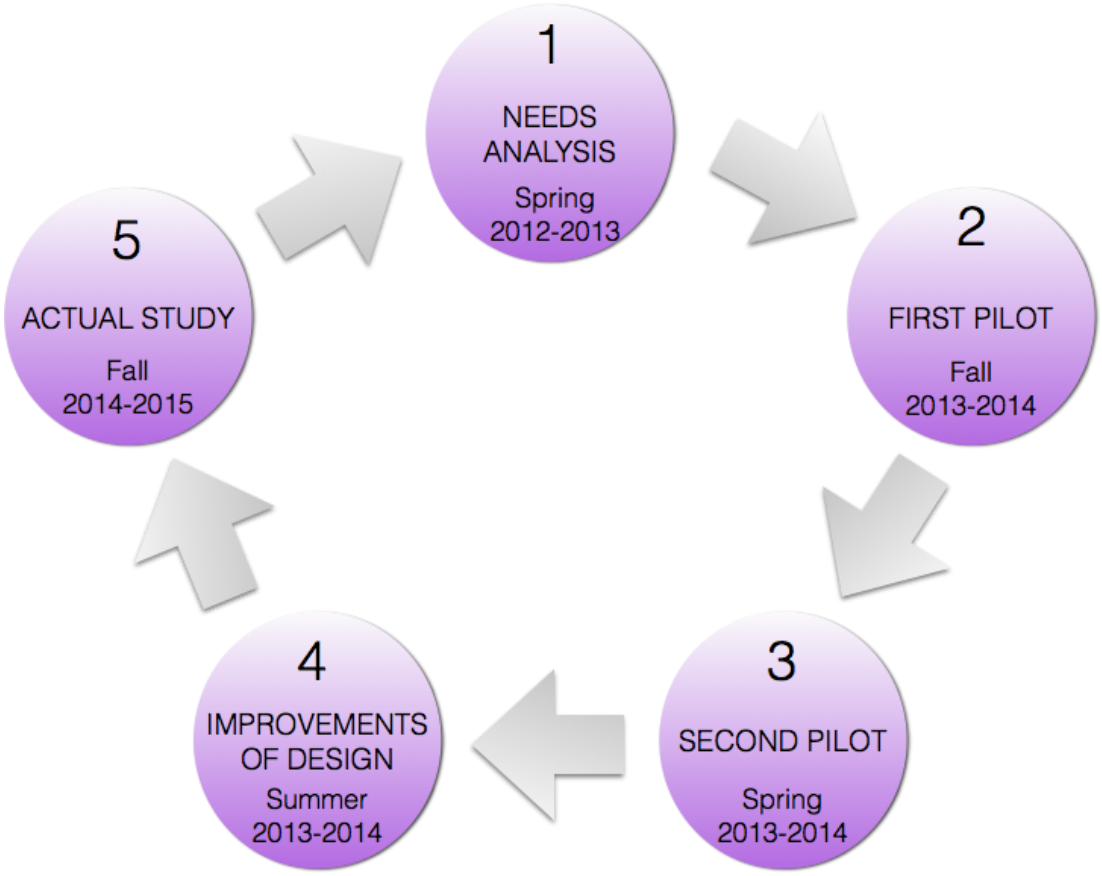


Figure 3.1. Cycle of Research

All 5 phases/semesters can be seen on table 3.1 on next pages with data collection procedures and data sources.

Table 3.2. *Phases of the study*

Semester Details	***Phases***	***Procedure***	***Data (Number of Documents)***
2012-2013 Spring Semester	Needs Analysis	Observation of the learning environment and determining the course related problems	Field notes (1), Expert opinion (1)
2013-2014 Fall Semester	First Pilot Study	Testing Facebook as a course medium, online collaboration, podcasts and online videos. Tablet PC for the instructor.	Field notes (1), Instructor Reflections (1)
2013-2014 Spring Semester	Second Pilot Study	Testing LMS as a course medium with digitalization of course materials. Recording and sharing lab sessions. Mobile application for students.	Field notes (1), Instructor Reflections (1)
2013-2014 Summer School	Improvements of Design	Refinements of the course design with adding online communication and collaboration. Exergaming (XBOX).	Instructor Reflections (1), Instructor Interview (1), Student Interviews (6), Student Open-ended Online Surveys (12)
2014-2015 Fall Semester	Design Implementation	Improved LMS ınterface. Heart-rate monitors & accelerometers. Webinars. Class videos.	Field notes (1), Instructor Reflections (1), Students Reflections (3), Student Interviews (6)

3.4. Participants and Data Sources

The instructor who has 20 years of field experience teaches the classes. The students from variety of departments with different backgrounds have taken the course as an elective:

Phase 1: 1 section: 34 participants (18 males, 16 females)
Phase 2: 1st section: 21 participants (13 males, 8 females)
2nd section: 23 participants (14 males, 9 females)
Phase 3: 1st section: 22 participants (10 males, 12 females)
2nd section: 28 participants (16 males, 12 females)
Phase 4: 1st section: 25 participants (21 males, 4 females)
Phase 5: 1st section: 24 participants (11 males, 12 females)
2nd section: 24 participants (11 males, 13 females)

Throughout five semesters, a total of 201 university students (131 males, 70 females) participated in the study. With the convention of research ethics about participants, the real identities were confidential within this research. Pseudonyms were used to protect the rights of the participants in texts and pictures. The researcher was the assistant for the first four semesters. Only the last semester, there was one more course assistant. Hence the researcher concentrated on the video recording of the classes as a participant observer.

3.5. Data Collection

In an attempt to answer the research questions, the data sources that were selected and their reliability, validity and trustworthiness issues are presented in Table 3.3. Concerning educational matters, the process of the education was investigated instead of a final product that gave students a final grade (Summative Assessment). The portfolio file was changed, divided and distributed to the whole semester. Hence, Formative Assessment was used in this study. In formative assessment, which is considered as assessment for learning, it is focused on the educational

process as improvement of student learning and achievement (Black & William, 2006).

Qualitative Research is a kind of storytelling. Therefore, the main source of data collection was the researcher as it was defined *"researchers are the research method"* (Patton, 2002, p. 164). Along with instructor and students, experts were the data sources. Researcher's field notes and reflection reports, interviews with instructor and students, and expert opinions documents were the general instruments in the current study.

Expert Opinions: At the beginning of the study (1st phase), doctoral committee members and some colleagues were asked to give feedbacks.

Field Notes: Field notes are the researcher's feelings and observations according to the real life experiences about a specific subject (Patton, 2002). It contains what's happening in the observed setting (field) and explains what does it mean in the eyes of the researcher. In the current research, there is a total of 4 field notes, from 1st, 2nd, 3rd, and 5th phases.

Reflection Reports: Reflections provides information about how people's background, concerns, and interests affect a process at different stages (Litchman, 2013). Discussions with Instructor were utilized and noted as Instructor's reflections in this study. In the current research, there is a total of 4 reflection reports form instructor from 2nd, 3rd, 4th and 5th phases. Also, three student reflections were included in 5th phase.

Interviews: Allowing us to understand other person's perspectives and perceptions about issues that cannot be observed, interviews help to understand the meaningful knowledge out of experiences in a social context (Patton, 2002). Interviews with the instructor (2) and various students (12) in different 4th and 5th phases were done.

Open-ended Survey: With using e-mails, open-ended questions sent to students on summer semester. Of the 25 students, 12 of them returned.

3.6. Data Analysis

To understand the design and the impact of technology-enhanced HRF course, analysis of qualitative data of the study was administered with QSR NVivo 11 software. Throughout the five phases of the study, the researcher collected qualitative data and managed it with this software.

All the data documents analyzed with thematic analysis approach, which is explained by Willig (2013, p. 178) as a *"method for recognizing and organizing patterns in content and meaning in qualitative data."* Various descriptive codes were identified within these data documents. The codes assembled into categories and sub categories, which lead them to themes. In the end, certain themes were emerged for answering research questions.

3.7. Issues of Trustworthiness

Both the data triangulation and the investigator triangulation were used to provide trustworthiness in this research. In order to triangulate the findings, varieties of sources were used for data collection. With regard to quality and accuracy of the data that was gathered, data triangulation was used with combining different data sources in an attempt to answer research questions in a consistent manner. Patton (2002, p.554) indicates data triangulation as *"comparing and cross-checking the consistency of information derived in different times and by different means."* Those are expert opinions, interviews with instructor and students, researcher's field notes, instructor and students' reflections, and students' open-ended surveys derived from different times throughout five different time periods (phases as researcher dubbed it). For the investigator triangulation, the researcher had continuous discussions and negotiations with another specialist in the physical education field to create and refine the codes separately and then together. The data reviewed line by line and eventually certain themes were emerged with mutual understandings.

3.8. Limitations

In qualitative research, the researcher bias is considered as one of the main threads to the studies. In the current research, this thread was decreased to the minimum with implementing the triangulation technique to analyze the data. Another thread in qualitative research is researcher might be perceived as intrusive and disruptive from the participants, and the environment can be effected with this situation. The researcher was the course assistant throughout the five semesters as a role of participant observer. According to the reflections with instructor, students were thought to embrace the researcher as a natural part of the class (Creswell, 2014).

The findings of qualitative research can represent only a small part of a context and cannot be generalized to the population. The focus of qualitative research is transferability, rather than generalizability, essentially. Whether the findings of a certain research could be applied to different settings. The strength of this type of research is it helps to understand in-debt of a phenomenon (Patton, 2002). Being a longitudinal research spread out over five semesters, repeated interviewing with the same person (instructor) threads the study as changing his behavior, yet it gives an in-depth and comprehensive understanding of the process (Creswell, 2014).

3.9. Researcher's Role

Developing the standards of excellence with technology for students, teachers, administrators, coaches, and computer science educators, the International Society for Technology in Education (ISTE) defines the skills, knowledge and goals for teaching and learning with technology (ISTE, 2015). Being as a technology coach, researcher acted in the current research according to second standard of ISTE Standards for Coaches; which is "Teaching, Learning, and Assessments":

"Technology Coaches assists teachers in using technology effectively for assessing student learning, differentiating instruction, and providing rigorous, relevant, and engaging learning experiences for all students. "(ISTE, 2015).

In the current research, for the needs of a university physical education instructor in Turkey to transform his lesson into a more effective form, researcher generates a variety of solutions by employing different instructional approaches integrated with technology.

The researcher, who was a Ph.D. candidate during the data collection, firstly observed the field and took notes for the problems that the instructor was confronted. Beginning with a needs analysis, the university HRF course was restructured in line with the problems. The researcher was responsible for monitoring and recording the class, taking notes about the whole instruction processes, conducting interviews, collecting and analyzing the data. The instructor was assisted and supported by the delivery of a technology-oriented environment. There was no involvement from the researcher into any instruction processes throughout the semesters.

Table 3.3. *Data sources and reliability issues with analysis for each research question*

Research Questions	Data Sources	Trustworthiness	Analysis
1. What are the design principles for re-structuring a university HRF course with technology?	Field Notes, Interviews, Reflection Reports	Data Triangulation Investigator Triangulation	Thematic Content Analysis
2. What were the challenges when restructuring the university HRF course with technology?	Field Notes, Interviews, Reflection Reports	Data Triangulation Investigator Triangulation	Thematic Content Analysis
3. What was the impact of re-structuring the university HRF course with technology on students and instructor?	Field Notes, Reflection Reports, Interviews	Data Triangulation Investigator Triangulation	Thematic Content Analysis

CHAPTER 4

RESULTS

The results chapter presented the three research questions under two topics: Design and Impact of technology enhanced HRF course. While design part includes the process of restructuring the HRF course and first two research questions, the impact part is consisted of the last research question.

4.1. Designing the Technology Enhanced HRF Course

The first part of the study concentrated on the design of technology enhanced university physical activity course.

4.1.1. Research Question 1

What are the design principles for restructuring university HRF course with technology?

The technology integration actions during the instructional design process of this research outlined certain principles within university health-related fitness context. According to the literature, a total of five principles considered the most decisive components for restructuring a university health-related physical activity course with technology. Those are Offering Differentiated Learning (1), Data Management with Technology (2), Providing Classroom Management with Technology (3), Using Physical Activity Technologies (4), and lastly Creating Opportunities for Collaboration with Technology (5). After the re-structuring process, this new instructional design dubbed as TE-HRF (Technology Enhanced University Health-Related Fitness) course (See Figure 4.1 below).

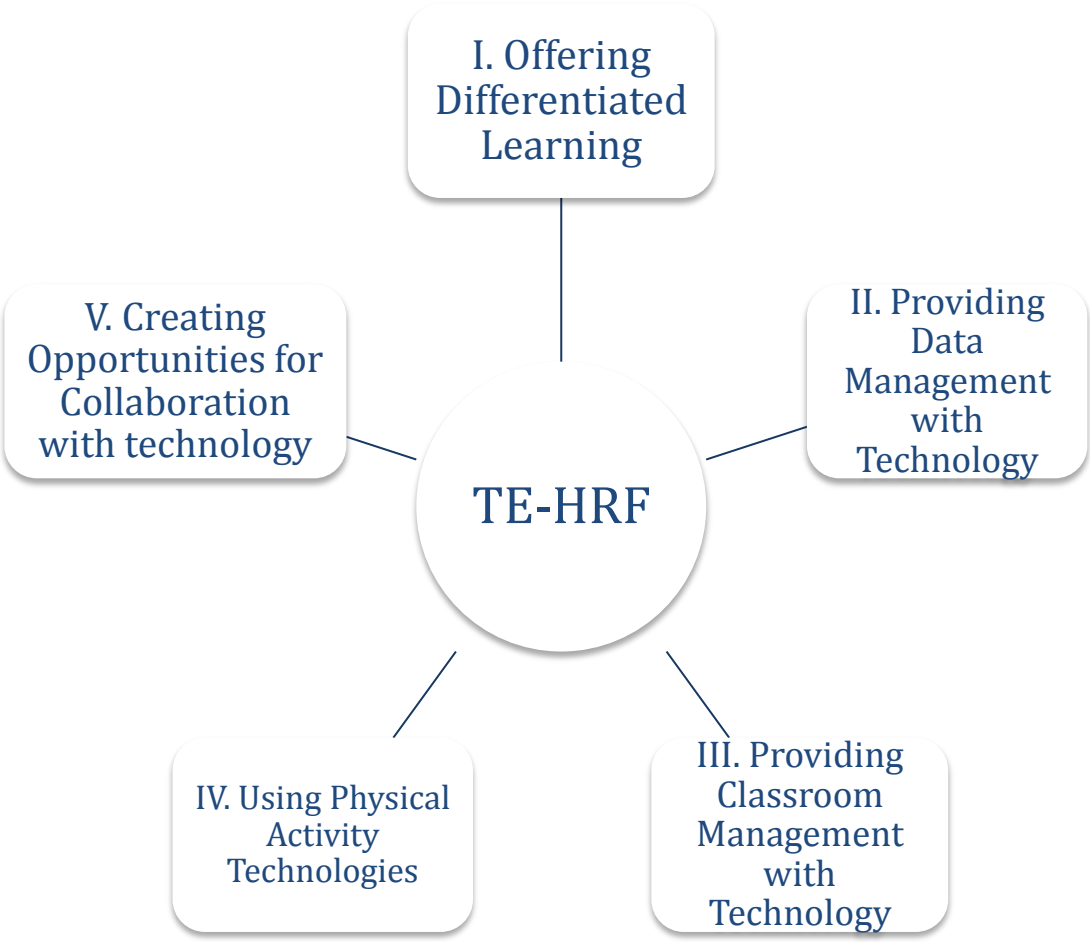


Figure 4.1. Design Principles

Beginning with the spring semester of the 2012 - 2013 academic year (Phase 1), re-designing process of the Health-Related Physical Activity course with technology had taken a complete five semesters through the end of the fall semester of the 2014 – 2015 academic year (Phase 5). After the needs assessment in the first semester, those five design principles were applied from 2nd semester to the end of the 5th semester. Throughout this time, certain decisions had taken into consideration according to the needs and perceptions of the instructor and the students under four main steps (Figure 4.1). The course activities were thought, created, and matched with those five design principles as mentioned below. Each course activity includes at least one design principle. Those are, using pedometers, accelerometers, mobile

applications, heart rate monitors, and exergaming (1), integrating online sources and videos (2), Using online portfolio home works / assignments (3), and lastly, using webinars and online discussion forum.

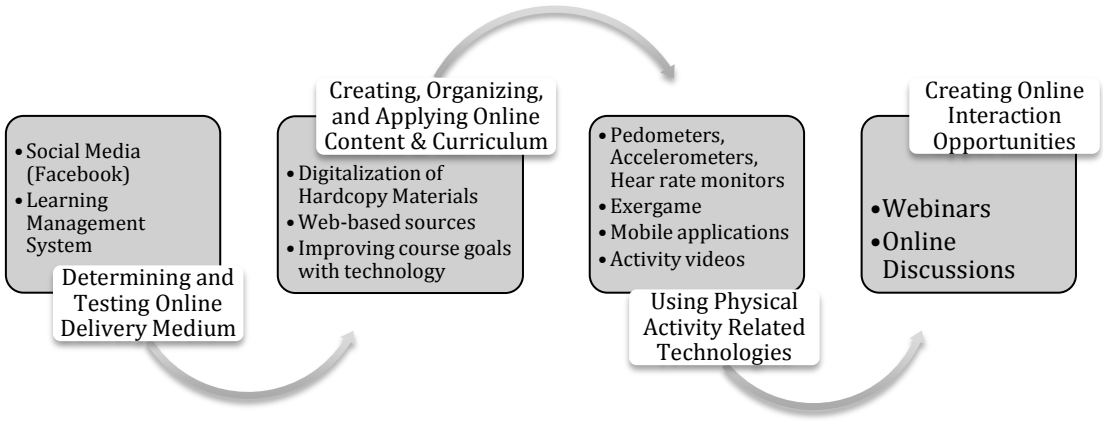


Figure 4.2. Design Elements

Phase 1 – Spring 2012-2013

The class was consisted of 34 students (18 males, 16 females). Being assisting the instructor, the researcher took field notes for the problems that instructor and students were faced. These problems were the starting point (1st phase) of this research, which will be mentioned in further pages. These problems were categorized for both students and the instructor:

For the students:

1. Approximately, an average of 150 students apply for taking the course at the beginning of every semester, which has a quota for 32 students.
2. Even though it is a requirement, most of the students do not take their portfolios back at the end of the semester, which has a potential for kind of a personal health file that can be used lifelong.

3. Due to some reasons like the specific environment of the gym and time limitation, the students were observed to have limited collaboration and communication, especially in sharing experiences and knowledge levels.
4. Attendance for the lesson is recorded with an attendance sheet, which is given to the students for their signature. There is an expectation for this process to be improved.
5. Students sometimes can be confused about the place that day of the classes is: gym, lab or classroom.
6. The ways to contact the instructor for questions are limited. Therefore, sometimes students can have nervous moments about the course such as the exam content and types.

For the instructor:

1. There is excessive paper consumption for examinations, surveys, handouts, and portfolios.
2. Managing the materials of the students' needs lots of time and space.
3. Punctuality for the attendance to class is not strict; sometimes this can cause functioning issues like the flow in the class.
4. Due to some reasons like the workload, age and becoming acquainted with too many students after years, the instructor has difficulty in learning the names of each student.
5. Even though the lesson creates highly individualized learning opportunities, most of the times some noteworthy feedbacks cannot be given to every individual due to the flow of the class and limited time.
6. Since the high number of demands from students, the classes tend to be oversized.
7. Students could occasionally lose their course materials, handouts and home works since they are handed out in gym or lab sometimes.

The need for technology integration to solve certain problems of the instructor has emerged in this phase:

"In past, I tried to learn every student's name. But now, it became exhausting. However, if I had a technology that it has ability to visually relate each student, I can use it automatically when I needed."

Instructor's Reflections, 21.08.2013

The instructor has hesitations with regards to missing certain feedbacks due to heat of the class:

"After a while, you became automatic, you gave feedbacks that you saw. The ones that you did not see or you think giving some but you won't. Why not giving feedback because I am not walking around with pen and paper? And I do not recognize the student. Then I could not record it. It cannot without a name or another thing like what s/he wears. At this case, if there would be a visual technology, I can take notes when I see things, like specialized content knowledge, and I can give feedbacks to each of them. "

Instructor's Reflections, 21.08.2013

An expectation for online platform to be integrated into the course had emerged within time as instructor mentioned the exhaustion and boredom about lecturing:

"I get bored to do lecturing. I do lecturing for 5 hours. It's meaningless. On the other way, you shall tell just check this, read the questions and come again, with only 5 minutes lecturing, right? "

Instructor's Reflections, 21.08.2013

How can these issues be improved with technology? These are the focuses of this restructuring process. Planning the course with technology is the main issue, which was pointed by the experts:

"Technology is good or not? This is not the case. Technology integration in physical education is the point."

Expert Opinion, 21.08.2013

The instructor reflects the similar topics with the researcher's observation as he mentioned the importance of feedback:

"Giving lectures at the right time is important, while wearing the shoes in the gym is meaningful. It is like ceasing the runners and measuring their heart rates. So if it can be prepared with videos and let students watch it before class, it would be meaningful. Meeting the students with correct feedbacks is very crucial."

Instructor's Reflections, 23.09.2013

The paper consumption and managing all the course materials were also another issue:

"We are consuming too much paper. Managing this much paper also very difficult. I am sick of storing the portfolios in my room. May be students happy with those handouts, photocopies, etc. May be when they are digitalized, the filling rates would be lower. This can be a drawback."

Instructor's Reflections, 23.09.2013

With all the information collected through the field notes, expert opinion and instructor reflections, redesigning the course was at stake. However, instructor stated his need of help in that process:

"The situation right now requires the course to be re-designed. Actually, every instructor in the university should have a technology supervisor. I mean, it is kind of person who helps to design technology integrated courses. There is no chance for following the emerging developments in the instructional technology area."

Instructor's Reflections, 03.10.2013

As the course outline needed to be examined according to the needs, an important suggestion had to be taken into consideration:

"In-debt study of a design is the point. What happens if the classroom ecology is changed when designing the class with technology? Affordances of technology should be considered for the certain pedagogy and content. In order not to overload the instructor and the students, all the interaction should be given within one medium/environment."

Expert Opinion, 28.11.2013

Through the end of the Spring 2012-2013 semester, it was most likely an issue to find a medium for the course. Middle East Technical University already has an online aid tool for instructors and students. Its name was metuonline. However, neither students nor instructors like it and use it properly (Cirit & Gumusok, 2013). Although it has other features like forums and blogs, nobody uses them. Instructors mainly use metuonline for sharing the PowerPoint slides or some documents of the courses. After searching to find an appropriate delivery medium for the course, the researcher decided to use Facebook. Instead of getting the students to the delivery medium of the course, bringing the course related materials to where they already are (Facebook) looks easier (Wang, Woo, Quek, Yang, & Liu.; 2012). However, Instructor's perception is also an important issue to consider as he expressed his expectations to be motivated and supported:

"You know that I do not use Facebook effectively. But you suppose that I will use communication technology. Do you think I am trainable? Motivating and helping the instructor is very important."

Instructor's Reflections, 28.11.2013

Phase 2 – Fall 2013-2014

A total of 44 students within two sections joined the class in this semester. The first section had 21 students (13 males, 8 females), and the second section had 23 students (14 males, 9 females). The researcher had a teaching assistant role.

A Facebook Group for the Health-Related Physical Activity course was created. All the students enrolled the group very quickly. In general, I received positive reactions from the students with regards to Facebook Group. Students asked questions through Facebook and got their answers. The questions were about: classroom attendance, mid-term, location of the classes, the content of the class, and home works. Before the physical activity classes, I shared the activity, which will be the content of the day, as videos. All of the students saw it as Facebook reports. I used podcast (short sound recordings) to let the students know about the mid-term exam content and type. All of the students saw it, and I received positive feedbacks about it as a teaching assistant. Students said it helped a lot to understand what is waiting for them in the exam paper (See Figure 4.1.). Instructor's reflection was also parallel with researchers' field notes:

"I had positive feedbacks about podcasts. Lots of students find answers in it about the exam."

Instructor Reflections, Fall 2013-2014

With acknowledging all the benefits of it, instructor still seemed little bit insecure and unsatisfied about the social media involvement in the course:

"I am not comfortable with using Facebook. I'm also not an effective user, and I think it's a little bit informal."

Instructor Reflections, Fall 2013-2014

The instructor held back from the Facebook, and the teaching assistant generally lead the course-related sharing.

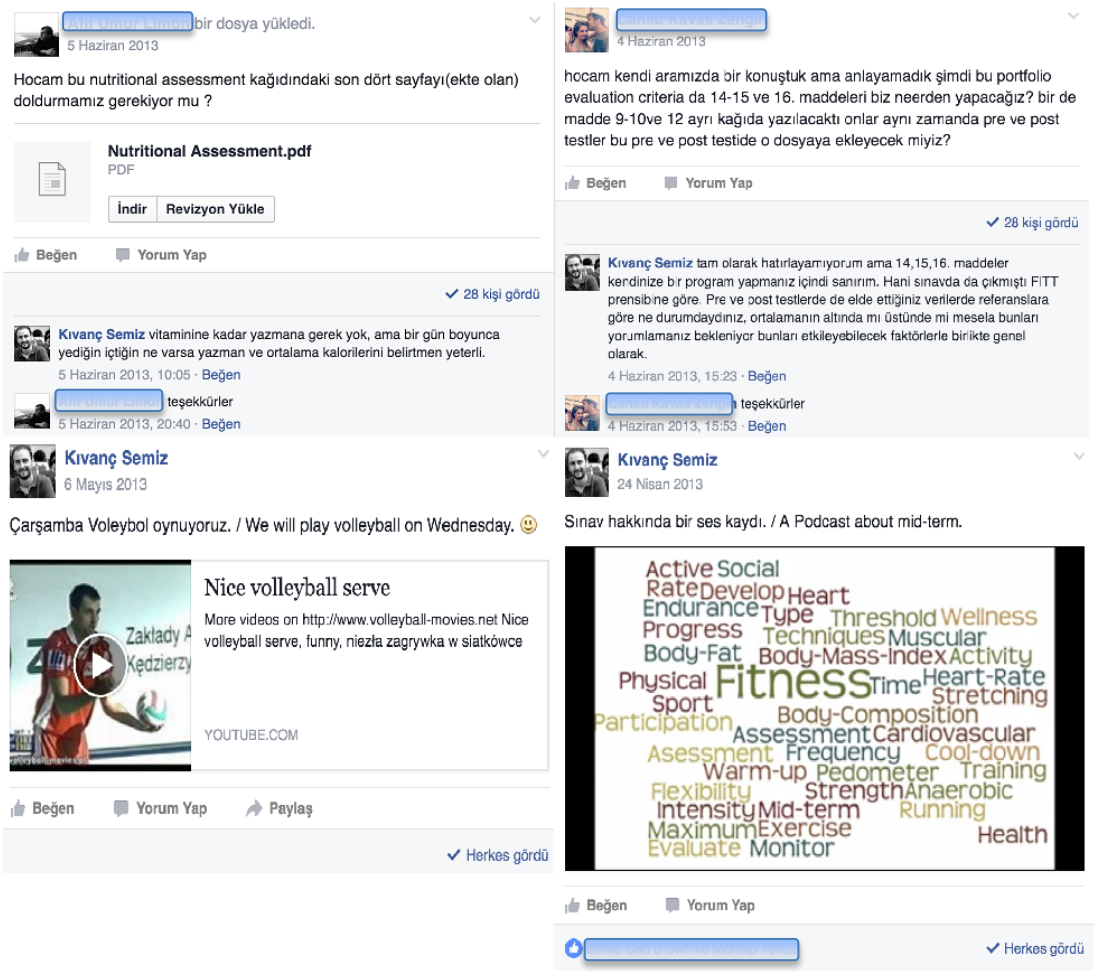


Figure 4.3. Facebook Group for Spring 2013-2014

With the need for digitalizing of the course materials and sharing them through a more formal delivery medium, I decided to leave Facebook. Through the end of the same semester, Middle East Technical University started to test a new Learning Management System (LMS), which is a Moodle-based tool. This tool gives the opportunity to digitalize the course materials and create a course on LMS.

This semester was the first attempt for the new design. However, eventually, a need for the second pilot study was emerged with the new course delivery medium.

Table 4.1. *Phase 2 Course activities with design principles*

Design Principles	**Course Activities with technology**
1. Offering Differentiated Learning	
2.Providing Data Management with Technology	Using Facebook as a course medium
3. Providing Classroom Management with Technology	Sharing web-based sources
4. Using Physical Activity Technologies	Using pedometers
5. Creating Opportunities for Collaboration with Technology	Using Facebook as a course medium

Phase 3 – Spring 2013-2014

In this semester, a total of 50 students enrolled the course under two sections. While the first section had 22 students (10 males, 12 females), the second section had 28 students (16 males, 12 females). The researcher had a teaching assistant role again.

Before the beginning of the Fall 2013-2014 semester, researcher digitalized the portfolio materials on LMS. The portfolio is consisted the 40 % of the course grades, and it is required from the students to prepare it at the end of the semester. However, with digitalizing the course materials and going week by week changed the focus of the evaluation from summative to formative. Prepared as weekly home works, these online forms spread out to the related topics in the syllabus. Tentative Schedule was prepared and related weeks were created on LMS (Table 4.2.). Physical activity related technologies also became an important facet of the course as a mobile GPS tracking application (Endomondo) and exergaming (XBOX Kinect) added to the course activities besides pedometers. Since the technology became an important part of the course, the instructor improved the course goals as he added the competency for the use of fitness-related technologies to the syllabus. The outcomes and the related activities matched with the TPACK indicators (Yeh, et al., 2014) in Table

4.1. to be sure about the course is being redesigned according to certain pedagogical strategies aligned with appropriate technologies to teach health-related fitness. The interface of the LMS can be improved for the upcoming semester (See Figure 4.3.).

Table 4.2. *Phase 3 Course activities with design principles*

Design Principles	**Course Activities with technology**
1. Offering Differentiated Learning	Online Assignments on LMS
2.Providing Data Management with Technology	Using LMS for the course medium
3. Providing Classroom Management with Technology	Using LMS for the course medium, Digitalization of the hardcopy materials,
4. Using Physical Activity Technologies	Using pedometers, mobile app (endomondo), Exergaming (XBOX Kinect)
5. Creating Opportunities for Collaboration with Technology	mobile app (endomondo),

Table 4.3. *Intended Outcomes with related activities matched with TPACK indicators*

Intended Outcomes	Technology Strategies / Activities	TPACK Indicators
1. Understand the relation between health, wellness, and physical fitness.	• E-portfolio: → Health Status Questionnaire → Functional Status Worksheet	3. Using technology to understand content, 7. Applying Technology to instructional management
2. List the fundamentals of health related physical fitness.	• E-portfolio: → Health Status Questionnaire • Webinar	7. Applying Technology to instructional management
3. Comprehend the basic anatomy, exercise physiology, and exercise psychology knowledge.	• E-portfolio → Resting Heart Rate and Blood Pressure → Calculating Target Heart Rate Zone • Recorded Video Lecture: Anaerobic Threshold	4. Planning Technology-infused curriculum 7. Applying Technology to instructional management
4. Practice and evaluate the health related physical fitness tests.	• E-portfolio: → Pre-test form → Post-test form	1. Using technology to assess students, 2. Using technology to understand students,
5. Choose correct methods to improve physical fitness based on personal needs.	• Promoting suggested mobile applications • E-portfolio: → Caloric Intake Record → Caloric Expenditure Record → My Physical Activity Goal Form	6. Using Technology integrated teaching strategies 7. Applying Technology to instructional management
6. Practice different physical activity choices.	• Using exergaming (Xbox) • E-portfolio → Preferred Physical Activities Form	5. Using Physical Activity Technology 7. Applying Technology to instructional management
7. Be a critical consumer of physical education and sport.	• Sharing link for appropriate clothing and footwear • Research an article to critique it.	6. Using Technology integrated teaching strategies 8. Infusing Technology into teaching context
8. Appreciate the physical fitness and healthy lifestyles.	• Promoting Mobile Physical Activity Tracking Applications • E-portfolio → My Physical Activity Goal	5. Using Physical Activity Technology 7. Applying Technology to instructional management

Table 4.4. *Tentative Schedule for the last semester*

Week	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Topic	FIRST MEETING (Classroom) Selection of the Students	• Introduction to health, wellness and fitness (Classroom) • Guidelines for physical activity (GYM)	• PRE-TEST (GYM) • Fundamentals of physical fitness and evaluation of pre-test scores (Classroom)	• Body composition measurement (GYM) • Discussion on body composition and weight control (Classroom)	• Discussion on cardiorespiratory fitness and exercise physiology (Classroom & Exercise Lab) • Testing aerobic fitness. Physical activity for cardiorespiratory fitness (GYM)	• Testing muscular endurance. Physical activity for muscular fitness (GYM) • Discussions on muscular fitness and basic human anatomy (Classroom)	• Testing flexibility. Physical activity for flexibility (GYM) • Discussions on flexibility and low-back fitness (Classroom)
Technology Integration	• Learning Management System ○ Syllabus ○ Video Lecture: Introduction to PES 335 ○ Recommendation for clothing and Footwear Information form	• Learning Management System ○ Health Status Questionnaire ○ Functional Status Worksheet	• Learning Management System ○ Pre-test form ○ Physical Activity Stages of Change Questionnaire ○ International Physical Activity Questionnaire ○ Preferred Physical Activities Form	• Learning Management System ○ Caloric Expenditure Record ○ Caloric Intake Record	• Learning Management System ○ Resting Heart Rate and Blood Pressure ○ Calculating Target Heart Rate Zone ○ Recorded Video Lecture: Anaerobic Threshold	• Learning Management System ○ Class Notes for Anatomy ○ Online Discussions	• Technology Integrated Gym (Using Slides for Stretching at Gym)

Continued… Table 4.4. *Tentative Schedule*

Week	8	9	10	11	12	13	14
Topic	• Physical activity for general physical fitness (GYM) •	• Development of exercise programs for body composition (GYM)	• Development of exercise programs for cardiorespiratory fitness (GYM)	• Development of exercise programs for cardiorespiratory fitness (GYM) • Development of exercise programs for muscular fitness (GYM)	• Development of exercise programs for muscular fitness (GYM)	• Development of exercise programs for flexibility (GYM)	• POST-TEST (GYM) • Review (Classroom)
Technology Integration	• Webinar • Learning Management System ○ Online Discussions	• Learning Management System ○ FITT Program ○ Online Discussions	• Learning Management System ○ FITT Program ○ My Physical Activity Goal Form	• Exergaming (Xbox) • Learning Management System ○ FITT Program	• Learning Management System ○ FITT Program	• Learning Management System ○ FITT Program	• Learning Management System ○ Post-test form ○ Physical Activity Stages of Change Questionnaire ○ International Physical Activity Questionnaire

The main page on LMS created within weeks by weeks as it can be seen on Figure below:

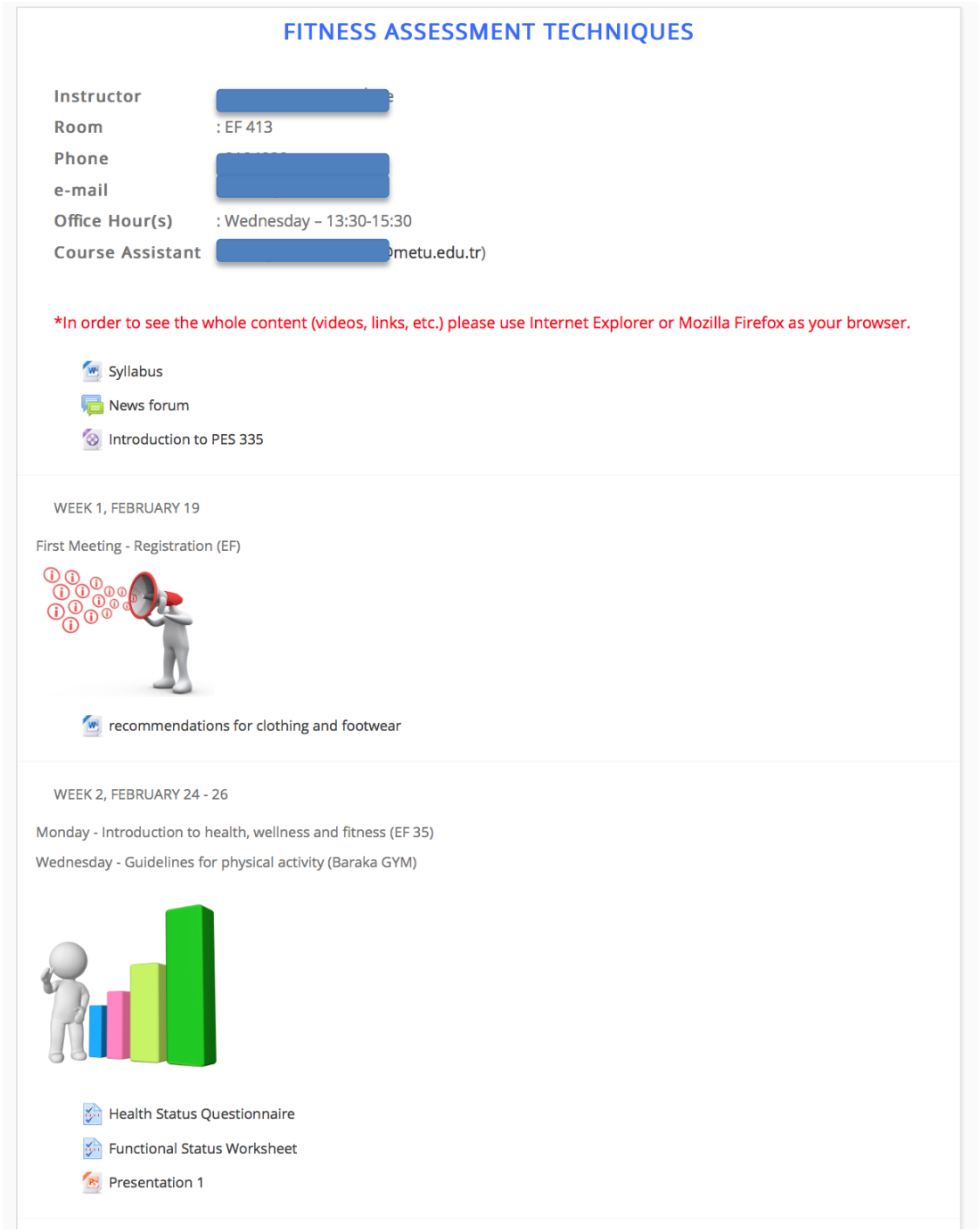


Figure 4.4. LMS Interface

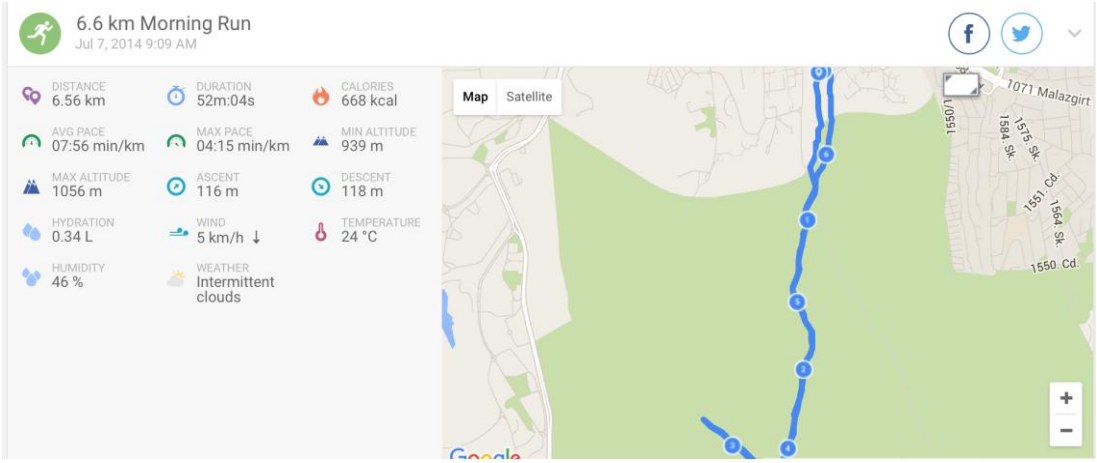
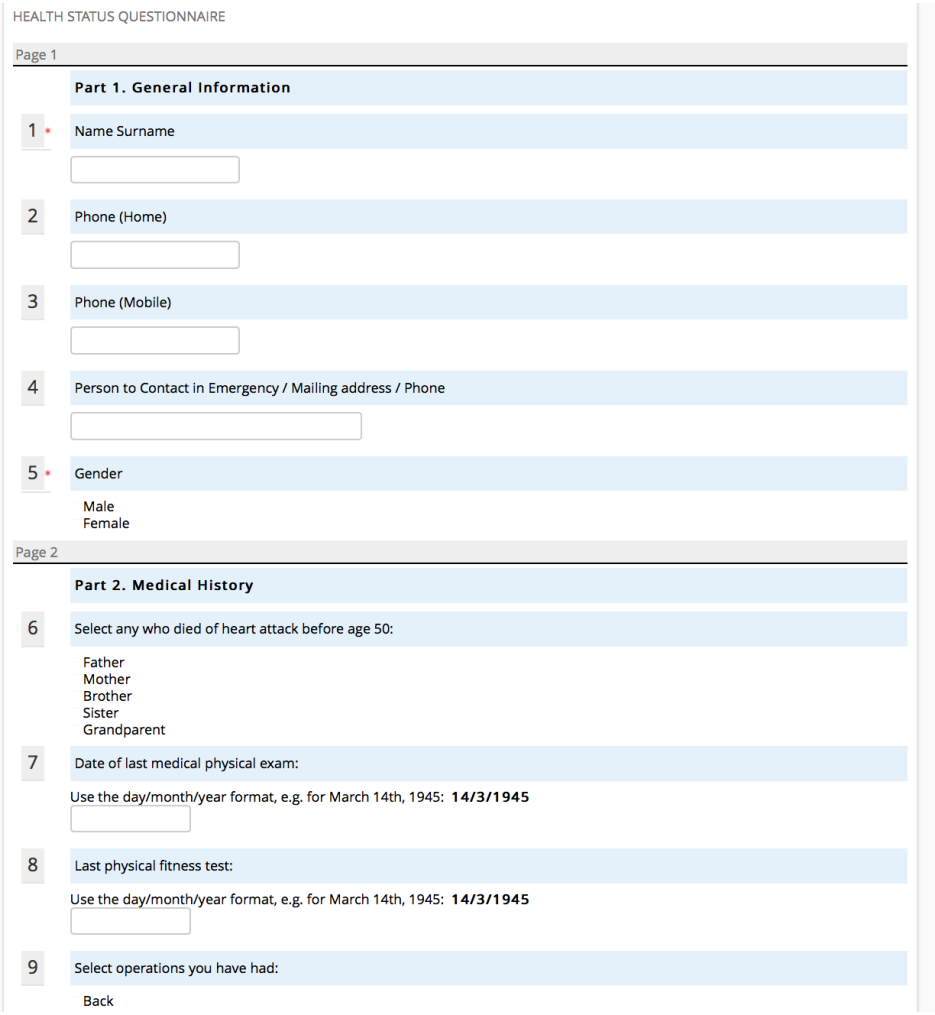


Figure 4.5. Mobile GPS Application (Endomondo)


HEALTH STATUS QUESTIONNAIRE

Page 1

Part 1. General Information

1 * Name Surname

2 Phone (Home)

3 Phone (Mobile)

4 Person to Contact in Emergency / Mailing address / Phone

5 * Gender

Male
Female

Page 2

Part 2. Medical History

6 Select any who died of heart attack before age 50:

Father
Mother
Brother
Sister
Grandparent

7 Date of last medical physical exam:

Use the day/month/year format, e.g. for March 14th, 1945: **14/3/1945**

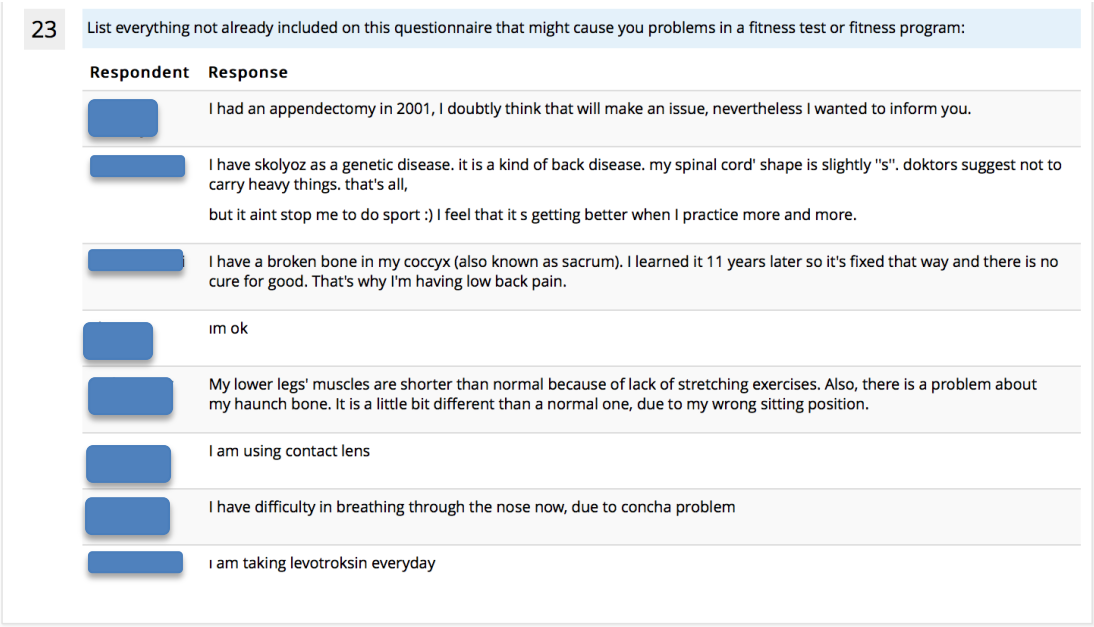
8 Last physical fitness test:

Use the day/month/year format, e.g. for March 14th, 1945: **14/3/1945**

9 Select operations you have had:

Back

Figure 4.6. Example of e-portfolio



23 List everything not already included on this questionnaire that might cause you problems in a fitness test or fitness program:

Respondent	Response
[redacted]	I had an appendectomy in 2001, I doubtly think that will make an issue, nevertheless I wanted to inform you.
[redacted]	I have skolyoz as a genetic disease. it is a kind of back disease. my spinal cord' shape is slightly "s". doktors suggest not to carry heavy things. that's all, but it aint stop me to do sport :) I feel that it s getting better when I practice more and more.
[redacted]	I have a broken bone in my coccyx (also known as sacrum). I learned it 11 years later so it's fixed that way and there is no cure for good. That's why I'm having low back pain.
[redacted]	ım ok
[redacted]	My lower legs' muscles are shorter than normal because of lack of stretching exercises. Also, there is a problem about my haunch bone. It is a little bit different than a normal one, due to my wrong sitting position.
[redacted]	I am using contact lens
[redacted]	I have difficulty in breathing through the nose now, due to concha problem
[redacted]	ı am taking levotroksin everyday

11 Please select any of the following for which you have been diagnosed or treated by a physician or health professional:

Response	Average	Total
Alcoholism	5%	1
Anemia, Other	5%	1
Eye Problems	25%	5
Epilepsy	10%	2
Heart Problems	5%	1
Kidney Problem	5%	1
Mental Illness	5%	1
Neck Strain	5%	1
Thyroid Problem	10%	2
Ulcer	5%	1
Other	20%	4

Figure 4.7. Example of answers from e-portfolio

Phase 4 – Summer 2013-2014

In the summer class, 25 students (21 males, 4 females) chose the course. The researcher had a teaching assistant role.

After determining and creating online delivery medium (LMS), online content was improved and organized. The interface of the LMS has improved with posters week by week, which is showing the location and date of the classes. More videos were

added (Introduction video and Lab video were recorded and uploaded, exercise physiology video was shared).

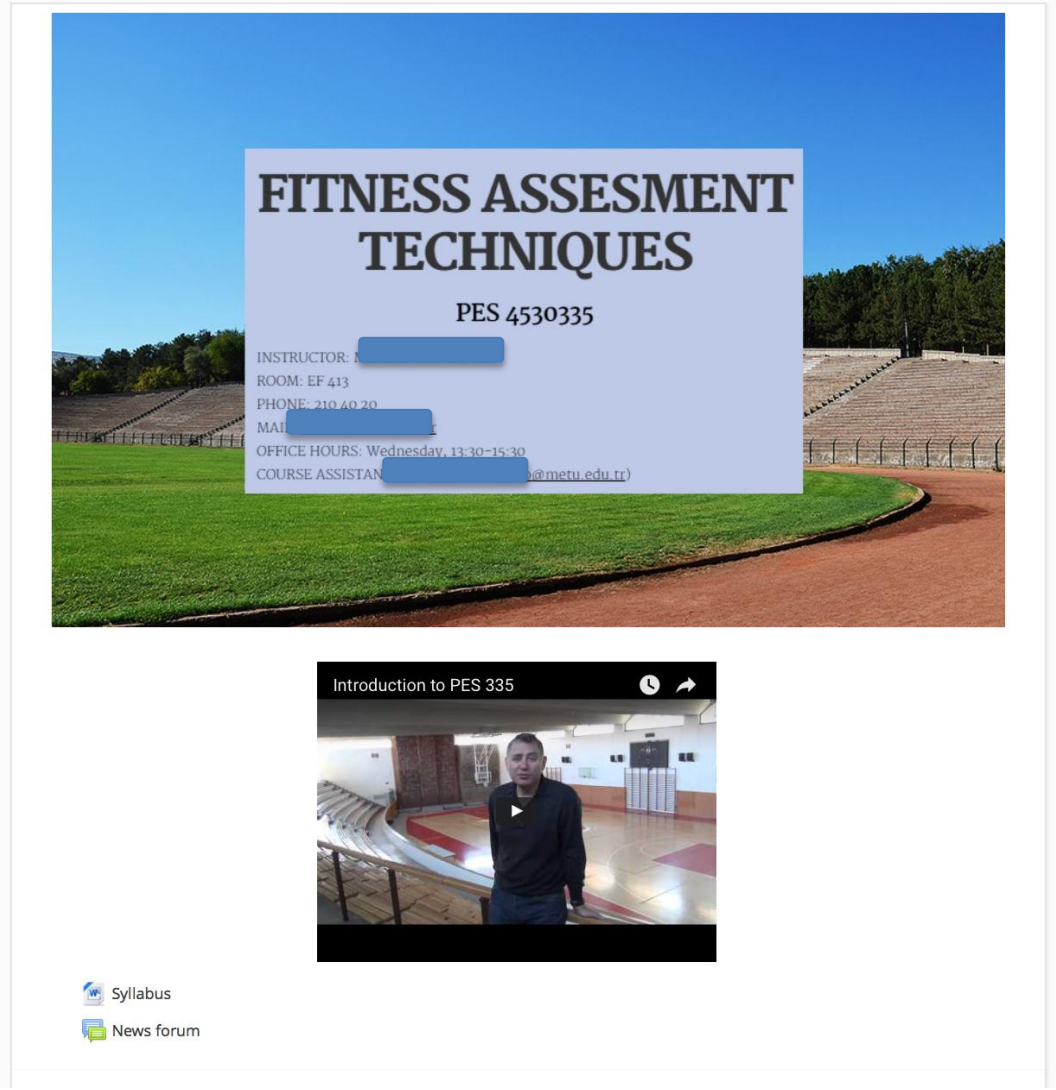


Figure 4.8. Main Page

The weeks on main page of LMS had prepared with posters to become clearer and let the user understand the distribution of weeks easier.

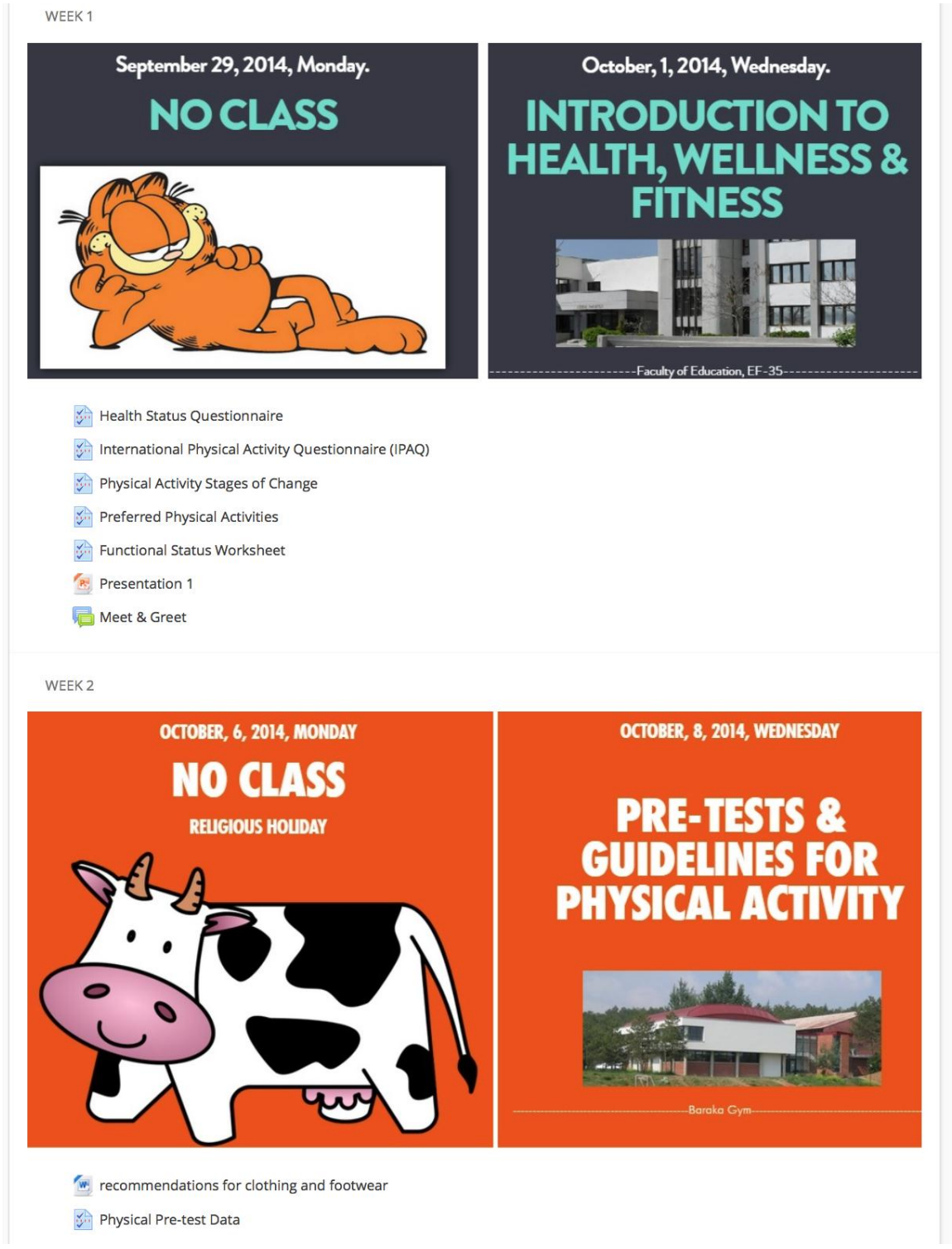


Figure 4.9. Week by week

Table 4.5. *Phase 4 Course activities with design principles*

Design Principles	**Course Activities with technology**
1. Offering Differentiated Learning	Online Assignments on LMS
2.Providing Data Management with Technology	Using LMS for the course medium, Online Assignments on LMS
3. Providing Classroom Management with Technology	Using LMS for the course medium, Digitalization of the hardcopy materials,
4. Using Physical Activity Technologies	Using pedometers, mobile app (endomondo), Exergaming (XBOX Kinect)
5. Creating Opportunities for Collaboration with Technology	mobile app (endomondo), online forum on LMS

Phase 5 – Fall 2014-2015

In the last semester, a total of 48 students registered the class within two sections: 24 students (11 males, 12 females) in the first section and 24 students (11 males, 13 females) in the second section. The role of the researcher had changed into observer as a new teaching assistant joined the classes.

Activity related technologies become diversified as heart rate monitors and accelerometers were added in this semester. Also classes were recorded and the videos were shared on LMS to let the students see themselves. Instructor started to use Tablet PC to record the movements and give instant feedbacks. An online discussion under the topic of "meet and greet" was added. Through the end of the semester, students were categorized according to their physical activity stage, and webinars were organized with these groups separately.

Figure 4.10. Meet & Greet Forum

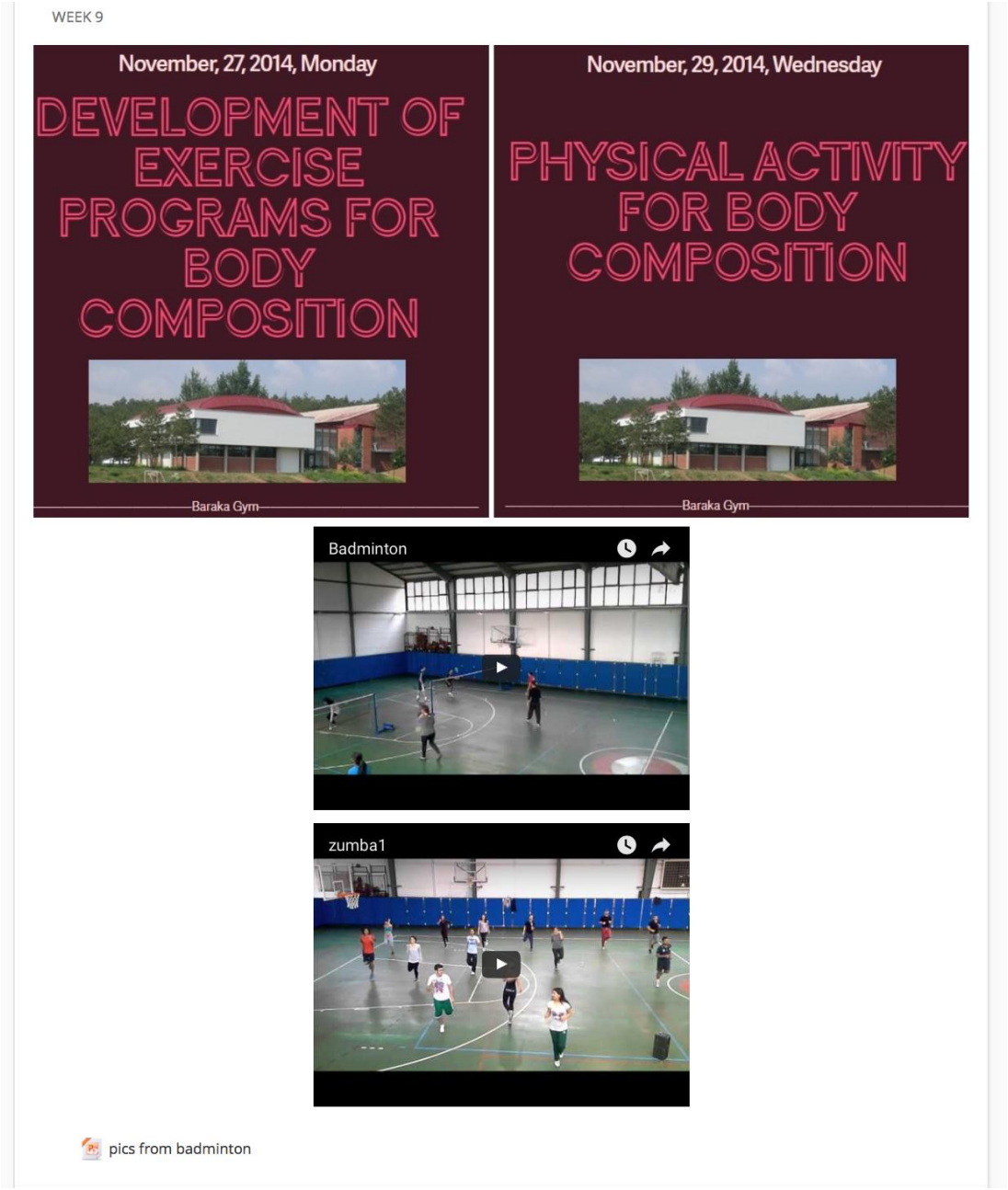


Figure 4.11. Class Videos & Pictures on LMS

Figure 4.12. Heart Rate Monitors

Figure 4.13. During exercise with Heart Rate Monitor

Figure 4.14. Exergaming (XBOX Kinect)

Figure 4.15. Tablet PC in class

Table 4.6. *Phase 5 Course activities with design principles*

Design Principles	**Course Activities with technology**
1. Offering Differentiated Learning	Online Assignments on LMS, heart rate monitor, pedometer, web-based sources
2.Providing Data Management with Technology	Using LMS for the course medium, Online Assignments on LMS
3. Providing Classroom Management with Technology	Using LMS for the course medium, Digitalization of the hardcopy materials, instructor used Tablet PC
4. Using Physical Activity Technologies	Using pedometers, mobile app (endomondo), Exergaming (XBOX Kinect), heart rate monitor, accelerometers
5. Creating Opportunities for Collaboration with Technology	mobile app (endomondo), online forum on LMS, webinar

4.1.2. Research Question 2

What were the challenges when restructuring the university HRF course with technology?

The thematic content analysis of expert opinions, student and instructor interviews and reflections, field notes, and open-ended online student surveys revealed that there were five main challenges that were encountered during the restructuring process. These were Ethical Considerations (1), Attitudes towards Technology (2), Need for Technology Helper (3), Need for Time to adapt (4), and lastly University Policies for Technology Integration (5) as can be seen in Table 4.4. below:

Table 4.7. *Challenges of Technology-enhanced HRF Course*

Themes	**Sub-themes**
1.Attitudes towards Technology	Instructor's Attitudes Students' Attitudes
2.Ethical Considerations	Confidentiality
3.Need for Tech Support	Accessibility, Device Management, Software Issues
4.Need for Time to adapt	Adaptation Period
5.University Policies for technology integration	University Regulations

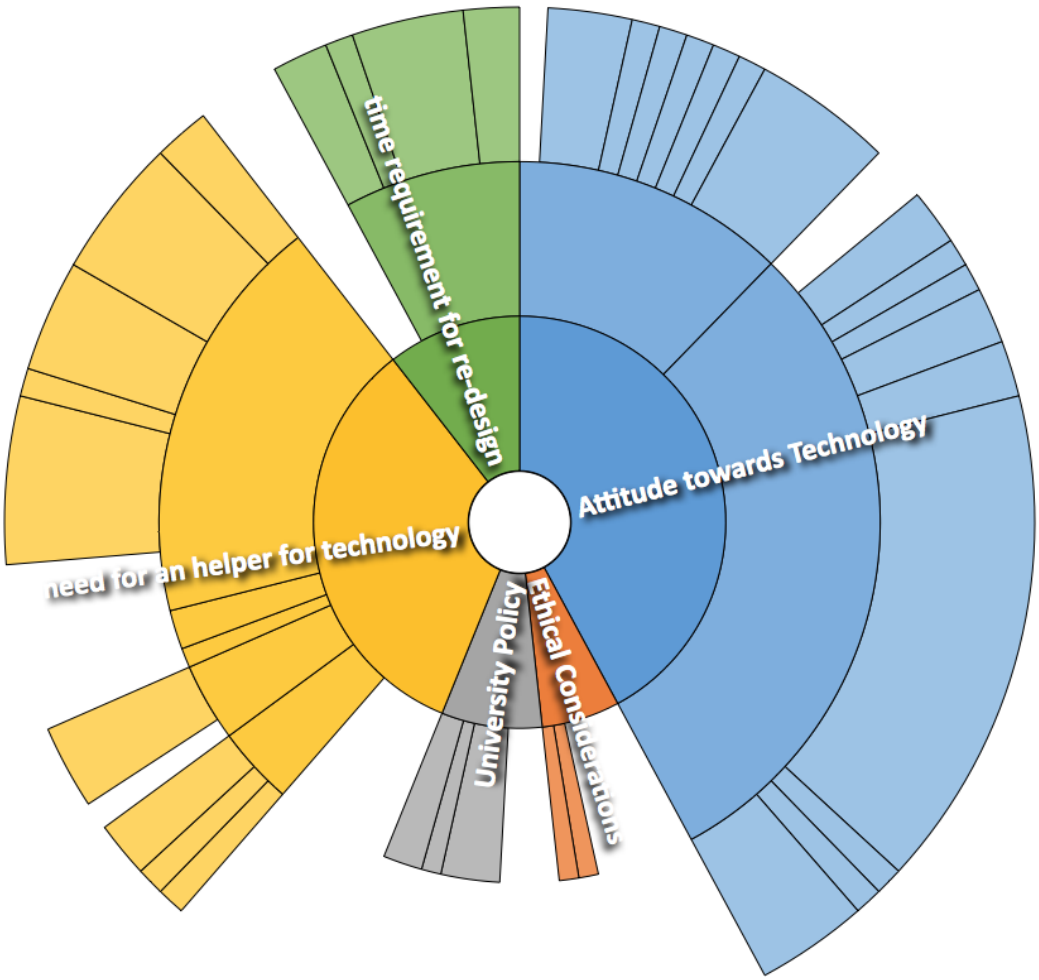


Figure 4.16. Challenges of Technology-enhanced HRF Course

1. Attitudes towards Technology

Although there was a need and will to integrate technology in his HRF course, instructor raised concerns about quality of the course raised at the beginning of the process:

"The quality of this course is already at a certain level. When we integrate technology into the course, where will be the position of the course?"

Instructor's Reflections, 21.08.2013

Even though he was eager to get rid of the hardcopy materials, which were plenty and hard to deal with, instructor still expressed some concerns:

"We are consuming too many papers. Managing such large amount of paper is also very difficult. May be students happy with those handouts, photocopies etc. May be when they are digitalized, the filling rates might be lower. This can be a drawback."

Instructor's Reflections, 23.09.2013

The instructor's hesitation can still be felt during the last semester after all the materials were digitalized and online space on odtuclass were created:

"The instant feeling of writings or visuals motivates the student. Me saying and showing them with handouts in the gym, and them taking notes and looking the handouts increase the quality. The more feelings I address and the more I give them on time duties, the more impact it would have. Now, I will tell them to fill these things; I will appeal to their ears, and there will be visuals to see. They will not enter mental processes."

Instructor Interview, Fall 2014-2015

The perception of the instructor for online medium also changes through time. The researcher has observed that instructor held himself back from Facebook, thinking that it was informal and that it made him feel insecure in Fall 2013-2014 semester.

Besides, the instructor has also found odtuclass somewhat confusing, and he indicated that he was reluctant to use it at first according to instructor reflections document.

On the other hand, the students' attitude towards technology is also another challenge faced during technology integration process. Instructor was also aware of this issue when looking to his reflection on summer 2014 semester:

"When I checked odtuclass for who does not upload their home works, I saw that they are always the same students. In general, these are the stereotypes that keep themselves away from technology."

Student 1 in his reflection and Student 6 in her interview verified this issue as they both indicated that they could not upload their pictures on meet & greet forum in odtuclass. There are also some students who have negative attitudes towards being online:

"I think the face to face class is more effective. There were two videos and I do not remember the videos 90 percent. I Just remembered the video and there was something about treadmill."

Student 7 Interview, Summer 2014

The uncertainty of whether the students watched the videos or not, and what they can get from videos raised another issue. Student 1 from Phase 5 and Student 6 from Phase 4 expressed their thoughts in their interviews that since there is no grade and obligation about it, they did not watch the videos.

2. Ethical Considerations

Certain considerations can be seen on researcher's field observation as it quoted:

"A Facebook Group for the Health-Related Physical Activity course was created. Yet, there were some students who hesitated to combine their personal life and academic life together. This raised ethical issues."

Field Notes, Fall 2013-2014

Instructor's perception is also another crucial point in these considerations:

"Facebook was just a tool to communicate. I did not like it in some ways; there can be some problems in some areas. It can lead some unwanted informal communications with some unwanted people."

Instructor's Reflections, Fall 2013-2014

On the other hand, researcher observed that there was some discomfort among some students in the last semester due to having a camera taking shots in the gym or weight room. Additionally, since the problems occurred viewing odtuclass in different browsers, the videos about classes had to be uploaded on YouTube. Although these videos were hidden, there were questions from students about if the videos and the pictures on odtuclass might be seen by any other person out of the class or not.

3. Need for a Tech Support

There have been some issues emerged as the technology integration process carried on. These issues were mainly around device management and software issues, and accessibility. For instance, a GPS-based physical activity tracker named endomondo was used in classes. However, some students claimed that they had not have smartphones or other students said their phones were not compatible.

"While trying to deal with the students' problems with technology they are using in a group, I may miss the other important topics when I was focusing the problems with technology. It provides easiness in one hand but also may cause problems in the other hand."

Instructor Reflections, Fall 2014-2015

Instructor claimed that having an assistant for technological devices could be convenient:

"It seems difficult to walk with a tablet PC and take notes. Last year, I tried it in a few classes and I saw that it would not be that difficult. If you can know when to take tablet PC in your hand and when you put it back, and if you have a helper like an assistant, I understood that it would work."

Instructor Interview, Fall 2014-2015

On the other hand, when providing lots of technological devices to students, managing those was emerged another issue. One of the assistants for instance prepared a name list. The students signed this list when they take and bring back the devices. Still, according to field notes from fall 2014-2015, two pedometers were lost. Instructor pointed out another important issue about the need of a helper that the technology assistant should know the context:

" The responsible individual should know the gym environment since we are going there for the classes. I do not think so that an individual from outside of this context can give this service. It is important the existence of the sport-related technologies but also the environments related to sports."

Instructor Interview, Summer 2014

4. *University Policies for Technology Integration*

University's strategies for technology integration are another important topic. Providing tech support to instructors should be taken into consideration:

"Every instructor in the university should have a technology supervisor. I mean, it is kind of person who helps to design technology integrated courses. Essentially, this position should be created and supported by the CEIT (Computer Education and Instructional Technology) departments of the universities. If such positions do not

exist, there is no chance for following the emerging developments in the instructional technology area."

Expert Opinion, Spring 2012-2013

Providing tech support to students also another issue that Instructor identified:

"Equal opportunities should be created for students. University should be able to rent smart phones and/or tablet PCs *to students. Not everyone but the ones that have limited financial situations. Then I can use mobile devices more effectively and would not think about the students who have limited financial status and not have such devices. To be able to digitalize the course would be easier for me."*

Instructor Reflections, Summer 2014

Instructor also stated the role of architects when designing gyms and role of university for professional development of its staff:

"Gyms are not constructed well according to technology integration. The architecture is not flexible to changes, and the staff, too. We saw these as instructors and newly started to argue about it. The management of university is not aware of such needs. Even though our school has a good wireless Internet system, the gyms are not covered well."

Instructor Reflections, Summer 2014

5. *Need for time to adapt*

The researcher pointed out an important consideration about time and effort to create and sustain online materials in the beginning. As Design-Based Research provides the flexibility, digitalizing the course materials and designing the online learning environment (odtuclass/LMS) as a course delivery medium took a while.

"The digitalization of the course materials took a considerable time and effort. Once created, they can be copied, improved and used for the upcoming semesters but still, creating and developing the online materials takes time. "

Field Notes, Spring 2013-2014

Instructor also expresses his need of time for adapting new technology on following semester:

"I need some time to try it at the gym and look for how does it make me feel walking around with a tablet pc in my hand as a teacher."

Instructor Reflections, Fall 2013- 2014

On upcoming semester, the instructor had also mentioned the focal points for the adaptation period:

"Firstly, understanding the technology itself, then meet it with the content of the class and understand how to use it meaningfully, later on applying it. All of these processes need a certain amount of time."

Instructor Interview, Fall 2014- 2015

The students were also in need for time to understand odtuclass:

"There were some moments that I did not know how to find some things. For instance: food intakes. How much carbohydrate, how much protein? Determine these according to what? Average, low or high, I did not know these. Therefore, I did those forms shallowly. Also, there was no "I don't know" option in those questionnaires and it did not allow us to leave the forms blank. It was a minus for me."

Student 5 Interview, Summer 2014

A need for an adaptation period emphasized by another student:

"The content is loaded I mean you can see a lot of details but still there is a structure that is confused to me. Therefore, I did not go into it other than my needs like where is what etc. May be it's just because of me, I don't know."

Student 5 Open-ended Questions, Summer 2014

4.2. Impact of technology enhanced HRF course

As the Health-Related Physical Activity course redesigned according to the needs, how this course has an impact on the instructor and students have become an essential issue.

4.2.1. Research Question 3

What was the impact of restructuring the University HRF course with technology on students and instructor?

As a result of the thematic content analysis of expert opinions, student and instructor interviews and reflections, researcher's field notes, and open-ended online student surveys revealed, a total of 5 themes emerged: Classroom Management (1), Data Management (2), Differentiated Learning (3), Motivation (4), and Workload (5) as it can be seen in Figure 4.17 below:

Table 4.8. *Impact of Technology-enhanced HRF Course*

Themes	**Sub-themes**
1. Classroom Management	Classroom Interaction, Planning, Teaching strategies
2. Data Management	Cost-effectiveness
3. Differentiated Learning	Using technology to understand content, Meaningful Feedback
4. Motivation	Students' Motivation, Instructor's Motivation, Appreciation for Technology
5. Workload	Students' Workload, Instructor's Workload

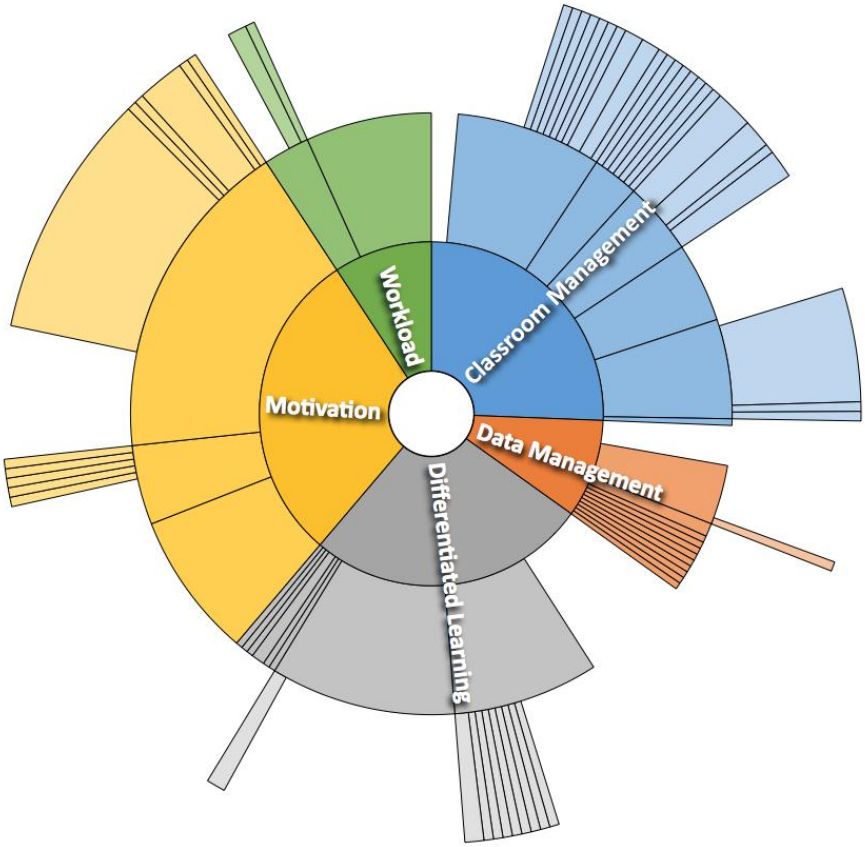


Figure 4.17. Impact of Technology-enhanced HRF Course

Each and every theme emerged as the impact of the technology-enhanced HRF course has also sub-themes that can be seen in Table 4.4 below:

1. Classroom Management

"The focus would be describing the process more than the result. In-debt study of a design is the point. What happens if the classroom ecology is changed? Affordances of technology for the certain pedagogy and content is crucial."

Expert Opinion, Spring 2012-2013

During the restructuring process, one of the biggest impacts is on classroom management. Instructor reflected on an issue about recognizing students and matching related feedbacks with them without missing any:

"Even if I do not know their names, there is a system created now to be able to take notes about students. Within an application in this Tablet PC, I can take notes for a student for specific things. That helps me to not to forget feedbacks about them personally."

Instructor Reflections, Fall 2013-2014

Researcher also witnessed a similar situation like above:

"In the fitness room day, Instructor used Tablet PC for the first time to give a feedback to a student. The student had written about an issue in the e-mail before but instructor didn't know who he was. So he found out the student from the visual list in Tablet PC. Instructor said that he felt so relieved about this because this student has a health issue about his back and now instructor can act accordingly."

Field Notes, Fall 2014-2015

The odtuclass spread out the portfolio items throughout the weeks by the researcher. Instructor attributes this issue:

"Obtaining the product files part by part in each week, which I took at the end of the course in previously, is beneficial for me. You know, to understand how is the class going, what is their level, which direction are they going, got easier."

Instructor Interview, Summer 2014

The students also gave positive feedbacks for having the semester week by week before their eyes online:

"The information about where is the class and which topic will be was prepared quite fun and nicely with illustrations."

Student Reflection 3, Fall 2014-2015

The researcher observed on Fall 2014-2015 that lots of the students enjoyed and had fun watching themselves on videos. They said that they can identify their mistakes or it's good to see themselves from outside in an activity.

On Fall 2014-2015, the instructor improved the course goals with the addition of technology utilization settings.

"This was the application that I have been looking for. Especially, we were sharing our physical activity records and motivating each other with our friends. Hence, I wanted to learn such thing and I learned endomondo. My friends were sharing it but I did not know how they were doing it. I am so glad that I learned endomondo. I have it on my smart phone now."

Student 6 Interview, Summer 2014

Classroom interaction was another focus during the restructuring process of this HRF course with technology. Hence, meet & greet forum was promoted amongst students:

"I know someone with their names. I mean the ones who talk to me. When I saw them, I understand that this person was his or her on meet and greet forum."

Another student mentioned the advantages of online collaboration as commented:

"It was good to see people's interests because there were things that I did not know like Zumba. I did not know this it was interesting. Having the other friends was a nice thing. We are from different departments. When we took courses from our departments we already know the people. However, in here, we do not have any dialogue with them. Hence, it is nice for the beginning."

Student 5 Interview, Fall 2014-2015

For benefits of having an online medium for classroom interaction, another student stated his thoughts as:

"I think it has a big plus for communication with the instructor and the class because in other classes we generally don't have much communication with the instructor. They just give lectures and go. There is also not anything on Internet. Therefore, I think it improves our connection with the instructor and let us to get to know our friends more easily, visually. I think it was beneficial."

Student 6 Interview, Fall 2014-2015

2. Data Management

The answers of the questionnaires helped instructor to behave accordingly. For instance, the most preferred physical activities from students were already shown in odtuclass. The students who have health problems have shown there too. The physical activity stages of students also can be seen on odtuclass. How many of them on preparation stage, or contemplation stage as a physical activity level, etc. The instructor was happy to see all the information about every individual online. They were all statistically ready and stored online after students filled the questionnaires.

"When students answer online the tools and materials, I can have transcriptions about each individual. With this, it takes a huge burden from my shoulders. Ahmet or Ayşe, it is personally identifiable data. When s/he enters the data, the elements that I should take my attention on, is coming to me with already analyzed."

Instructor Interview, Fall 2014-2015

Students used the advantage of having their data online:

"I checked my previous physical activity programs to see what did I write and compare them. Then I wrote a program accordingly. It was good to write after checking my drawbacks. Because I was happened to be monitor my improvement in the semester. I saw what I want to do."

Student 6 Interview, Fall 2014-2015

There was excessive paper consumption for examinations, surveys, handouts, and portfolios, which instructor was unhappy about.

"Storage is very important for me. I am really sick of the hardcopy portfolios piled up in my office."

Instructor Interview, Spring 2013-2014

"There is a financial consideration, too. There was a lot of work like photocopies, printing, etc. I got rid of these. As a matter of fact, both students and me got rid of a serious paperwork."

Instructor Interview, Summer 2014

Without a fear of losing the materials or missing the deadlines, students stated:

"Filling out the home works that is online makes our job easier. There is no trouble for handing out the forms to the instructor or being late, and we can continue to do them until the very last moment. "

Student 6 Open-ended Questions, Summer 2014

Managing the plenty of course materials never got easier:

"Using odtuclass is very good for this course because we did a lot of tests and filled out a lot of forms. Saving them in the computer instead of collecting the hardcopy papers is better. There is no risk for losing any of it. Also, I can see deadlines whenever I logged in to odtuclass. It does not have to be memorized."

Student 3 Open-ended Questions, Summer 2014

3. <u>Differentiated Learning</u>

Previously, the instructor had to give students lots of feedbacks according to their heart rates like "slow down!" or "go little bit faster!" to reach or stay in the heart rate zones. On the other hand, now, we can see each student continuously checking their heart rate monitor watches and they are all around in the gym separately while they are doing their activity. Heart rate monitors made the learning experiences individual.

"I effectively used individual feedbacks. It was really worked, based on individual-based self-reflections. It was really effective. Based on the self-reflection reports (from the portfolio materials) I can know the needs of each individual."

Instructor Reflections, Spring 2013-2014

"Using heart rate monitor make me feel more comfortable in the gym. The students were scattered to the gym according to their needs all by themselves. Each one has different heart rate zones and I don't have to stop them and let them measure their heart rates each time and give them feedbacks. Now, they can have their feedbacks from heart rate monitors that they are currently wearing."

Instructor Reflections, Fall 2014-2015

The students also acknowledged the benefits of using heart rate monitor as they have their feedbacks constantly:

"First of all, I did not give any attention to heart rate before. When I was exhausted, my heart was beating fast but I did not aware when I was tired. I think the thing we do with that heart rate worked. For example, running with 150 heart rate is ideal for me. When I run with 150 heart rate, I am like almost able to run for hours. But there is one test that was on treadmill. I saw in that test for example, when you run with 180 heart rate, the body began to produce lactic acid and tired. Eventually began to not to be able to produce energy. It was helpful to understand that."

Student 4 Interview, Summer 2014

"I remember I was telling to instructor before the class that I cannot run. I had pain in my stomach and I had short of breath. It was the same in the stadium. When I was trying to run with my friend, after running half of the distance, I got out of breath and stop. In that class, I learned to control this. When I was told not to go over 140 beats, one can set the pace and run longer. It created awareness. For example, I was telling myself I can never run. However, it was not like that. When you are being careful about your heart rate and breath, it can be slower and you can run. I have never seen a heart rate monitor before."

Student 3 Interview, Fall 2014-2015

A GPS-tracking physical activity application called endomondo was promoted in the class. The students had their individual learning opportunities:

"Then when I used endomondo, it was given some information there like how much distance did I run and how much water an average person loses. The thing that was nice was you could arrange your pace like how you can run with certain amount of time. For example, when I was running around the house, I was doing it on 2 min 10 sec. But in endomondo, I was checking from the clock and I knew that one tour is

400 meter. I was seeing that I run 6min for a km. Mobile application like endomondo serves the purpose well."

Student 4 Interview, Summer 2014

"Information is provided in endomondo like how much distance did I run and how much water an average person loses. The thing that was nice was you could arrange your pace like how you can run with certain amount of time. For example, when I was running around the house, I was doing it on 2 min 10 sec. But in endomondo, I was checking from the clock and I knew that one tour is 400 meter. I was seeing that I run 6min for a km. Mobile application like endomondo serves the purpose well"

Student 2 Interview, Summer 2014

Using a tablet PC to take notes, record videos, and give instant feedbacks is the skills that instructor acquired:

"The biggest impact is we have a system now, even if do not know the name of the individual I can take notes about him/her. The best way to reflect students' problems is giving them a chance to watch themselves while moving. When you give an instant feedback with a video that was recorded with a Tablet PC, we saw that it worked really well. I mean we saw it became concrete in students' minds, which can be an abstract problem. "

Instructor Interview, Fall 2014-2015

Students' perspectives can be understood with regards of having feedbacks with watching themselves:

"Instructor recorded our videos and showed those to us. It was a beneficial class with regards to running techniques. You may not be aware of how you look when you run. For instance, when you saw somebody who runs correctly, you can say to yourself "yes he's running good". When you see yourself in a recording, you can say like "hmm why do I swing my arm like that? Actually swinging my arm was not

necessary. Or you can make comments like " If I can step more inwardly it would be better." It's beneficial because of this."

Student 4 Interview, Fall 2014-2015

Giving meaningful feedbacks is important. Determining without missing them is crucial:

"In general, it goes like this; the lessons, which stay in your mind, are either the students who have special needs or the ones who are good. The students between these two are missing, mostly. However, when I use this (LMS & Tablet PC) and the data, which is specific for the individual collected and analyzed instantly unfolded before my eyes, I have a chance to understand the needs for everyone. I started to pay sufficient attention to the missing group that was in the middle. So, the biggest impact was this."

Instructor Interview, Summer 2014

4. <u>Motivation</u>

Instructor's motivation can be seen with the reflection and interview on consecutive semesters for using tablet PC and odtuclass:

"I liked Tablet PC. I need some time to try it at the gym and look for how does it make me feel walking around with a tablet pc in my hand as a teacher. Within an application in this Tablet PC, I can take notes for a student for specific things. That helps me to not to forget feedback about them personally."

Instructor's Reflections, Fall 2013-2014

"Students were also filling the portfolio materials week by week but I did not see them. I just analyzed the reflections that they made. Now because of these data is in my hands from the beginning week by week, I think it increases my individual-based feedback quality. In short, there is a matter of success for formative assessment, which technology integration brings. "

Instructor Interview, Fall 2014-2015

Students' motivation for using heart rate monitors and mobile application named endomondo can be seen below:

"I learned that I should stay in that heart zone or target zone. And in order to keep tracking this zone, heart rate monitor helps a lot. It also has another advantages like the GPS in the endomondo tracks you and gives information about how much calorie you burn, the distance and water loss, these are all motivation for the activity. Using different Technologies encourages you. And staying in the heart zone helps you reach your goals."

Student 2 Interview, Summer 2014

"Before taking this class, there were lots of times that I have pain, and realized that I pushed myself too much. However, the tools that measures my heart rate, how much distance I covered, and how much calorie I burned, helped me to act more conscious since I have body weight problem. Also since such tools helped me not having pain while burning calories and not to be alienated from doing sports."

Student 3 Interview, Summer 2014

"Frankly speaking, I did take this class for doing a physical activity. I thought like maybe I can do some sports. I did not know this course have a broader concept. Especially when I remember that we had heart rate monitors, I understood that this is different than a regular physical education like we had in elementary school. I saw which heart beat should I run."

Student 5 Interview, Fall 2014-2015

"The technologies like endomondo and heart rate monitor were encouraging for me. I used endomondo not only during the class but also out of the class because I could see the distance I run and the calorie I burned, which motivates me. I can say that my interest for doing sports increased."

Student 3 Open-ended Questions, Summer 2014

Some of the activity classes were recorded and uploaded on odtuclass to let the students watch themselves. Lots of them enjoyed and had fun watching themselves on videos. They said that they can identify their mistakes or it's good to see them from outside in an activity.

"The videos about our actives were fun. Opening it and laughing at us is fun. I watched the activity videos with my roommates and commented like "oh god how bad I played or I could not catch this ball" But it was nice I had a lot of fun."

Student 3 Interview, Fall 2014-2015

"I saw myself in the orienteering video and also the other videos, too and laughed myself a lot. It is a nice thing for a person to see himself in the Internet and to see what did I do in the previous classes. How do I look from outside or to remember what was done in the class. It's more interactive. I found it positive. It connected me to the class."

Student 3 Interview, Fall 2014-2015

Using exergaming was one of the most fun parts of this course:

"I saw that some students try to escape from rhythm education. I assume that some students will think and try to explore exergames at their life after we successfully used it in the gym. I saw such benefits. These were not decreased the motivation of the students."

Instructor Interview, Fall 2014-2015

"I think XBOX class was more fun and efficient than Zumba class for my perspective. Also it teaches you the moves and knowing that it sees you, these are good things. I had fun like little kids."

Student 3 Interview, Fall 2014-2015

5. Workload

During the restructuring process, whether it brings extra workload or not is another issue:

"I asked someone to set up the XBOX Kinect in a dance class. I am thinking if I spend that amount of energy to do it myself. Because it is an extra workload like whether the technological tool works or not, make you vacant or not… For instance, if the speaker is not working effectively or if there is no electricity these can be problematic. The batteries of the heart rate monitors can be run out so I should check all of them. I cannot say this lesson does not solve my needs but new problem areas appeared."

Instructor's Reflections, Summer 2014

Nevertheless, the instructor said that he has a relief. He's more comfortable because he doesn't have to stop students to let them measure their heart rates from their arteries.

"In the past semester, I had to give a lot of feedbacks to students. This semester, with the heart rate monitor, I don't have to give a lot of feedbacks to students at all. It helps me to focus on different things. Technology lightened my workload. It gives the feedbacks for me and more individually."

Instructor's Reflections, Fall 2014-2015

"Well, I will try to take notes about it but I tolerate this like I give the digitalization duty to an assistant. I mean it took me a lot of time. But since it is a supportive element, it is a workload that can be tolerated. However, what I saw in this point is, when you do it at first, the next processes are just for refinements and improvements. You can use the same materials with some improvements. I saw it as a burden just at first. "

Instructor's Reflections, Fall 2014-2015

"It decreased my workload in certain ways. Like, before starting each lesson, I had a workload for paperwork. After this lesson, I am finished with all this paperwork. Surely, this has a financial consideration, too. There was a lot of work like photocopies, printing, etc. I got rid of these. I also got rid of the workload for handing them out and collecting them again, which I benefited for time management in class. On the other hand, out of the class, I have to download and analyze the digitalized versions of them in an environment that have Internet access. Still, I must say that my workload decreased in this sense because the profiles are shown to me already categorized. "

Instructor Interview, Summer 2014

Students' workload seemed to be favorable with getting rid of the hardcopy materials and preventing any possibly loses:

"We observed the physical test on Lab. Then we answered the questionnaires on odtuclass. It's so good to fill the questionnaires and send our answers to Instructor from that platform. We only need to think about the question that it was asked since it's short and there is no need to read any article so it's a thing that decreases the workload of the course. I think it will be an interesting archive since we are answering the questions from our perspectives. Fitness course is the one that uses odtuclass most effectively and even opening it before the classes make you happy. It's a great comfort since the documents are always opened on time because I like to finish my home works after 1 or 2 days from the class. Uploading the materials without any delay is so good that makes you think the instructor actually cares and this is positive for the students. "

Student 3 Interview, Fall 2014-2015

"*I think being online is good because I can follow the flow of the class. I don't have such a chance in my other classes. If I miss a class, I got information about it and see what was done in that day. I think being online is so good for following the class."*

Student 6 Interview, Fall 2014-2015

"At first, while filling the questionnaires, I was thinking like why there is so many of them what benefits will these questionnaires but after filling the questionnaires and finding opportunities to compare, it was good to be aware of the progress that we made. I believe this. Secondly, the classes should be followed. Ok, I was a student who is trying to attend all the classes but even if I cannot, I can log on to LMS and see where is today's class, what will be the topic or activities like syllabus. These are good. Since continuously mailing to the instructor and waiting for the response is a trouble, I think this system is nice. I think we use it a lot."

Student 3 Interview, Fall 2014-2015

"I think the workload of the course is appropriate. Even when we are filling the forms, we have information about lots of topics for our physical conditions. Since these forms were designed for not to take so much time of students, it does not make any difficulties."

Student 11 Open-ended Questions, Summer 2014

CHAPTER 5

DISCUSSION

This chapter presents the discussion of the results of the study with regards to the literature. The purpose of this study was to investigate the design process and the impact of restructuring a university health-related physical activity course with technology. In order to achieve this goal, the thematic content analysis was conducted within qualitative research perspective in the light of Design-Based Research. Current results were discussed within each research question as follows:

Research Question 1

What are the design principles for restructuring a university HRF course with technology?

Certain principles within university health-related fitness context derived from literature applied to restructure the course. Those were 1. Offering differentiated learning. 2. Data management with technology. 3. Providing classroom management with technology. 4. Using physical activity technologies. 5. Opportunities for collaboration with technology. This study extended the literature by identifying the design principles for a technology-enhanced health-related university physical activity course and how those principles could be applied within a course syllabus.

Offering differentiated learning was one of the focus in the current research. Especially with the help physical activity technologies such as of heart rate monitors, pedometers, and mobile applications, students reported having their feedback in this study. The instructor was also highly satisfied with the feedback that he has got from LMS. Literature was also in line with these findings as teachers were reported to be able to differentiate or individualize the learning process according to the learners'

readiness level and personal need (Harris, Mishra, & Koehler, 2009; Davies, Dean, & Ball, 2013; Rosen & Beck-hill, 2012).

Data management with technology was one of the main advantages of this study. Students could check up what they had been doing during the semester, where were they in the beginning and how the progressed. The instructor was also very happy to got rid of the hardcopy materials and everything went online so it was easier to manage all the course materials from on medium. Chung and Ackerman's (2014) findings were also parallel with this study as they stated that students gave value to learning management systems because they can monitor and control their educational progress. Dias & Diniz (2014) also mentioned the biggest advantage of LMS was its content repository feature as it involves documents, slides, study notes, and subject contents in one medium.

Classroom management with technology was also another dimension of this study. Giving information to students beforehand with LMS and saving the time for activities was the main strategy for classroom management in this study. Also besides using LMS, Tablet PC allowed the instructor to be able to manage and track the students' information. Literature was in line with these findings as the more educational technology skills teachers demonstrated the more classroom management skills they have (Varank & Ilhan, 2013; Bester & Brand, 2013). Technology affects classroom management in a number of ways as computing grades, tracking attendance, communicating with students, storing course related contents, etc. (Emmer, Sabornie, Evertson, & Weinstein, 2013).

Using physical activity technologies was also very important aspect of this course. Let the students experience various physical activity technologies such as heart rate monitors, pedometers, XBOX, mobile applications etc. was important to promote physical activity. Literature also showed positive effects towards physical activity participation with pedometers (Cayir, Aslan, & Akturk (2015), physical activity trackers (Diaz et al., 2015), heart rate monitors (Ignico & Corson, 2006), and mobile applications (Middelweerd, Mollee, van der Wal, Brug, & te Velde, 2014).

The fifth and the principle was creating opportunities for collaboration with technology. The students have reported their satisfaction for the online forum on LMS to get to know people in class. They also liked the online videos of classes to see each other from an outside perspective. The instructor mentioned the importance of webinar that he administered on last semester according to physical activity levels of students. Literature was also in line with these aspects it was emphasized the potential of collaboration to improve and gather the knowledge via technology (Goodyear, Jones, & Thompson, 2014; Carroll, Diaz, Meiklejohn, Newcomb, & Adkins, 2013; Junco, Elavsky, & Heiberger, 2013) and engagement in forums, discussions, chats, etc. (Romero, Ventura, & García, 2008).

Research Question 2

What were the challenges when restructuring a university HRF course with technology?

The data were collected with expert opinions, student and instructor interviews and reflections, field notes, and open-ended online student surveys. The thematic content analysis revealed five main challenges that were faced with during the restructuring process. These were Attitudes towards Technology (1), Ethical Considerations (2), Need for Tech Support (3), Need for Time to adapt (4), and lastly University Policies for Technology Integration (5).

Attitudes toward technology both from the instructor and the students emerged as a challenge while restructuring the health-related physical activity course. Instructor's hesitation for decreasing the quality of the course and dissatisfaction for using Facebook as a medium were among the first notable issues. Baert's findings (2011) was parallel with this result as most of the PETE faculty in the USA did not feel confident in using technology, they often have low proficiency and integration levels, and they remain using mostly traditional computer technologies. Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, and Sendurur (2012) also have similar findings that existing attitudes and beliefs toward technology and current levels of

knowledge and skills are the strongest barriers to prevent teachers using technology. On the other side, students had also their reluctance for sharing information and joining the online discussions. Some of them reported since there are no grade and obligation; they don't watch the videos on LMS. Some of them even mentioned they would have preferred face-to-face classes because they don't remember the videos they watched. As a similar finding, Trinder (2016) surveyed 175 Austrian university students and found that the students mostly prefers face-to-face environments versus online settings for Language Learning. Three barriers revealed as technical difficulties (1) such as lack of robustness, cognitive issues (2) such as lack of less direct, less focused and less personal, and lastly, lack of authenticity (3) such as being virtual and not real.

Ethical and legal issues have also arisen during the restructuring process. Students stated that they might be nervous about their personal thoughts shouldn't be reached by the outside world on web since some videos were uploaded to YouTube because of video viewing problems on LMS. Institutions should provide this privacy (Ozkan & Koseler, 2009). Some of the students also don't want to combine their personal life and academic life with using Facebook for educational purposes. Instructor was also mentioned his displeasure for using facebook is he thought it is a little bit informal and may cause problems. Similarly in literature, while students reported that Facebook is important for socialization in university and can be integrated in education, faculty members thought Facebook is not suitable for educational purposes (Madge, Meek, Wellens & Hooley, 2009; Roblyer, McDaniel, Webb, Herman & Witty, 2010).

Need for tech support was an essential point of this study. To begin with, the instructor had some difficulties to use the Tablet PC in the gym for instance. Also since there are lots of technological devices out there, which the students were using, another issue raised as managing the devices. When using a smartphone application for instance, some software problems had been faced with, too. Research indicates that technology coaches can help teachers to gain confidence in using technology in their classrooms (Sugar, 2005). University instructors need technical support because

they thought digital tools are difficult (Schoonenboom, 2014). In order to overcome the problems that the instructors experienced, listening to their views, giving them a participatory role, and using their experiences appeared to be critical in order to re-shape the higher education teachers' perspectives on technology integration (Baran, Correia, & Thompson, 2013). Previous studies also have similar results. Porter, Graham, Spring, & Welch (2014) investigated the blended learning procedure of 11 USA Institutions in higher educations. They identified three stages: Awareness /Exploration, adoption/early implementation, and mature implementation/growth. The one of the key recommendation for the higher education institutions was providing sufficient technical and pedagogical support not only for instructors but also for the students, who might be lack of necessary skills for using technology. They suggested that advocates for blended learning should be defined to support potential adopters to transform their traditional face-to-face lessons into blended learning forms. However, sole technology literacy is also not enough. Pedagogical skills of teachers should always be high. Benson and Ward (2013) evaluated three professor's teaching expertise with the lens of TPACK framework. They found that technological knowledge alone is not enough for developing TPACK skills. One should have an adequate pedagogical knowledge first.

Adopting the technology integration process required time. Creating, organizing the online content took time. Ozkan & Koseler (2009) showed that information quality on Learning Management System positively correlated with students' perceived satisfaction. Therefore, in order to develop and improve the information on LMS, and maintaining it at a certain level is a demanding area. Previous research was in line with that finding as lack of time was found one of the barriers for developing e-learning environments (Birch & Burnett, 2009). Searching, finding, and learning about appropriate technologies for a specific context, developing teaching strategies, planning and organizing the course schedule, creating, updating, and maintaining the online sources. All of these processes require certain amount of time. Ocak (2011) investigated why higher education teachers do not teach blended courses with 117 faculty members from 4 universities in Turkey. Spending more time for designing and teaching blended courses was among the findings. Hence, teachers in higher

education hesitate to integrate technology into their teaching because it takes time. This finding is also another reason why tech support for instructors is crucial.

University policy for technology integration was raised as another issue. As universities provide online delivery mediums (Learning Management Systems - LMS) for organizing and administering online course information and assignments, (Luke & Morrissey, 2014), support mechanisms should also be developed for blended learning opportunities such as organizational infrastructure, faculty development and course development (Moskal, Dziuban, & Hartman, 2013). Previous research also supports this issue as Burnett (2009) investigated 14 university instructors and three instructional designers and they found that there were institutional barriers such as lack of institutional guidance and specialized training. Wu, Tennyson & Hsia (2010) stated that computer self-efficacy has positive effects on performance expectations. Therefore, educational institutions should support students for computer self-efficacy and encourage them to participate in blended courses. Holley and Oliver (2010) investigated online learning within four different cases. They stated that offering e-learning is not sufficient enough to meet the problems that students experienced. Not only new pedagogical approaches but also the new policies may need to be determined in order to satisfy the needs of the students. Lack of institutional support was among the reasons why Turkish higher education teachers do not teach blended courses (Ocak, 2011).

Essentially, the results of the current study indicated that certain challenges were experienced before, after, and during the restructuring process of the health-related physical activity course with technology. These challenges were in line with previous studies. Still, current research extends the literature as the significance of the collaboration between technology coach, instructor, and students against the problems and experiences that could be faced with during the transition period from traditional learning to the blended learning environment.

Research Question 3

What was the impact of restructuring the university HRF course with technology on students and instructor?

Data were collected with expert opinions, student and instructor interviews and reflections, researcher's field notes, and open-ended online student surveys. Thematic content analysis revealed a total of 5 themes: Classroom Management (1), Data Management (2), Differentiated Learning (3), Motivation (4), and Workload (5).

For the classroom management, technology integration has a big impact. Issues that increase students' inactivity time appeared to be decreased. For example, giving the information about the places of the class on certain days and the topic to be covered certain days were all online on LMS. Strand, Egeberg, and Mozumdar, (2010) stated that online HRF courses could decrease seat time and allow students be more active. One of the hesitations that the instructor had was decreasing the quality of the course. However, results showed technology integrated health-related physical activity course offered already analyzed and categorized data to the instructor whenever the students do their assignments. Similarly, Jenkins, Jenkins, Collums, and Werhonig (2006) found that the students perceived the physical fitness testing and wellness assignments, instructional techniques, and lastly meeting with people positively. On the other hand, the students perceived classroom meeting time, classroom management, and lack of team cohesion negatively. Online collaboration and interaction between students and the instructor were also reported at satisfied levels in current study. Previous studies were also in line with these findings as Wu, Tennyson & Hsia (2010) indicated that interaction and learning climate are among the primary determinants of college students' satisfaction in blending learning environments in Taiwan. They also emphasized that interaction significantly effects learning climate.

Data management was also one of the key findings in this study. One of the things that made the instructor happiest was all things went online and all the hardcopy materials piled up at instructor's office was gone. Instructor was also happy for another reason: he did not have to read and analyze all the assignments anymore because as soon as students complete and submit the online assignments, they were already analyzed and categorized before his eyes on LMS. LMS has also offered students to check how they were doing throughout the semester. Chou, Peng and Chang, (2010) stated that students could monitor and track their progress through course management systems.

Differentiated learning is another area that the technology integration had impact on. With relevant technology solutions offered with certain pedagogical strategies get the students, who have individual needs and differences, involved. Students reported that they could check their previous physical activity goals and their current situation on LMS. Keating, Wallace, Schafer, O'Connor, Shangguan, and Guan (2012) found that physical activity goal setting and planning were only included in approximately one third of the schools which offer CPE courses in USA. They also suggested most of the CPE courses remain in mastery knowledge, however, solving students' daily life problems should be the focus. With the instant and continuing feedback from physical activity technologies like heart rate monitors and smartphone applications, students reported to connect the knowledge they learned in class to the normal life situations. Ignico and Corson (2006) found that providing concrete feedbacks and evidences help teachers to motivate students for physical activity. Bort-Roig, Gilson, Puig-Ribera, Contreras and Trost (2014) stated that smartphone applications help to encourage goal setting, real time feedback, and social support. Instructor also mentioned he can be assured about each individual's development with information on LMS. Similarly, Cooner (2010) indicated in his research that online lectures and communication tools can encourage students to reflect. On the other hand, instructor also reported that the students who procrastinate things or event don't do the assignments are always the same ones. Research was also in line with this finding. Owston, York, and Murtha (2013) investigated 577 university students' perceptions in Canada with regard to blended learning. Results showed that high achievers were

more satisfied with blended learning when comparing to low achievers. While high achievers thought that blended learning is more engaging, convenient and enabling to be learned more than the traditional face-to-face courses, low achievers found not to be able to deal with blended learning environment.

Motivation was another theme emerged from the findings. Nicole, Lenders, Sherman and Ward (2003) stated that the top three reasons to enroll in a physical activity class were to learn a new activity (20%), to have fun (18%), and to improve physical skills (18%). Therefore, motivating students for physical activity is very crucial. However, Keating, Wallace, Schafer, O'Connor, Shangguan, and Guan (2012) found that only less than 10% of the schools include social support for physical activity in CPE courses in USA. Current research showed that students found physical activity technologies like exergaming and smartphone applications fun. Previous research also supports these finding. A research with GPS devices indicated that acceptability and ease of use rates were high, and wear related concerns were low. The young participants with higher education background found that the GPS device made the study interesting (Zenk, Schulz, Odoms-Young, Angela, Wilbur, Matthews, Gamboa, Wegrzyn, Hobson, & Stokes, 2012). Sun (2012) stated that although it is questionable to increase physical activity of children, exergames could help to improve for physical activity motivation.

Workload emerged as another area which the technology integrated health-related physical activity course had impact on. Milroy, Orsini, D'Abundo, and Sidman (2013) found that the students who prefer online lifetime physical activity and wellness lectures rather than face-to-face courses. They suggested that instructional activities could be designed accordingly. Hence, the university students can be challenged in online lectures more. Sidman, Fiala, and D'Abundo (2011) found that students select online physical activity courses to balance the social responsibilities and work. Academic workload was found one of the barriers since adopting and integrating technology in education takes time (Birch & Burnett, 2009). Cerezo, Sanchez-Santillan, Paule-Ruiz, & Nunez, (2016) investigated learning management system interaction patterns of 140 undergraduate students and they defined four

different patterns with two category named Task oriented groups (socially focused & individually focused) and Non-Task oriented groups (procrastinators & non-procrastinators).

Consequently, previous studies support the findings of this research by means of impact of a blended learning design. Nonetheless, current research extends the knowledge for technology integration into physical education settings. Findings of this study showed that re-designing process with technology was documented in-depth with the pros and cons during the phases/semesters. The transition from traditional to blended learning environment was well embraced by the instructor since most of the needs in the beginning point were satisfied. According to the impact of the new-look design, with all the voices and reflections of the participants, both instructor's and students' job observed to be easier.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

In this very last chapter, the conclusion of the current findings, implications emerged from this research and recommendations regarding the results for related stakeholder are provided.

6.1. Conclusions

As a brief, the results of the current research shed a new light on re-structuring the traditionally designed university physical activity courses with technology. The potential of the design principles in this research for the instructor and the students can be a good example for other university physical activity classes. All the stakeholders for university physical education setting can benefit from the implications of this research.

1. The design principles for restructuring a university HRF course with technology

Based on the literature, five main design principles were generated within this context: 1. Offering differentiated learning. 2. Data management with technology. 3. Providing classroom management with technology. 4. Using physical activity technologies. 5. Opportunities for collaboration with technology.

2. The challenges for restructuring a university HRF course with technology

The results of the qualitative data analysis revealed that there are five main challenges that were faced with during the restructuring process: 1. Attitudes towards Technology (Instructor's and Students' attitudes), 2. Ethical Considerations (Confidentiality), 3. Need for Tech Support (Accessibility, Device Management,

Software Issues), 4. Need for Time to adapt (Adaptation Period), and lastly 5. University Policies for Technology Integration (University Regulations).

3. The impact of restructuring the university HRF course with technology

The results of the qualitative data analysis revealed that the TE-HRF course has impact on five main areas: 1. Classroom Management (Classroom Interaction, Planning, Teaching Strategies), 2. Data Management (Cost-effectiveness), 3. Differentiated Learning (Using technology to understand content, Meaningful Feedback), 4. Motivation (Students' and Instructor's motivation, appreciation for technology) and 5 Workload (Instructor's and Students' workload).

As a conclusion, restructuring process with technology was successful. The transition from traditional learning to blended learning environment in a university health related physical activity context constitutes a valuable example.

6.2. Implications of the study

Regarding the results of this study, there are certain implications as follows:

1. A total of five design principles for a technology enhanced health-related physical activity course were generated as an example for counterparts and stakeholders.
2. The impact of a technology enhanced health-related physical activity course for the teaching and learning practices was described in-debt.
3. Physical Activity Technologies are influential for students to promote and motivate for physical activity.
4. Instructor's job got easier with a technology assistant beside a course assistant.
5. Students can manage, monitor and follow their progress with a well-designed course medium.

6.3. Recommendations

With regards of the findings of this study, following recommendations were proposed for the researchers, practitioners, technology coaches, administrators and policy makers:

1. Researchers

- Since this research was designed for university students, it would be interesting to apply this research with the k-12 students as the possible results would be contributed to the field.
- With a possible experimental design, it was recommended that the effectiveness of this design could be checked especially for physical activity levels of students.

2. Practitioners / Instructors

- Providing rich learning environments to students by means of physical activity technologies were highly recommended since promoting physical activity with boosted motivation.
- It was recommended to choose formal mediums and learning management systems offered by university comparing to social media platforms and video sharing websites because of ethical issues to let the students remain in confidentiality.
- Since the attitude towards technology draws attention in this study, it was recommended to be more supportive for students to use technology.
- Adopting the emerging technologies requires time. Hence practitioners don't take it quick and then give up.

3. Technology Coaches

- The online learning environments should be designed user-friendly since there would be some students who have negative attitudes towards technology.
- Since the instructors can be resist changing during the transition period for integrating technology in their teaching, technology coaches were highly recommended to be more supportive for the motivational factors.
- It was recommended to consider the time requirement for instructional design since thinking, solving problems, applying strategies takes time.

4. Administrators

- It was recommended that the administrators should monitor the needs of instructors and provide support for the related issues.
- It was recommended that administrator's role is important as a bridge between the instructor and tech support person.

5. Policy Makers

- It was recommended that universities should create and maintain positions for tech support to instructors.
- It was recommended that university policies should always be under supervised according to the needs of the current semester.
- It was recommended that the existing buildings' architectural plans should be inspected according to technology implementations.
- It was recommended that future buildings' architectural plans should be technology-friendly.

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APPENDICES

APPENDIX A: ETHICAL COMMITTEE APPROVAL

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

DUMLUPINAR BULVARI 06800
ÇANKAYA ANKARA/TURKEY
T: +90 312 210 22 91
F: +90 312 210 79 59
ueam@metu.edu.tr
www.ueam.metu.edu.tr

Sayı: 28620816/

09.06.2014

Gönderilen : Doç. Dr. Mustafa Levent İNCE
Beden Eğitimi ve Spor Bölümü

Gönderen : Prof. Dr. Canan Özgen
IAK Başkanı

İlgi : Etik Onayı

Danışmanlığını yapmış olduğunuz Beden Eğitimi ve Spor Bölümü öğrencisi Kıvanç Semiz'in "Effectiveness of a Technology Integrated Health Related Fitness Course" isimli araştırması "İnsan Araştırmaları Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

09/06/2014

Prof.Dr. Canan Özgen
Uygulamalı Etik Araştırma Merkezi
(UEAM) Başkanı
ODTÜ 06531 ANKARA

APPENDIX B: CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Semiz, Kıvanç
Nationality: Turkish (TC)
Date and Place of Birth: 3 July 1985, Rize
Phone: +90 505 373 14 23
email: kivancsemiz@gmail.com

EDUCATION

Degree	Institution	Year of Graduation
MS	METU Physical Education and Sports	2011
BS	KTU Primary School Teacher Education	2007
High School	Rize Anadolu Lisesi, Rize	2003

WORK EXPERIENCE

Year	Place	Enrollment
2008-Present	METU Department of Physical Education & Sports	Research Assistant
2015-2016	SUNY Cortland Physical Education Department	Visiting Scholar

PUBLICATIONS

Semiz, K. & İnce, M. L. (2012). Pre-service physical education teachers' technological pedagogical content knowledge, technology integration self-efficacy and outcome expectations. *Australasian Journal of Educational Technology*, *28*(7), 1248-1265.

PEER-REVIEWED ORAL PRESENTATIONS

Semiz, K., İnce, M.L. (2011). *Adaptation and Validation of Teachers' Knowledge of Teaching and Technology, Technology Integration Self-efficacy and Outcome Expectations Questionnaires for Pre-service PE Teachers.* 16th Congress of European College of Sport Science. July 6-9, Liverpool, England.

Semiz, K. (2014). *University Students' Past Physical Education Lesson Experiences.* 7th National Sport Sciences Student Congress. May, 15-17, Karaman, Turkey.

Semiz, K., Baran, E., Baert, H. & İnce, M.L. (2015). *Designing a Health Related Fitness Course with Technological Pedagogical Content Knowledge Framework.* SHAPE America PETE & HETE Conference, October 28-31, Atlanta, GA, USA.

PEER-REVIEWED POSTER PRESENTATIONS

Semiz, K. & İnce, M. L. (2012). *Pre-service Physical Education Teachers' Technological Pedagogical Content Knowledge, Technology Integration Self-efficacy and Outcome Expectations.* 2nd International Social Sciences in Physical Education and Sport Congress, May 31st – June 2nd, Gazi University, Ankara, Turkey.

Semiz, K. (2012). *Perceived messages of a weight-loss reality TV show in Turkey: Concentrating on Different Stakeholders.* Applied Education Congress, 13-15 September, Middle East Technical University, Ankara, Turkey.

Kayaduman, H., **Semiz, K.** , Sertel, O. and Tokel, S. (2012). *Design and Development of Physical Activity Environment in 3D Virtual World.* Association for Educational Communications and Technology International Convention, October 30th- November 4th, the Galt House, Louisville, KY.

Semiz, K. & İnce, M. L. (2012). *Analysis of instruction: A case study of a technology-enhanced physical education course.* 12th International Sport Sciences Congress, 12-14 December, Pamukkale University, Denizli, Turkey.

Erkmen, G., Miçooğulları, O.B., **Semiz, K.**, Asçı, H. (2010). *The Collective Efficacy Questionnaire: It's Psychometric Properties for Turkish Athletes.* 15th Congress of European College of Sport Science. 23-26 June, Antalya, Turkey.

APPENDIX C: TURKISH SUMMARY

GİRİŞ

Birçok araştırma üniversite öğrencilerinin fiziksel aktivite seviyelerinin düşük olduğunu göstermiştir (Cengiz, İnce, & Çiçek, 2009;Ullrich-French, Cox, & Bumpus, 2014). Bu nedenle üniversiteler öğrencilerine sağlıklı yaşam stilleri ve hayat boyu fiziksel aktivite alışkanlığı kazandırma amacıyla sağlıkla ilişkili fiziksel uygunluk derslerini müfredatlarına dâhil etmektedirler (Hensley, 2000; Kulinna, Warfield, Jonaitis, Dean, & Corbin, 2009). Bir sağlıkla ilişkili fiziksel uygunluk dersi genellikle şu dört bilgi ve beceriden oluşur: 1. Vücut Kompozisyonu, 2. Kardiyovasküler Dayanıklılık, 3. Kas Kuvveti ve Dayanıklılığı, 4. Esneklik (ACSM, 2014). Sağlıkla ilişkili fiziksel aktivite dersleri genellikle öğrencilere lise eğitimleri boyunca verilen beden eğitimi dersleri aracılığıyla fiziksel uygunluk kavramları ile alakalı temel bilgiler sağlar. Üniversite ortamında sağlıkla ilişkili fiziksel uygunluk dersleri sunmak, öğrencilerin fiziksel aktiviteye katılımında önemli bir rol oynar. Araştırmalar sağlıkla ilişkili fiziksel uygunluk bilgisinin üniversite öğrencilerinin fiziksel aktivite seviyelerini geliştirdiğini göstermiştir (Ferkel, Judge, Stodden & Griffin, 2014). Sağlıkla ilişkili bir fiziksel aktivite dersi ayrıca öğrencilerin fiziksel, psikolojik ve duygusal zindeliklerini geliştirir (Li, Lu & Wang, 2009). Adam, Graves ve Adam'ın (2006) araştırmasındaki benzer sonuçlara göre sağlıkla ilişkili fiziksel aktivite dersi öğrencilerin sağlıkla ilişkili fiziksel uygunluk bilgisini geliştirmesinde yardım etmiş ve dört yıl sonrasında bile öğrencilerin bu bilgiyi hatırladıkları görülmüştür. Nicole, Leenders, Sherman ve Ward (2003) çalışmalarında öğrencilerin genellikle fiziksel aktivite derslerini eğlenmek, yeni bir fiziksel aktivite öğrenmek ya da yeni bir beceri geliştirmek için seçtiklerini göstermişlerdir. Jenkins, Jenkins, Collums ve Werhonig (2006) öğrencilerin fiziksel aktivite derslerinde fiziksel testleri, yeni insanlarla tanışmayı ve ödevlerini tamamlamayı olumlu olarak algıladıklarını çünkü kendi fiziksel uygunluk ve zindelik hedeflerini belirleme ve bunlara yönelik sorumlu olma konusunda öğrencileri desteklediği görülmüştür.

Sağlıkla ilişkili fiziksel uygunluk derslerini sunmak önemli olduğundan, söz konusu derslerin içerik ve tasarımları da değerlendirilmelidir. Keating ve arkadaşları (2012)

86 Amerikan üniversitesinin sağlıkla ilişkili fiziksel uygunluk dersi müfredatını incelemiş ve derslerin sağlıkla ilişkili fiziksel aktivite bilgisinde derinleşme seviyesinde kaldığını bulmuşlardır. Oysa araştırma da tavsiye edildiği üzere, bahsi geçen derslerde öğrencilerin fiziksel uygunluk bilgisini günlük hayatlarında uygulamaları için ilgili fiziksel uygunluk becerilerini öğretmek de ayrıca bir odak olmalıdır. Beden Eğitimi ve Sağlık Birliği (SHAPE, önceki adıyla NASPE), beden eğitiminde fiziksel uygunluk öğretimi için bir öğretim tasarımı geliştirmiş ve öğrencilerin bu konu hakkında bilgi ve beceri gelişimi için içerik yönergeleri sağlamıştır. Bu çerçeveye göre bütün ilk ve orta öğretim ile beraber yükseköğretimdeki öğrencilerin sekiz farklı alanda bilgi ve beceriler göstermeleri beklenmektedir: Teknik, Bilgi, Fiziksel Aktivite, Sağlıkla ilişkili Fiziksel Uygunluk, Kişisel ve Sosyal Davranışlarda Sorumluluk, Değerler, Beslenme ve son olarak da Bilinçli Tüketici olma. Üniversite sağlıkla ilişkili fiziksel aktivite dersleri bu sekiz ana alanı içerecek şekilde tasarlanabilmektedir.

Sağlıkla ilişkili fiziksel uygunluk derslerinin tasarımları gittikçe yeni teknolojilerden etkilenmeye başlamaktadır. Örneğin, kalp atım hızı monitörleri, adımsayarlar, GPS saatler ve son zamanlarda akıllı telefon uygulamaları öğretmenlere derslerini zenginleştirmek ver otantik öğrenme ortamları sunmak için geniş seçenekler sunmaktadır (Mohnsen, 2012; Roth, 2014). Ayrıca son yıllarda web tabanlı teknolojiler de daha işbirlikçi ve etkili bir şekil almıştır. Öncelerde Web 1.0 olarak anılırken sadece bilgi sunma amaçlı olan bu web tabanlı teknolojiler, son yıllarda Web 2.0 olarak adlandırılan, insanların işbirliği yapabileceği, kendi bilgilerini yaratabilip paylaşabileceği, bloglar ve wikiler gibi çeşitli araçlarla donatılmış bir platform halini almıştır (Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, 2013).

Çevrimiçi öğrenme ortamlarını klasik yüz yüze eğitim ortamlarıyla bütünleştirmek anlamlı öğrenme için zengin öğrenme ortamları sağlar (Garrison & Vaughan, 2008). Bu tarz bir eğitim tasarımı web destekli eğitim ya da harmanlanmış öğrenme (blended learning) olarak adlandırılır. Uygun planlama ve destek ile karma öğrenme öğretim üyelerinin gelişimi ve öğrencilerin öğrenme tecrübelerinin tatmininde cesaret verici bir değişime öncülük eder. (Moskal, Dziuban, & Hartman, 2013).

Araştırmalar web destekli eğitimin ve çevrimiçi eğitimin öğrencilerin sağlıkla ilişkili uygunluk bilgisini yükseltebildiğini göstermiştir (Keating ve arkadaşları, 2009). Strand, Egeberg, ve Mozumdar'a göre 2010 yılında Amerika'daki üniversitelerin yaklaşık yarısı web destekli sağlıkla ilişkili fiziksel uygunluk dersi sunmaktadır. Ve bu dersler sınıfta oturma süresini azaltıp zamanı daha aktif olarak kullanma fırsatı sunmaktadır. Etkili bir şekilde çevrimiçi ders içerikleri ve ödevleri oluşturmak için, üniversiteler Öğrenme Yönetim Sistemi (Learning Management System) de denilen çevirimiçi içerik sağlama ortamlarını kullanıma sunmaktadırlar (Luke & Morrissey, 2014).

Teknoloji ile bütünleşik dersleri tasarlamak, geliştirmek ve test edip uygulamak zorlu bir süreç olabilir. Baert (2011) Amerika'daki beden eğitimi öğretmenliği bölümleri ile yaptığı çalışmada öğretim üyelerinin teknolojiyi kullanmada güvensiz hissettikleri, düşük yeterlilikte oldukları ve genelde geleneksel bilgisayar teknolojileri kullanmakta olduklarını bulmuştur. Teknoloji koçları, öğretmenlerin teknolojiyi kullanmada güven kazanmalarına yardımcı olup eğitim ortamlarında önemli bir role sahip olabilirler (Sugar, 2005). Baran ve arkadaşları (2013) yükseköğretimdeki öğretmenlerin teknolojiyi eğitim ile bütünleştirmedeki perspektiflerini yeniden şekillendirmek için; onların görüşlerini dinlemek, onlara katılımcı bir rol vermek ve tecrübelerini kullanmanın çevrimiçi öğretme uygulamalarını kuvvetlendirmede kritik olduğunu ortaya koymuştur. Sonuç olarak, teknoloji ile bütünleştirme süreci, yükseköğretimdeki öğretim elemanlarının bilgisi, teknolojiyi kullanma becerisi ve teknoloji ile öğretme tecrübelerine yönelik algıları ile daha da iyileştirilebilir.

Teknolojiyi öğretme ve öğrenmede kullanmanın gerekliliği ve yararları genel kabul gördüğü halde teknolojiyi bütünleşmiş etme süreci belli engeller de içermektedir. Örneğin, Kim ve arkadaşları (2012) öğretmenlerin sınıf ortamları ve projelerinde yeni fikirleri yansıtmak için çeşitli medya teknolojileri kullanmada zorluklar yaşadığını göstermiştir. Öte yandan Ertmer ve arkadaşları da (2015) öğretmenleri teknoloji kullanmada engelleyen en büyük bariyerlerin teknolojiye karşı var olan tutum ve davranışlar ile o andaki teknoloji bilgi ve becerileri olarak ortaya

koymuştur.

Bir süre öncesinde kadar teknoloji ile bütünleştirme öğretmenler için bir "seçenek" olarak değerlendirilmekteydi. Fakat, eğitim teknolojilerinin öğrencilere sunabileceği iyileştirmeler ile birlikte artık öğretmenler teknolojiyi derslerine entegre etme konusunda cesaretlendirilmektedirler ve teknolojiyi eğitim öğretim ortamlarında etkili bir biçimde kullanmak, öğretmenlerden beklenen kaçınılmaz bir beceri olarak ortaya çıkmıştır. (Roth, 2014). 2000'li yılların başlarında Tinning şu an yaşadığımız zamanları "Yeni Zamanlar" olarak öngörerek, bu ortamın kendi kavram ve sonuçlarına göre tartışılması gerektiğini öneriyordu. Bu 16 yıl içerisinde öğretmenlerden teknolojiyi derslerine entegre edecek gerekli bilgi ve becerilere sahip olmaları beklenir hale geldi. Eğitim ortamındaki genel eğilimde öğretmenler, belirli bir teknolojinin satın alınabilirliğine ve ulaşılabilirliğine göre öğrencileri bu söz konusu teknolojilere uygun hale getirmeye çalışmaktadırlar. Hâlbuki araştırmaların gösterdiği üzere ilk olarak öğrencilerin ihtiyaçları göz önünde bulundurularak bir ders planı hazırlanmalı, daha sonra uygun aktiviteler seçilerek uygun teknolojilerin kullanılması ile öğrenme sağlanmalıdır (Niess, 2005; Hofer & Harris, 2009, Juniu, 2011). Bellir bir eğitimi çevrimiçi teknoloji kullanarak sunma çabasına harmanlanmış (Blended) eğitim adı verilir (Graham, 2006). Bu tarz bir eğitimin etkililiği alan yazında birçok farklı alanda ortaya konmuştur; bilgi işlem sistemleri öğretimi (Hoic-Bozic & Mornar, 2009), anatomi dersi (Pereira, ve ark., 2007), yabancı dil (Wang, Shen, Novak, & Pan, 2009). Bu araştırmada da, geleneksel öğretim yöntemi, çevrimiçi ortamlarla birleştirilerek bir öğrenme ortamı yaratılmaya çalışılmıştır.

Üniversite öğrencilerine verilen fiziksel aktivite derslerinde yeterli içerik ve zengin öğrenme ortamları sağlanması çok önemlidir. Öğrenme ortamlarının zenginleştirilmesinde de fiziksel aktivite teknolojileri önemli yer tutmaktadır. Bu teknolojiler, GPS (Uydu yer takip sistemi) entegreli cihazlar, adımsayarlar, kalp atım hızı montörleri, interaktif oyunlar (exergaming), çeşitli mobil uygulamaları, fiziksel aktivite takip cihazları ve çeşitli giyilebilir teknolojiler olarak sıralanabilir. Alan yazına bakıldığında birçok farklı çalışmada ve farklı popülasyonlarda bu

teknolojilerin kullanıldığı ve olumlu sonuçlar alındığı görülmüştür (Cayir, Aslan & Akturk, 2016; Zenk, ve ark., 2012; İgnico, Corson & Vidoni, 2006).

Belli alanlarda teknoloji ile iyileştirme çözümleri sunmak, belli pedagojik stratejilerle gerekli eğitim teknolojileri arasında bağlantı yapmakla olur (Koehler & Mishra, 2009). Son yıllarda, Teknolojik Pedagojik Alan Bilgisi (TPAB), herhangi bir konuyu uygun bir teknoloji ve gerekli pedagojik perspektiflerle sunmada çokça çalışılır ve araştırılır hale gelmiştir. Öğrencilerin ve öğretmenin ihtiyaçlarına göre bir teknoloji ile bütünleşik sağlıkla ilişkili fiziksel aktivite dersi tasarlamada TPAB, bu bağlamda bir teorik çerçeve sunabilir. Bu araştırma ile sağlıkla ilişkili fiziksel aktivite dersini teknoloji ile yeniden tasarlarken, bir anlamda dersi veren öğretim üyesinin de Teknolojik Pedagojik Alan Bilgisi becerilerini geliştirmek söz konusudur.

Bu çalışmada araştırmacı bir büyükşehirdeki üniversitede verilen sağlıkla ilişkili fiziksel aktivite dersini vaka olarak seçmiştir. Bahsi geçen üniversite sağlıkla ilişkili fiziksel aktivite dersinin, sağlıklı davranışlar geliştirme ve hayat boyu fiziksel aktiviteyi teşvik etme odağıyla öğrencilere pozitif etkilerde bulunduğu çalışmalarla gösterilmiştir (İnce, 2008, İnce & Ebem, 2009; Müftüler & İnce, 2015). Çevrimiçi eğitim ile klasik yüz yüze eğitim ne derecede kaynaştırılmalı, teknoloji sınıf aktivitelerini ne ölçüde destekleyebilir ve uygun öğretim stratejilerine karar verirken hangi teknolojiler seçilmeli sorularını sorarak yola çıkılan bir teknoloji ile bütünleştirilmiş sağlıkla ilişkili fiziksel aktivite dersi tasarlamada, Tasarım Temelli Araştırma (TTA) bu süreçte yol gösterici olacaktır.

Bu çalışmanın amacı, bir üniversite sağlıkla ilişkili fiziksel aktivite dersinin teknoloji ile yeniden tasarlanma sürecini ve bu tasarımın öğrencilerle öğretmene etkisini incelemektir.

Bir üniversite öğretim üyesinin hali hazırda verdiği bir sağlıkla ilişkili fiziksel uygunluk dersinde karşılaştığı sorunlar ve yaşadığı tecrübeleri temel alarak, dersin öğretim tasarımının teknoloji ile yeniden şekillendirilmesine odaklanılmıştır.

Öğretim üyesinin ve öğrencilerin sorunlarına çözüm odaklı stratejiler geliştirilerek ve bu değişikliklerin öğrenme öğretme ortamlarına etkisi incelenerek süreç devam ettirilmiştir.

Araştırma Soruları

İlk iki soru sağlıkla ilişkili fiziksel uygunluk dersinin öğretim tasarımı ile alakalı iken, üçüncü ve son soru ise teknoloji ile bütünleştirmenin öğrenci ve öğretmene etkisine odaklanmaktadır.

1. Bir üniversite sağlıkla ilişkili fiziksel aktivite dersinin teknoloji ile yeniden tasarlanmasındaki tasarım prensipleri nelerdir?
2. Bir üniversite sağlıkla ilişkili fiziksel aktivite dersinin teknoloji ile yeniden tasarlanmasında karşılaşılan engeller nelerdir?
3. Bir üniversite sağlıkla ilişkili fiziksel aktivite dersinin teknoloji ile yeniden tasarlanmasının öğrenci ve öğretmene etkisi nedir?

Çalışmanın önemi:

Strand, Egeberg ve Mozumdar (2010)'a göre, Amerika Birleşik Devletleri'ndeki üniversitelerde verilen sağlıkla ilişkili fiziksel aktivite derslerinin neredeyse yarıya yakını web desteklidir ve bu derslerin etkililiği incelenmelidir. Melton ve Burdette (2011)'nin ifade ettiği üzere, Öğrenme Yönetim Sistemleri (LMS) üniversite fiziksel aktivite programlarının organizasyonunu ve etkililiğinin arttırılmasına yardım eder. Bununla birlikte, teknoloji ile bütünleştirmenin bir üniversite fiziksel aktivite dersine etkisi ve bu sürecin derinlemesine anlaşılması henüz araştırılmış değildir. Dolayısıyla, bu çalışma teknolojinin çeşitli şekillerde pedagojik olarak kullanılmasının bir üniversite sağlıkla ilişkili fiziksel aktivite dersini nasıl şekillendirdiği ve öğrenci ile öğretmene nasıl farklı tecrübeler edindirdiğinin görülmesi için bir fırsat sunmaktadır.

Teknolojik Pedagojik Alan Bilgisi ile alakalı 2002 ve 2011 yılları arası araştırmaları

inceleyen bir derleme çalışmasına göre (Wu, 2013), örneklem gruplarının %54.2'sinin aday öğretmenlerden ve %37.5'inin ilk ve orta öğretim okullarında görev yapan öğretmenlerden seçildiği görülmüştür. Üniversitelerde öğretim üyeleri ile ilgili çalışmaların sadece %8'de kaldığı ortaya konmuştur. Dolayısıyla, yükseköğretimdeki eğitmenleri içeren TPAB tabanlı bir çalışmanın literatüre önemli bir katkı sunacağı düşünülebilir. Aynı derleme çalışmasında (Wu, 2013) TPAB ile alakalı çalışmaların genellikle matematik, sosyal bilimler, fen bilimleri ve yabancı dil konularında olduğu vurgulanmıştır. Araştırmacının bilgisine göre TPAB ve beden eğitimi ile alakalı araştırmalar son derece limitlidir. TPAB teorik çerçevesi ile bir üniversite sağlıkla ilişkili fiziksel aktivite dersinin teknoloji ile yeniden tasarlanması için dijital araçlar, öğrenme hedefleri ve ölçme-değerlendirme tekrardan düşünülmüştür. Bu yüzden bu çalışmanın TPAB literatürüne değerli bir katkı sunabileceği söylenebilir.

YÖNTEM

Bir teknoloji ile bütünleştirilmiş sağlıkla ilişkili fiziksel aktivite dersinin tasarım unsurlarını ve etkisini anlamak için öğretim tasarımına odaklanılmalıdır. Bir öğretim tasarımını tekrar tekrar oluşturma, değiştirme, geliştirme fırsatını sunmada Tasarım Tabanlı Araştırma kullanılmıştır. Gerçek yaşamdaki öğretme ve öğrenme problemlerini temel alarak tekrarlanan süreçlerde çözüm önerileri yaratan ve geliştiren Tasarım Temelli Araştırma, öğretim tasarımı tatmin edici bir aşamaya gelene kadar değişimi ve iyileştirmeyi sağlar (Reeves, 2006).

Yenilik ve Yaratıcılık, 21. yüzyılda öğretmenlerin sahip olması gereken özellikler olarak öne çıkmakta, her daim etkili öğretme stratejilerine yönelik bir araştırma içinde olmaları beklenmektedir. Yeni öğretmen stratejilerini düşünürken de denemek tabi ki önemlidir. Peki, denemeye değer olup olmadığını nasıl anlayacaklar? Ya umdukları gibi sonuç elde edemezlerse? Ya da karşılaştıkları problemlere karşın yeni çözümler ve geliştirmelerle yollarına devam etmeliler mi? İşte bütün bu süreç ve çabalar, yeni bir şey öğrenme, onu deneme, değiştirip tekrar deneme, Tasarım Temelli Araştırma'nın birer parçasıdır. Araştırmacılar, çevrimiçi öğrenmeyi dersin kalitesini düşürmeden öğrenmek için Tasarım Temelli Araştırma'ya karşı süregelen

bir ilgi içindedirler (Barab & Squire, 2004; Shattuck & Anderson, 2013).

Bu çalışma, bir öğretim üyesinin alanda karşılaştığı problemlerinden yola çıkarak, bir sağlıkla ilişkili fiziksel aktivite dersinin teknoloji ile yeniden tasarlanmasına odaklanmıştır. Bu süreçteki ana odak noktası, Teknolojik Pedagojik Alan Bilgisi ışığında öğretim üyesinin problemlerine çözüm odaklı yaklaşımlar sunmak ve ortaya konan yeni eğitim tasarımının öğretim üyesi ve öğrenciler üzerinde ne gibi etkileri olduğunu incelemektir. Bu çalışma, ilgili paydaşlara bir sağlıkla ilişkili fiziksel aktivite dersinin teknoloji ile bütünleştirilmesindeki ihtiyaçlarını gösterme açısından iyi bir örnek teşkil edecektir.

Bir eğitim tasarımının teknoloji ile yeniden tasarlanması konusunda belirli eğitim stratejileri ile seçilen teknolojik araçlarla öğrenme ortamını birbiri içerisinde tekrar eden süreçlerde (Sömestr/dönem) devam ettirmeyi sağladığı için Tasarım Tabanlı Araştırma bu çalışma için uygun bir araştırma deseni olarak düşünülmüştür. Bu tekrarlanan süreçlerde ne gibi kararlar alınacağına, nelerin değiştirilip nelerin uygulanacağına bakılarak süreç yürütülür (Teras & Herrington, 2014; Van den Akker ve ark., 2006).

Bu çalışma Bahar 2012-2013 yarıyılından başlamak suretiyle Sonbahar 2014-2015 yarıyılına kadar toplam 5 sömestr boyunca yürütülmüştür. Nitel araştırma yöntemi ile veriler öğretim üyesi ve öğrencilerle yapılan görüşmeler, alan gözlem notları, uzman görüşü, öğrencilere açık uçlu sorular aracılığı ile toplanmıştır. Araştırmacının bu çalışmadaki rolü; öğretim üyesine bir teknoloji koçu olarak destek vermek ve katılımcı gözlemci olarak derslerde bulunmaktır. Birinci sömestrde araştırmacının katılımcı/gözlemci rolüyle takip ettiği dersler boyunca bir ihtiyaç analizi yapılmış ve öğrencilerin ve öğretim üyesinin karşılaştığı belirli problemler ortaya konmuştur. Bu ihtiyaç analizinin sonucunda belli stratejiler belirlenmiştir. Problemlerden bazıları;

Öğretim Üyesi açısından;

1. Çeşitli ödevler, anketler, ders notları vb. portfolyo içerikleri için aşırı derecede kâğıt israfı olduğundan şikâyet edilmiştir.

2. Öğrencilerin ders materyallerini yönetmek zaman ve alan açısından sorun yaratmaya başlamıştır.
3. İş yükü, yaş ve yıllardan beri birçok öğrenci ile muhatap olunmasından ötürü, öğretim üyesi yeni öğrencilerin isimlerini öğrenmede sıkıntı yaşamaktadır.
4. Hali hazırda ders belli bir seviyede bireyselleştirilmiş eğitim fırsatları sunduğu halde, dersin akışı içerinde zaman yetersizliğinden ötürü belli başlı geri bildirimlerin hemen her öğrenciye verilebilmesi hususunda tereddütler doğmuştur.
5. Öğrencilerin arada sırada kendilerine spor salonunda ya da laboratuvarda verilen portfolyolarını oluşturan ders materyallerini kaybetmektedirler.

Öğrenci açısından;

1. Zorunluluk olduğu halde, öğrencilerin bir nevi bir kişisel fiziksel uygunluk ve sağlık dosyası olan portfolyolarını not verilmesi için öğretim üyesine verdikten sonra geri almayı unutmaları bir problem olarak ortada durmaktadır.
2. Spor salonunun kendine özgü ortamı ve zaman kısıtlılığı gibi nedenlerden ötürü öğrencilerin belli bilgi seviyeleri ve tecrübelerini paylaşma konusunda ve işbirliği yapma konusunda sınırlı seviyede ilişki içerisinde bulundukları görüldü.
3. Dersin nerede ve nasıl yapılacağı ile alakalı öğrencilerin karışıklık yaşadığı ve belli konularda soru sormak ve bilgi almak için öğretim üyesine ulaşma yollarının kısıtlı olduğu görüldü.

Bir teknoloji ile bütünleştirilmiş eğitim tasarımı yapmada tasarım prensiplerini belirlemek için alan yazın taraması sonucunda beş adet prensip belirlenmiştir. Bu beş adet tasarım prensibine göre hâlihazırda on yıldır öğrencilere seçmeli olarak sunulmakta olan bir sağlıkla ilişkili fiziksel aktivite dersi, teknoloji ile yeniden tasarlanma sürecinde gözden geçirilmiştir. Birinci prensip Farklılaştırılmış Eğitim'dir. Teknoloji ile bütünleştirme öğretmenlere eğitim sürecini öğrencilerin hazır bulunurluk seviyelerine göre kişiselleştirme ve farklılaştırma imkânı verir

(Harris, Mishra, & Koehler, 2009; Davies, Dean, & Ball, 2013). Belli pedagojik amaçlar için seçilen uygun teknolojiler, öğretmenlere her bir birey için uygun geribildirim verme imkânı sunar. Kişinin ihtiyacına göre dersi tamamını ya da bir kısmını şekillendirmek, kişiyi özgü öğrenme ortamları sağlamak farklılaştırılmış eğitimin sunduğu en önemli avantajdır. İkinci prensip olarak Teknoloji ile Veri Yönetimi seçilmiştir. Öğrenciler kendi eğitim süreçlerini izleyebildikleri ve takip edebildikleri için çevrimiçi öğrenme ortamlarına değer verirler (Chung & Ackerman, 2015).

Sağlıkla ilişkili fiziksel aktivite dersinin hâlihazırda birçok materyali öğretim üyesinin iş yükünü arttırmakta, bu materyallerin saklanması ve yönetilmesi/analiz edilmesi konusunda da zaman ve mekân sorunu ortaya çıkarmaktadır. Bütün materyallerin dijital hale getirilmesi, verilerin çevrimiçi hale gelmesine ve öğrencilerin ilgili verilerini takip imkânı sunar. Üçüncü prensip Teknoloji ile Sınıf Yönetimi sağlamak. Alan yazında eğitim teknolojisi kullanma becerileri direkt olarak sınıf yöntemimi becerileriyle ilişkilendirilmiştir (Varank & İlhan, 2013; Bester & Brand, 2013). Öğrencilere çevrimiçi öğrenme ortamı aracılığıyla önceden dersle alakalı bilgi vermek, sınıfta zaman tasarrufuna yardımcı olacaktır. Dördüncü prensip olarak Fiziksel Aktivite Teknolojileri Kullanma seçilmiştir. Fiziksel aktiviteyi teşvik etmede birçok yeni teknolojiler kullanılabilir. Adımsayarlar (Cayir, Aslan, & Aktürk, 2015), fiziksel aktivite takip cihazları (Diaz ve arkadaşları, 2015), kalp atım hızı monitörleri (Ignico & Corson, 2006) vb. Öğrenciler kendi fiziksel gelişimlerini takip için birçok farklı fiziksel aktivite teknolojileri hakkında bilgi sahibi olmuş, onları kullanarak derste kendilerine özgü geribildirimler almışlardır. Beşinci ve son prensip olarak Teknoloji ile İşbirliği Fırsatları Yaratma seçilmiştir. Teknoloji aracılığıyla bilgi elde etme ve beraber çalışma büyük bir potansiyele sahiptir (Goodyear, Jones, & Thomspon, 2015). Bahsi geçen derste öğrenciler kendi fiziksel aktivite seviyelerine göre (egzersiz basamakları anketi, uluslararası fiziksel aktivite anketi) gruplara ayrılarak dönem sonunda bu gruplarla ayrı ayrı webinarlar yapılmıştır. Ayrıca çevrimiçi öğrenme ortamında tartışmalar yapılarak işbirliği süreci iyileştirilmiştir.

Toplam beş sömestr boyunca, ders aktiviteleri yukarıda belirlenen beş tasarım

prensibine göre düşünüldü, oluşturuldu ve eşleştirildi:

1. Aşama (Bahar 2012-2013): Toplam 34 öğrencinin (18 erkek, 16 kadın) katıldığı bu dönemki derste; sağlıkla ilişkili fiziksel aktivite dersi derinlemesine gözlemlenmiş, karşılaşılan problemler not edilmiştir. Alan notları ve uzman görüşü ile veri toplanmıştır.

2. Aşama (Sonbahar 2013-2014): İki sınıfta toplam 44 öğrencinin (27 erkek, 17 kadın) katıldığı bu dönemki derste; dersin çevrimiçi ortamı olarak Facebook kullanılmıştır. Çevrimiçi işbirliği, ses kayıtları (podcast), çevrimiçi videolar ve Tablet PC kullanılmıştır. Alan notları ve Öğretim Üyesi yansımalarıyla veri toplanmıştır.

3. Aşama (Bahar 2013-2014): İki sınıfta toplam 50 öğrencinin (26 erkek, 24 kadın) katıldığı bu dönemki derste; odtuclass dersin çevrimiçi ortamı olarak seçildi ve test edilmeye başlandı. Ders materyalleri dijital hale getirildi. Laboratuvar dersleri videoya alındı ve çevrimiçi ortama aktarıldı. Öğrenciler için fiziksel aktivite takibiyle alakalı bir akıllı telefon uygulaması kullanıldı. Alan notları ve öğretim üyesi yansımalarıyla veri toplandı.

4. Aşama (Yaz Okulu 2013-2014): Toplam 25 öğrencinin (21 erkek, 4 kadın) katıldığı bu dönemki derste; çevrimiçi iletişim ve işbirliği ile ders tasarımı iyileştirmeleri yapıldı. XBOX ile dans oyunu kullanıldı. Veriler öğretim üyesi yansımaları, öğretim üyesi ve 6 öğrenci ile görüşme ve 12 öğrenci ile açık uçlu çevrimiçi anket ile toplandı.

5. Aşama (Sonbahar 2014-2015): İki sınıfta toplam 48 öğrencinin (22 erkek, 25 kadın) katıldığı bu dönemki derste; odtuclass ara yüzü iyileştirildi. Kalp atım hızı monitörleri ve akselerometreler kullanıldı. Sınıf videoları çevrimiçi ortama aktarıldı ve webinarlar düzenlendi. Veriler alan notları, öğretim üyesi ve 3 öğrenciden alınan yansıma notları ve 6 öğrenci görüşmesi ile toplandı.

Nvivo bilgisayar programı kullanılarak bütün nitel verilerin çeviri yazısı (transcription) yapıldı. Tematik İçerik Analizi yapılarak belli kodlar ve temalar elde edildi. Geçerlilik ve Güvenirlik için veri üçlemesi ve araştırmacı üçlemesi yöntemleri kullanıldı. Veri üçlemesi için birçok farklı veri kaynağından yararlanıldı (Uzman görüşü notları, araştırmacının alan gözlem notları, öğretim üyesi ile farklı dönemlerde yapılan görüşmeler, farklı öğrencilerle farklı dönemlerde yapılan görüşmeler, öğrenciler için açık uçlu sorular, öğrencilerin yansıma notları ve öğretim üyesi yansıma notları). Bu veri kaynaklarından elde edilen verilerin çözümlemeleri yapıldıktan sonra araştırmacı üçlemesi için beden eğitimi ve spor alanındaki bir uzman ile tematik içerik analizi yapıldı. Bunun için ayrı ayrı belirlenen kodlar karşılaştırıldı, temalar belirlendi. Beş sömestr boyunca süregelen bu çalışma boyunca öğretim üyesi ve öğrencilerden toplanan verilere göre bir sağlıkla ilişkili fiziksel aktivite dersi teknoloji ile yeniden tasarlandı.

BULGULAR

Araştırma Sorusu 1: Bir üniversite sağlıkla ilişkili fiziksel uygunluk dersini teknoloji ile yeniden tasarlamak için gerekli tasarım prensipleri nelerdir?

Sağlıkla ilişkili fiziksel uygunluk bağlamında teknoloji ile bütünleştirme eylemleri, alan yazından elde edilen toplam beş prensip ile gerçekleştirilmiştir. Bunlar 1. Farklılaştırılmış Eğitim Sunma, 2. Teknoloji ile Veri Yönetimi, 3. Teknoloji ile Sınıf Yönetimi Sunma, 4. Fiziksel Aktivite Teknolojileri Kullanma ve 5. Teknoloji ile İşbirliği Fırsatları Yaratma olarak belirlenmiştir. Toplam beş dönem/sömestr süren bu çalışmada, ilk dönemde yapılan ihtiyaç analizi sonrasında ikinci dönemden başlayarak bahsi geçen beş adet tasarım prensibine göre sağlıkla ilişkili fiziksel aktivite dersin teknoloji ile yeniden tasarlanma sürecine girmiştir. Her bir dönemde kullanılan ilgili aktiviteler gitgide artarak beşinci ve son dönemde bütün prensipleri içerecek şekilde tasarlanır hale gelmiştir.

Araştırma Sorusu 2: Bir üniversite sağlıkla ilişkili fiziksel uygunluk dersini teknoloji ile yeniden tasarlarken karşılaşılan zorluklar nelerdir?

Alan notları, uzman görüşü, öğrenci ve öğretim üyesi görüşmeleri ve yansımaları ve açık-uçlu çevrim içi anketlerin üzerinde yapılan tematik veri analizine göre; bir üniversite sağlıkla ilişkili fiziksel uygunluk dersini teknoloji ile yeniden tasarlarken toplam beş ana zorluk ortaya çıkmıştır. Bunlar 1. Teknolojiye karşı tutumlar, 2. Etik Kaygılar, 3. Teknoloji Destek İhtiyacı, 4. Teknolojiye Adapte Olmak için Zaman İhtiyacı ve 5. Teknoloji Entegrasyonu için Üniversite Politikaları olarak belirlenmiştir.

Teknolojiye karşı tutum bir zorluk olarak ortaya çıkmış, özellikle öğretim üyesinin dersin kalitesinin düşebileceği ile ilgili kaygısı ve ikinci dönemde çevrimiçi öğrenme ortamı olarak düşünülen ancak üçüncü dönemde terkedilen Facebook'u bir öğrenme ortamı olarak kullanmaya soğuk bakması yaşanan zorluklar arasındadır. Alan yazın da bu sonuçlarla paralellik gösterir. Baert (2011) beden eğitimi öğretim üyelerinin teknoloji kullanmada güvensiz oldukları ve düşük seviyede teknoloji kullanma becerileri olduğunu bulmuştur. Ertmer ve arkadaşları da (2012) teknolojiye karşı inanç ve tutumun öğretmenleri teknoloji kullanmada en güçlü bariyerlerden biri olduğunu ortaya koymuştur.

"Hâlihazırda dersin kalitesi belli bir seviyede. Teknolojiyi entegre edelim derken, dersin pozisyonu ne durumda olacak? Çok fazla kâğıt tüketiyoruz. Bu kadar büyük materyalleri saklamak ve yönetmek de bir problem. Ama öğrenciler bu fotokopilerden, ders materyallerinden memnun da olabilirler. Bunları dijital hale getirdiğimizde ödev yapma oranları düşedebilir."

Öğretim Üyesi Yansıma Notları, Sonbahar 2013-2014

Trinder (2016) Avustralya'da 175 üniversite öğrencisi ile yaptığı anket çalışmasında, öğrencilerin yabancı dil öğrenimi konusunda geleneksel yüz yüze sınıfları çevrimiçi sınıflara tercih ettiklerini bulunmuştur. Bu süreçte de üç ana bariyer tanımlamıştır: 1. Teknik zorluklar 2. Paylaşımın direkt ve kişisel olmaması ve 3. Ortamın sanal olması, gerçek olmaması. Öte yandan, öğretim üyesinin gözünden belli öğrencilerin teknolojiye karşı tutumları da gözlemlenebilmektedir:

"Çevrimiçi öğrenme ortamına baktığımda, ödevlere cevap vermeyenlerin hep aynı öğrenciler olduklarını görüyorum. Genelde bu tipteki insanlar kendilerini hep teknolojiden uzakta tutanlar olabiliyor."

Öğretim Üyesi Yansıma Notları, Yaz 2014

Etik süreçler ayrıca bir engel olarak ortaya çıkmış, öğrencileri fikir ve düşüncelerinin dış dünya tarafından ulaşıma açık olabilme ihtimali onları tedirgin etmiş, bazıları kişisel hayatları ile akademik hayatı kaynaştırmak istememişlerdir. Ozkan & Koseler (2009) üniversitelerin öğrencilerin gizliliğini sağlaması gerektiğini söylemişlerdir. Öğretim üyesinin bu konuda söyledikleri de bu çekinceyi açıklar nitelikte:

"Facebook sadece bir iletişim aracı. Bazı açılardan bu aracı derste kullanmak benim hoşuma gitmiyor çünkü bazı istenmeyen durumlar yaşanmasına yol açabilir. Örneğin bazı informal kişilerle istenmeyen konuşmalar ve paylaşımlar engellenemeyebilir."

Öğretim Üyesi, Görüşme, Yaz Dönemi 2014

Söz konusu ders içerisinde özellikle beşinci ve son dönemde sınıfın ve spor salonunun içerisinde bir kamera ile dolaşmanın öğrencilerde farklı tepkiler oluşturduğu da gözlemlendi. Derste çekilen resimlerden oluşan slaytların ve videoların internet üzerinden seyredilebilmesi, sadece dersin çevrimiçi öğrenme ortamından izlenebilmesi için YouTube gibi dışarıdan bir araca aramalarda çıkmayacak şekilde yüklenmesine rağmen öğrencilerde dış dünyadan izlenebilme ve takip edilebilme riski korkusuna yol açmıştır. Dolayısıyla üniversitelerin bu konularda da önlem alması elzemdir.

Teknoloji destek ihtiyacı da ayrıca diğer bir zorluk olarak bulunmuştur. Örneğin öğretim üyesi tablet bilgisayarı spor salonunda kullanmada tereddüt etmiş, birçok farklı fiziksel aktivite teknolojisini yönetmek, dağıtmak ve toplamak bir problem haline gelmiştir. Öğretim üyesinin yansımalarından biri bu konuya da ışık tutuyor:

"Bir gruptaki öğrencilerin problemlerine teknoloji ile birlikte konsantre olmaya çalıştığımda, başka bir taraftaki önemli konuları kaçırıyor olabilirim. Teknolojiden kaynaklı olan problemlerle uğraşırken dersle alakalı öğrencilerin problemlerini kaçırıyor olabilir. Bir taraftan bir kolaylık sağlarken diğer yandan başka problemler doğabilir."

Öğretim Üyesi, Görüşme, Sonbahar 2014-2015

Sugar (2005) teknoloji koçlarının öğretmenlerin teknolojiyi derslerde kullanmaları için güven kazanmalarında önemli rolü olabileceğini ortaya koymuştur. Teknolojiyi eğitime entegre etme sürecinde öğretmenlerin fikirlerini dinlemek, onlara katılımcı bir rol vermek ve tecrübelerini kullanmak perspektiflerini yeniden şekillendirmek için imkan verebilir (Baran ve arkadaşları, 2013). Teknoloji için ayrıca bir asistan ihtiyacı bu durumda ortaya çıkmıştır. Güncel araştırmaları takip eden, gelişmekte olan teknolojileri bilen ve anlayan ve bu teknolojiler ile bunlara ihtiyacı olan öğretim üyesine buluşturan bir ara elemana ihtiyaç aşikârdır.

"Sorumluluk alan asistan spor salonu ortamını ve iklimini bilen biri olmalı. Bu alanın dışından bir insanın bu servisi sağlayabileceğinden şüpheliyim. Sporla alakalı teknolojiler önemli ama spora özgü ortamları bilmek de önemli."

Öğretim Üyesi, Görüşme, Sonbahar 2014-2015

Teknolojiye adapte olmak için zaman ihtiyacı bir diğer zorluk olarak öne çıkmıştır. Çevrimiçi içerik yaratma, şekillendirme ve geliştirme hep zaman alan işlerdir. Alan yazında da öğretmenlerin zaman bulamaması çevrimiçi ortam yaratmalarına bir engel olarak ortaya konmuştur.

"Bir öğretmen olarak spor salonunda elimde tablet bilgisayar ile gezmeye adapte olmak için zaman ihtiyacım var. Diğer dijital araçlar söz konusu olduğunda da öncelikle onları anlamak, sonra ders içeriği ile buluşturmak ve onu anlamlı bir biçimde kullanabilmek. Bunların hepsi belli bir zaman gerektiriyor."

Öğretim Üyesi, Görüşme, Sonbahar Dönemi 2014-2015

Öğrencilerin de teknolojiye adapte olmada zaman ihtiyacı ortaya çıkmıştır:

"Bazı durumlarda çevrimiçi öğrenme ortamında neyi nerede bulacağımı bilemediğim zamanlar oldu. İçerik oldukça dolu olduğundan birçok detay var. Ben sadece zorunlu olduğumda bir şeye ihtiyaç olduğunda girdim sadece."

Öğrenci 1, Görüşme, Sonbahar Dönemi 2014-2015

Üniversite politikaları çevrimiçi ortamları destekleme ve rehber olarak teknoloji koçları sağlama gibi rollerden ötürü önemli bir bulgu olarak sunulmuştur.

"Spor salonları teknolojiyi entegre etme konusunda tasarlanmış değiller. Mimari yapı değişim konusunda esnek değil. Personeller de aynı şekilde. Öğretim üyeleri olarak bunları görüyoruz ve yeni yeni tartışmaya başladık. Üniversite yönetimi bunların farkında değil."

Öğretim Üyesi, Görüşme, Yaz Dönemi 2014

Araştırma Sorusu 3: Bir üniversite sağlıkla ilişkili fiziksel uygunluk dersini teknoloji ile yeniden tasarlamanın öğrenciler ve öğretim üyesine etkileri nelerdir?

Alan notları, uzman görüşü, öğrenci ve öğretim üyesi görüşmeleri ve yansımaları ve açık-uçlu çevrim içi anketlerin üzerinde yapılan tematik veri analizine göre; bir üniversite sağlıkla ilişkili fiziksel uygunluk dersini teknoloji ile yeniden tasarlarken öğrenciler ve öğretim üyesi üzerinde toplam beş ana etki ortaya çıkmıştır. Bunlar: 1. Sınıf Yönetimi, 2. Veri Yönetimi, 3. Farklılaştırılmış Öğrenme, 4. Motivasyon ve 5. İş yükü olarak belirlenmiştir.

Teknolojinin sınıf yönetimine etkisi ilk bulgulardan biri olarak ortaya konuldu. Dersin hangi gün nerede olacağı ve hangi konu işleneceği gibi bilgiler önden verildiğinde öğrencinin aktiviteye daha çok zaman ayırdığı görüldü. Öğrencilerden birinin yansımalarından birine bakıldığında da bu açıklıkla görülmektedir:

"Derslerin hangi gün ve nerede yapılacağı ile ilgili bilgiler gayet açık ve eğlenceli

görsellerle hazırlanmış."

Öğrenci 3, Sonbahar, 2014-2015

Strand ve arkadaşları (2010) da paralel sonuçlar ortaya koyarak çevrimiçi öğrenmenin sınıfta oturma zamanını düşürdüğü ve öğrencilerin aktivite süresinin arttığını bulmuştu. Öğretim üyesinin dersin kalitesinde bir düşüş olacağı endişesi de, yine öğretim üyesinin çevrimiçi öğrenme ortamının kendisine önceden analiz edilmiş ve kategorize edilmiş bilgileri verdiğinden dolayı yaşadığı tatminden ötürü aşılmış oldu. Jenkins ve arkadaşları (2006) da öğrencilerin harmanlanmış (blended) eğitimden memnun olduklarını ortaya koymuştu. Bu çalışmadaki verilerde buna paralellik göstermektedir:

" Daha önceden dersin ve dönemin sonunda elime geçen ürün dosyasını (portfolyo) parça parça her hafta elde etmek, benim için yararlı oldu. Sınıfın ve dersin döneme nasıl devam ettiği, öğrencilerin seviyeleri ve ne yönde ilerlediklerini görmek benim için daha kolay oldu."

Öğretim Üyesi, Görüşme, Yaz Dönemi 2014

Veri yönetimi bir diğer etki olarak ortaya çıktı. Öğrencileri ödevleri yapar yapmaz çevrimiçi ortama düşen verileri öğretim üyesini memnun etti. Ayrıca öğrencilerin geriye dönük yaptıklarını inceleme ve karşılaştırma fırsatından bahsetmesi de alan yazınla paralellik gösterdi ki Chou ve arkadaşları (2010) öğrencilerin ders yönetim sistemleri ile kendilerini takip edebildiğini söylemişti. Öğretim üyesinin bir görüşme söyledikleri de literatürü doğrular nitelikte:

"Öğrenciler ne zaman bir çevirimiçi ödeve yaparsa, ben hemen ilgili verilerin transkriptlerini her bir bireye özgü olarak görme şansına sahip oluyorum. Bu sayede omuzlarımdan önemli bir yük kalkmış oldu. Ahmet ya da Ayşe her kimse bu veriler kişiye özgü. Kim ne bilgi girerse girsin, bu veriler bana hâlihazırda kategorize edilmiş halde geliyor."

Öğretim Üyesi, Görüşme, Sonbahar Dönemi 2014-2015

Farklılaştırılmış eğitim bir diğer etki olarak ortaya kondu. Öğrencilerin ihtiyaçlarına göre fiziksel aktivite teknolojileri ile geribildirim verilmesi bu çalışmanın en önemli bulgularından biri oldu. Bu durum öğrencilerin fiziksel aktiviteye teşvik edilmesi konusundaki motivasyonlarına da katkı sağlamış oldu. Çalışma verileri de bu konuda paralel sonuçlar ortaya koymaktadır:

"Öğrencilerin isimlerini bilmesem bile, öğrencilerin her biri için notlar alabilen bir sistem var artık. Bu tablet bilgisayardaki bir uygulama sayesinde, her hangi bir öğrenci için belli notlar alabiliyorum. Bu özellik bana belli öğrenciler için verebileceğim geribildirimleri unutmamamı sağlıyor."

Öğretim Üyesi Yansıma Notları, Sonbahar, 2013-2014

Motivasyon, bu çalışmanın bir başka önemli bulgusu olarak ortaya konmuştur. Teknoloji kullanmaya karşı motivasyon ya da bu araçlar aracılığı ile fiziksel aktiviteye karşı motivasyon, çeşitli verilerle gözlemlenmiştir:

"Mobil Uygulama ile ne kadar kalori yaktığımı, ne kadar sürede ne kadar mesafe kat ettiğimi, ortalama ne kadar su kaybettiğimi görmek oldukça ilginç geldi. Üstelik bunları faceboktaki gibi arkadaşlarımla paylaşabiliyor olmam da çok güzel. Tam aradığım uygulama buydu."

Öğrenci 4, Görüşme, Yaz, 2014

"Hocamız bazı derslerde video ile kayıt yaptı ve bunları bize izletti. Bahsi geçen derslerden birinde özellikle koşu tekniği ile alakalı yaptığımız bence çok faydalıydı. Normalde örneğin bir kişiyi koşarken gördüğünüzde onun iyi koştuğunu düşünebilirsiniz. Ama kendinizi dışardan bir gözle koşarken görmek gerçekten enteresan bir duyguydu. Kendiniz hakkında yorum yapma fırsatı oluyor."

Öğrenci 2, Görüşme, Yaz, 2014

Fiziksel aktivite teknolojilerini kullanmak bu dersin önemli bir kısmını teşkil etmekteydi. Öğrencilerin birçok farklı teknolojiyi tecrübe etmelerini sağlamak (kalp atım hızı monitörü, adımsayar, XBOX vb.) fiziksel aktivite motivasyonu sağlama

açısından önemliydi.

"Öğrencilerin çoğunlukla ritim eğitiminde kaçtığını gözlemlerim. Sanırım sınıfta kullandığımız exergame ile dans ettikten sonra birçok öğrencinin hayatında en azından bir defa bu teknolojiyi arayacağını ve deneyeceğini düşünüyorum."

Öğretim Üyesi, Görüşme, Sonbahar, 2014-2015

İş yükünün de bu çalışmanın önemli bulgularından biri olduğu söylenebilir. Birinci dönemdeki ihtiyaç analizi ile tespit edilen problemleri temel alarak başlayan teknoloji ile sağlıkla ilişkili fiziksel aktivite dersini yeniden tasarlama sürecinde öğretim üyesini iş yükünü hafifletmek hedefler arasında yer almaktaydı. Gelinen noktada öğretim üyesinin iş yükünün değişimi ile ilgili söyledikleri sürecin başarıya ulaştığına işaret etmektedir.

"Teknoloji entegrasyonu belli ölçülerde benim yükümü oldukça hafifletti diyebilirim. Örneğin her ders öncesi bazı evrak işlerim ve hazırlamam gereken notlar oluyordu. Artık bütün bu kâğıt işiyle işim bitti. Birçok işim vardı fotokopi olsun yazdırma olsun. Bunlarla artık işim kalmadı ve oldukça memnunum bu durumdan. Bunları sınıfta dağıtmaktan ve toplamaktan da kurtuldum. Artık bu ders materyallerinin dijital hallerini takip ediyorum. Bu açıdan işyükümün azaldığını ve öğrencilerle alakalı bilgilerinde artık hazır bir şekilde kategorize edilerek önüme konulduğunu söyleyebilirim."

Öğretim Üyesi, Görüşme, Sonbahar, 2014-2015

Sonuç olarak, önceki çalışmaların bu araştırmanın bir harmanlanmış eğitim (blended learning) olarak etkisini destekler nitelikte olduğu görüldü. Öte yandan, beden eğitimi ortamlarına teknolojinin entegrasyonu konusundaki bilgi, bu çalışma ile daha da genişlemiş oldu. Klasik yüz yüze eğitimden teknoloji ile iyileştirilmiş harmanlanmış eğitime geçiş süreci bir beden eğitimi ortamında tasvir edilmiş oldu.

ÖNERİLER

Araştırma bulgularına göre; araştırmacılar, öğretim üyeleri / öğretmenler, teknoloji

koçları, yöneticiler ve politika yapıcılar için aşağıdaki öneriler yapılmıştır.

1. Araştırmacılar

- Bu araştırma üniversite öğrencileri için uygulandı. Muhtemel bir ilk ve orta öğretim uygulamalarının sonuçları da ilgi çekici olacaktır.
- Muhtemel bir deneysel çalışma ile bu tasarımın üniversite öğrencilerinin fiziksel aktivite düzeylerine etkisi incelenebilir.

2. Öğretim üyeleri / Öğretmenler

- Fiziksel aktivite teknolojileri ile zengin öğrenme ortamları sunmak fiziksel aktivite motivasyonunu teşvik ettiği için şiddetle önerilir.
- Teknolojiye karşı tutum ve davranışlar tasarım ve uygulama sürecini etkilediğinden ötürü özellikle öğrencilere karşı destekleyici bir tavırda bulunulması önemlidir.
- Yeni teknolojileri adapte olmak zaman alan bir süreçtir. Bundan dolayı eğitmenlerin çabuk pes etmemeleri ve sabırlı olmaları önerilir.

3. Teknoloji Koçları

- Öğretim üyeleri değişime ve gelişime direnç gösterebilirler. Teknoloji entegre etme sürecinde destekleyici olma ve zaman yayma etkili olabilir.

4. Yöneticiler

- Yöneticilerin eğitmenlerin ihtiyaçlarını takip etmeleri, teknoloji koçuyla arasında bir köprü görerek ilgili desteği sağlaması önerilir.

5. Politika Üretenler

- Üniversiteler ve Eğitim kurumlarının teknoloji koçları için bir iş pozisyon yaratmaları önerilir.
- Hali hazırda bulunan ve yeni yapılan binaların mimari planları incelenerek teknoloji dostu bir hale getirilmeleri önerilir.

APPENDIX D: TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü ☐

Sosyal Bilimler Enstitüsü **X**

Uygulamalı Matematik Enstitüsü ☐

Enformatik Enstitüsü ☐

Deniz Bilimleri Enstitüsü ☐

YAZARIN

Soyadı : Semiz
Adı : Kıvanç
Bölümü : Beden Eğitimi ve Spor

TEZİN ADI (İngilizce) : RE-STRUCTURING A UNIVERSITY HEALTH RELATED PHYSICAL ACTIVITY COURSE WITH TECHNOLOGY AND ITS IMPACT: A DESIGN BASED RESEARCH

TEZİN TÜRÜ : Yüksek Lisans ☐ Doktora **X**

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. **X**
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. **X**
3. Tezimden bir (1) yıl süreyle fotokopi alınamaz. **X**

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: