EVALUATION OF A MOTION BASED 3D VIRTUAL SPORTS PLATFORM IN
THE SCOPE OF TECHNOLOGY ACCEPTANCE MODEL

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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.

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ABSTRACT

EVALUATION OF A MOTION BASED 3D VIRTUAL SPORTS PLATFORM IN THE SCOPE OF TECHNOLOGY ACCEPTANCE MODEL

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In this study, a recently developed 3D Virtual Sports Platform (VSP) using Kinect motion detection technology, which allows the individual to exercise in the home environment, is evaluated in the scope of technology acceptance model; in terms of the perceptions of students using it, and the views of preservice coaches, and experts. Participants of the study consisted of 22 users, who were students at the Computer Education and Instructional Technologies Department; 8 preservice coaches who were students at the Sports Sciences Faculty; and two experts, who are academics at the Sports Sciences Faculty, in Kırıkkale University. Basic qualitative research method was implemented throughout the study. Data collection was held separately with each group of participants through semi-structured interviews. According to the results of this study, the VSP has some effects that are perceived to be useful in physical, affective and productivity manners by the participants. VSP is mostly perceived to be easy to use, companied with some design and technical drawbacks. In addition, participants provide suggestions for further improvements, which shall aid designers with the development of similar systems. Thus, this study contributes to the literature of designing, developing, and evaluation of similar instructional technologies in

physical education or personal exercise in general. Also providing feedback for further improvement of this tool, suggestions for future studies, and implications for practice.

ÖZ

HAREKET TABANLI 3 BOYUTLU SANAL SPOR PLATFORMUNUN TEKNOLOJİ KABUL MODELİ KAPSAMINDA DEĞERLENDİRMESİ

İlhan, Fatih
Yüksek Lisans, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü
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Eylül 2019, 250 sayfa

Bu çalışmada, Kinect hareket algılama teknolojisini kullanarak bireye ev ortamında tek başına spor yapma imkanı veren 3-Boyutlu Sanal Spor Platformu (SSP), teknoloji kabul modeli kapsamında, platformu kullanan öğrencilerin algıları ile öğretmen adayı antrenörlerin ve uzmanların görüşleri açısından değerlendirilmektedir. Araştırmaya katılanlar, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümünde öğrenci olan 22 kullanıcı; Spor Bilimleri Fakültesinde öğrenim gören 8 antrenör adayı; ve Kırıkkale Üniversitesi Spor Bilimleri Fakültesinde öğretim üyesi olan iki uzmandan oluşmaktadır. Çalışmanın araştırma desenini temel nitel araştırma yöntemi oluşturmaktadır. Veri toplama, yarı yapılandırılmış görüşmelerle her katılımcı grubuyla ayrı ayrı yapılmıştır. Bu çalışmanın sonuçlarına göre, Sanal Spor Platformunun, kullanıcıların fiziksel, duygusal ve üretkenlik gibi yönlerden faydalı olarak algıladıkları bazı etkileri vardır. Ayrıca, bazı tasarımsal ve teknik dezavantajları olsa da, SSP çoğunlukla kullanımı kolay olarak algılanmaktadır. Ek olarak, katılımcılar benzer sistemlerin geliştirilmesinde tasarımcılara yardımcı olabilecek, ve ileriteki iyileştirmeler için önerilerde bulunmaktadır. Bu nedenle, genel olarak beden eğitimi veya kişisel egzersizde bu tür öğretim teknolojilerinin tasarlanması, geliştirilmesi ve değerlendirilmesi kapsamında literatüre katkıda bulunmak

amaçlanmaktadır. Ayrıca bu ve geliştirilecek olan benzeri araçların iyileştirilmesi için geri bildirim sağlanmakta, gelecek çalışmalar için önerilerde ve uygulama için çıkarımlarda bulunulmaktadır.

Anahtar Kelimeler: Kinect, Hareket Yakalama, Teknoloji Kabul Modeli, Beden Eğitimi

To my family

ACKNOWLEDGMENTS

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LIST OF ABBREVIATIONS

ABBREVIATIONS

VSP	Virtual Sports Platform
CEIT	Computer Education and Instructional Technologies Department
TAM	Technology Acceptance Model
AVG	Active Video Games

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Movement is an essential component of human existence. People have moved with the ultimate objective of eating, staying secure, and living all through time. Nevertheless, contemporary individuals tend to move not precisely like their ancestors, mostly due to lifestyles that are immersed in technological developments that transmit simplicity and effectiveness to their daily duties. However, this choice of moving less has brought some negative side effects such as; obesity, circulatory system diseases, and muscle-skeleton system diseases over the last few decades. Deficient diets and physical inactivity almost exceed tobacco as the main cause of death (Mokdad, Marks, Stroup, & Gerberding, 2004). Even in instances that do not lead to mortality, physical inactivity impedes individuals from living a fulfilling life, as overweightness and disfigurement lead to psychological issues and a decline in quality of life (Çolakoğlu, 2003). Increasing physical activity at all ages therefore has beneficial health impacts (Kell, Bell, & Quinney, 2001). The effects of exercise on the human organism has shown positive effects for all age groups, and the most common of these effects is the increase in daily living conditions after regular exercise (Guiney & Machado, 2013). A lifestyle of regular exercise can promote healthy and happy life. More and more modern life adoption, however, leads to the spreading of sedentary -inactive- life style. Even everyday activities become challenging due to the inactive life, which is the start of many diseases. While the research shows a positive relationship between physical activity and health, people do not exercise enough (Hallal et al., 2012). Therefore, it is

very important that we provide other approaches to improve the opportunities for people to do sports and help them gain the habit of doing sports, because their absence affects the wellbeing of people all over the world more and more.

Rapid information technology advances show their impact in the world of sport as well as all other fields. In almost all sports sectors technological developments are now encountered and new technology products are commonly used. These developments in sports technologies, contributes to change and development of the equipment used in sports sector; the materials used by athletes, trainers, and coaches in training, competitions and education; laboratory and measuring instruments used in sports research; sports halls and stadiums (Devecioğlu & Altıngül, 2011). In addition to these developments in sports technologies, there are also changes in physical and sports education. Due to the high expectations of society from physical education and sports, it is inevitable to benefit from the technology of the era. In recent decades, various devices such as Opaque Projector, Overhead Projector, Slide Projector, Interactive Video, Computer, Internet, Closed Circuit Television, Video, Video Camera and so on are being used in sports education as well as in many other fields (Yaman, 2007). It is possible to say that computer technologies which are able to process data quickly, have reached a very high quality level in terms of graphics and video, and especially using multimedia facilities, help learning psychomotor skills as well as cognitive abilities. Nevertheless, scientific studies have shown that the use of information technology is not adequate in sport education in Turkey. It is not possible to fully use information technology and digital instruments or to achieve the desired effectiveness because of factors such as technical impossibilities, insufficient information technology literature, inadequate infrastructure and, at times, insufficient in-service training (Yücel & Devecioğlu, 2012).

In order to meet the competition in the field of sports that has become a wide sector, and to be successful, the training to be provided to the next generations must be given in such a way to optimize the value of the new technologies in accordance with the requirements of the era. It is anticipated that more positive results will be achieved by applying the benefits of internet technology and high-definition video technologies,

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which are commonly used in all fields, to academic settings. Motion capture, which is one of these technologies, has great potential, especially in the field of physical education (Gauthier & Cretu, 2014).

Kinect is a motion-sensing device manufactured by Microsoft for the Xbox 360 gaming console. It allows users to control and interact naturally with Xbox 360 games and apps without having to touch a game controller or any kind of device. Kinect does this through a natural user interface, by tracking the body movement of the user and sensing gestures and spoken commands. Kinect could be classified as a marker-less tracking device. The device projects an infrared laser speckle pattern on the viewing area of the infrared camera. This infrared camera senses the pattern and the software measures deformations in the pattern of the reference speckle, in order to produce a 3-D map of the area. The device is often used in scientific research (Bonnechère et al., 2014; Choppin, Lane, & Wheat, 2014) because of its low costs and reasonable accuracy; specifically 0.19 m at 7.5 m2 (Dutta, 2012). Studies show that learning experiences created with Kinect software help students acquire everyday life skills, transfer them to real life and increase their motivation (Vaghetti, Monteiro-Junior, Finco, Reategui, & Da Costa Botelho, 2018). In this study, a recently developed 3D Virtual Sports Platform (VSP) using Kinect motion detection technology, which allows the individual to exercise in the home environment, is evaluated in the scope of technology acceptance model.

1.2   Problem Statement

As presented above, some studies investigate the effectiveness and implications of motion capture technologies in physical education (Vaghetti et al., 2018). This review of literature indicates that, there are some developmental research that discusses the design of a particular system and investigates its usability on small number of users. While, these investigations show promising results for the capabilities and effectiveness of motion capture studies in physical education, there is a need for more research to determine the factors affecting the acceptance of such new technologies (Peng, Crouse, & Lin, 2013).

There are a few amount of research, which aims to provide users from every age group, the opportunity to exercise correctly on their own by giving feedback on their movements. One of those systems the 3D Virtual Sports Platform (VSP) (Yukselturk, Erbay, & Kutlu, 2017) was developed in Turkey. However, the system has not been tested by a large number of participants, yet. Thus, there is a need to evaluate the VSP in terms of technology acceptance, infer practical implications, and provide suggestions for further improvements.

1.3 Purpose of the Study

The purpose of this study is to evaluate the 3D Virtual Sports Platform by examining the perceptions of the users and opinions of coaches and experts in terms of their technology acceptance. Thus contributing to the literature for designing, developing, and evaluation of such instructional technologies in physical education or personal exercise in general. Also providing feedback for further improvement of this tool. Concerning the research purpose, the following research questions are investigated.

1.4 Research Questions

There are six main Research Questions (RQ) of this study, as listed below.

RQ 1 What are the perceptions of users, and opinions of coaches and experts on the *ease of use* of the Virtual Sports Platform?

RQ 2 What are the perceptions of users, and opinions of coaches and experts on the *usefulness* of the Virtual Sports Platform?

> **RQ 2.1** What are the perceived physical effects of the Virtual Sports Platform?
>
> **RQ 2.2** What are the perceived affective effects of the Virtual Sports Platform?
>
> **RQ 2.3** What are the perceived effects of the Virtual Sports Platform on productivity?

RQ 3 What are the *attitudes* of users, coaches and experts towards using the Virtual Sports Platform?

RQ 4 What are the *intentions* of users, coaches and experts towards using the Virtual Sports Platform in the future?

RQ 5 What are the *opinions* of users, coaches and experts on the implications of using the Virtual Sports Platform in educational settings?

RQ 6 What are the *suggestions* of users, coaches and experts for improvement of the Virtual Sports Platform?

1.5   Significance of the Study

In order to promote physical activity in the society, "innovative approaches are needed that are able to more efficiently reach groups of people and at the same time enhance accessibility and personal relevance" (Lau, Lau, Wong, & Ransdell, 2011). The 3D Virtual Sports Platform used in this study is a recently developed product of a project, aiming to bring the opportunity of doing exercises properly to the large number of people, at the convenience of their home or work place. However, it has not been tested on a large group, yet. Thus, this research aims to evaluate the VSP in the scope of technology acceptance of users, preservice coaches and sports sciences experts. As mentioned before, this platform is different from any commercially available exergame, on its availability for coaches to record new movements and exercises, and personalization for users. Thus, a wide range of physical activities from sports to dance moves can be integrated and learned through this platform. In accordance, this study examines this recent platform to contribute to the literature of technology integration in to physical education. Also, providing practical implications for physical education in preservice teacher education programs and schools. Finally yet importantly, this study provides users' suggestions for designers in the context of designing a motion capture based exercise system.

1.6   Definitions of Terms

Motion Capture could be defined as "the process of capturing the large scale body movements of a subject at some resolution" (Moeslund & Granum, 2001). It is primarily used to track large-scale body movements, i.e. head, arms, torso, and leg movements, with the purpose of computer analysis of human actions.

Active Video Games (AVGs) or **Exergames** are video games that require physical activity in order to play.

Kinect™ is a human motion tracking device produced by Microsoft™ with the primary purpose to control the Xbox 360 games. Kinect diminishes the need for controller, and allows players to play games with just their body, thus provides a natural user interface.

The 3D Virtual Sports Platform (VSP) is a software that runs on a personal computer that has a Microsoft Kinect™ plugged in (Yukselturk et al., 2017). This software, utilized in this research, provides its user feedback while they are exercising, based on analyzing their movements simultaneously. The VSP and its features are described in detail in the method chapter.

Technology Acceptance as a research topic aims "to find factors that influence an individual's acceptance of technology, thereby ultimately enhancing its usage" (Avcı Yucel & Gulbahar, 2013).

Technology Acceptance Model (TAM) proposed by Davis (1989) is extensively applied and empirically tested for user acceptance of new technologies. TAM suggests that *perceived ease of use* and *perceived usefulness* are the predictors in the acceptance of information technology.

Perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320).

Perceived ease of use represents "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320).

Attitude toward using is "the degree of evaluative affect that an individual associates with using the target system in his or her job" (Davis, 1993, p. 476).

Behavioral intention to use refers to the degree of likelihood that an individual will use a particular system in his or her job (Davis, 1989).

CHAPTER 2

LITERATURE REVIEW

In this chapter, the model that is used in this study is explained, the system implemented in the design is introduced, and the review of related research studies based on their use of the similar technologies are reviewed.

2.1 Technology Acceptance Model

The Technology Acceptance Model (TAM) created by Davis (1989) is based on "Theory of Reasoned Action" which was introduced to the literature by Fishbein & Ajzen (1975). Theory of Reasoned Action argues that behavioral intention is effective in showing an individual's behavior, and that the attitude towards that behavior and the response to this behavior in society affects behavioral intention. Although Theory of Reasoned Action provides a general framework for understanding voluntary behavior, it cannot fully serve specific beliefs such as adaptation to information technologies. Therefore, Davis (1989) took a more comprehensive approach to identify critical perceptions about the adoption of technology in organizations and scanned the information technology, human factor, and psychometric literature and revealed two beliefs. These beliefs are "Perceived Ease of Use" (PEU) and "Perceived Usefulness" (PU). Davis (1989) defines perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" and perceived ease of use represents "the degree to which a person believes that using a particular system would be free of effort" (p. 320). These two separate and basic variables essentially play a mediating role between external factors and the use of the system. TAM claims that the actual use of the system is determined by the behavioral

intention (BI) of an individual to use the system and that BI is jointly influenced by the attitude towards (A) the system and perceived usefulness (PU) (Davis, Bagozzi, & Warshaw, 1989). Davis (1993) explains attitude toward using (A) as "the degree of evaluative affect that an individual associates with using the target system in his or her job" (p. 476). Attitude is determined by the PU and PEU. The direct effect of PEU on PU is also important. According to TAM, external variables such as individual characteristics, organizational characteristics and system characteristics influence the use of the system only through the effect they have on the PU and the PEU. TAM is assuming that PU and PEU are key factors in user acceptance of information technology (Figure 2.1).
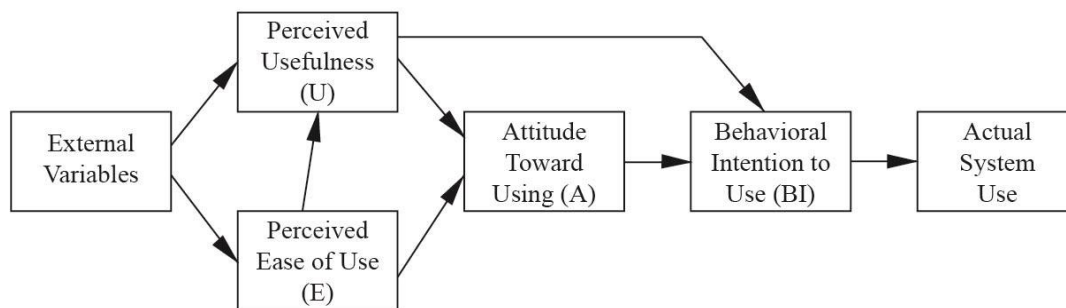
Figure 2.1. Technology Acceptance Model (TAM) (Davis et al., 1989, p. 985)

TAM (Davis, 1989) was accepted, applied, examined and extended as one of the most powerful models for examining the acceptance of new information technology (King & He, 2006; Šumak, Heričko, & Pušnik, 2011). One of its decedents is The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003). Research based on this model found that UTAUT explains about 70% of users' acceptance of the technology, while previous models can explain 40% (Avcı Yucel & Gulbahar, 2013). Even so, PU, PEU and BI are the most preferred variables in "Technology Acceptance Models" developed by the researchers (Avcı Yucel & Gulbahar, 2013).

2.2 Instructional Technologies in Sports Education

Rapid developments in the field of technology show their effects in the field of sports as well as in all other fields. It contributes to the change and development of every element from tools and materials used to sports halls and stadiums. The rapid processing of data with computer technologies and the very high quality level in terms of multimedia provide advantages for psychomotor skills as well as cognitive learning. Many devices such as Projector, Overhead Projector, Computer, Internet, Video Camera are used effectively in the physical education. The video technology focuses on the use of video cassette recorders and players, using several formats such as VHS. Video can be used for instruction and assessment from the learning process perspective. Video technology has been used in the field of instruction to present model performance, demonstrate concepts, provide scenarios and provide resources for self-analysis for learners (Mohnsen & Thompson, 1997). Video technology provides students with the opportunity to document skill improvement and create projects that demonstrate learning for assessment. Videos are especially, useful in showing the model execution of skills over and over at different speeds and from different angles, allowing students to focus on the critical features of execution of skills (Mohnsen & Thompson, 1997). Green (2002) has outlined similar advantages of using digital video in physical education, including the positive impact of playing a brief moving picture back and forth on the learning process, demonstrating the right technique, and the benefits of student observation and analysis. Similarly, digital video was considered a useful tool for learning and maintaining engagement with students in physical education (Weir & Connor, 2009). Another study suggest that video reflection may help improve novice sports coaches by highlighting performance strengths and weaknesses that traditional methods can overlook (Carson, 2008). A recent study examined the effectiveness of the video feedback on student learning in physical education, found positive results especially with the 'video and teacher feedback' condition, as learners showed improvements in skill execution, technique, and knowledge learning, as well as the highest level of practice (Palao, Hastie, Cruz, & Ortega, 2015). Nevertheless, more recent technologies bring other benefits into the physical education, such as motion capture.

2.3   Motion Capture Studies in Education

Information and communication technology continues to improve with time, and affects every area of life including education. For the last decades, body sensory systems provide new approaches for learning designers to facilitate learning in a creative way. One of those approaches could be digital game-based learning, that emerged in the 1980's (Johnson, 2008). One of the newer approaches is "exergame", a blended word from "exercising" and "game", also recognized as active video game (AVG), (Lieberman, 2006). AVG could be defined as video games that require physical activity in order to play. There are a number of research regarding the AVGs in education, according to the a review of literature, reporting that controlled trials show that active video games enhance physical activity and education capabilities (Merino-Campos & Del Castillo Fernández, 2016). Another study reports that motors, which means body movements, can facilitate psychological activities in learning by enhancing information processing, encoding, representing, and communicating (X. Xu & Ke, 2014). As for the effectiveness of AVGs in metabolic expenditure and activity patterns of children, a review found that AVGs enable light to moderate levels of physical activity (Biddiss & Irwin, 2010). However, Biddiss & Irwin, (2010) note that, whether AVGs can be used efficiently in the long run to assist motivate increased daily physical exercise and decrease sedentary pastimes remains to be seen. A randomized controlled trial, investigated the effects of exergaming on balance, gait, technology acceptance and flow experience in people with multiple sclerosis (Robinson, Dixon, Macsween, van Schaik, & Martin, 2015). Robinson et al. (2015) found that Wii Fit™ is comparable to traditional balance training, in terms of the physical effects of exergaming, however no difference in technology acceptance.

Another review (Bratitsis & Kandroudi, 2014) presents the motion sensor technologies in two parts. The first one concerns the education of people with special needs. The utilization of motion sensor technologies, incorporated by game consoles, in the education of such people is examined. The second one refers to various educational approaches in regular education, under which not so many research approaches, but

many teaching ideas can be found (Bratitsis & Kandroudi, 2014). The Authors (Bratitsis & Kandroudi, 2014) conclude that technology for motion sensing has been rapidly developed over the past few years and there are many game titles available that appear to be exploited for educational purposes. A lot of concepts and learning material could be found, although not always tested in the context of thoroughly designed approaches to studies.

In addition, Bratitsis & Kandroudi, (2014) states that there are several sensor technologies available, nevertheless they focus primarily on those that provide physical user experience in which the user freely utilizes his/her own body without any specific space restrictions. For example, the latter applies to the Wii Balance Board where the user is required to step only on the board's designated parts. This facility is achieved by advanced algorithms in the Kinect sensor of Xbox One console. This sensor's software development kit has been published freely and computer programmers have plenty of tools to design apps on either the Xbox console or a computer platform based on Windows. Thus, more education-oriented solutions are accessible to exploit this technology, while the other popular movement sensing systems are primarily limited to the utilization of current commercial games.

2.4   Kinect

Kinect™ is a motion detection sensor (Figure 2.1), primarily designed for natural interaction in a gaming environment. Low-cost distance sensors are an attractive alternative to expensive laser scanners in applications such as indoor mapping, surveillance, robotics and forensics. The latest developments in consumer-grade field detection technology are Microsoft's Kinect sensor. Kinect's most striking feature is its detection of human movements, so the player can play the game with their movements without using any control tool. The main components and functions of the Kinect sensor are as follows:

- 3D Depth Sensors: Three-dimensional sensors monitor the user's movements in the playing area.

- RGB Camera: An RGB (red, green, blue) camera helps to identify the user(s). Takes pictures and videos during the game.

- Microphones: Kinect has an array of microphones located at the front, bottom edge of the device. Used for voice recognition and chat.

- Motorized Bending: The mechanical drive under the Kinect sensor automatically moves the sensor up and down as needed.

Figure 2.2. Kinect for Xbox 360 by Microsoft

Kinect® hardware was developed in 2006 by Microsoft under a project called Natal. The main purpose of this project was to control the Xbox 360 games with Kinect. This equipment has the ability to scan objects in 3D. The equipment was originally produced for entertainment purposes, however researchers develop new applications using Kinect, thanks to the Software Development Kit (SDK) published by Microsoft.

Since it is a motion-based technology, there has been an increase in the number of studies on Kinect in sports sciences for a number of years. Particularly, one-to-one or more face-to-face trainings from traditional sports trainings face some problems not only due to time and space limitations but also because of their high costs. For this reason, it is suggested that technologies such as Kinect can be used as a solution as a motion capture tool that provides highly accurate data (Che & Lu, 2014).

2.5   Kinect in Educational Studies

Kinect, which detects three-dimensional body motions and works in a contactless way has different fields of implementation in the educational environment. Studies show that this new technology, which addresses hearing, visual and motor skills at the same time, was used to educate people with special needs (Öğülmüş & Melekoğlu, 2015).

Kinect has been used in various context with various user demographics. For example in a higher education course, students used it in their project for developing an interactive user interface for a public display, that allows users touchless control (Dias et al., 2014). Author mentions Kinect's affordability and its Software Developer Kit (SDK) that enables users to create their own projects.

In a recent study, Kinect was used for developing a visual sensing and tracking system for distance education (Yang, Zhang, & Zhao, 2019). They conclude this intelligent visual sensing system can be applied to videotaping in distance education, as well as the platform can be extended to enable more natural human-computer interaction, although the system was not used yet in such learning context (Yang et al., 2019).

Another study investigates the effect of kinesthetic educational game on students' mental computation speed (Yilmaz & Bayraktar, 2018). A Solomon four-group design was used, with the participation of 123 students. First, the group was divided into two as control group and experimental group. The participants of the control group played a computer game while the members of experimental group played a kinesthetic educational game. The study lasted for 8 weeks in total. They (Yilmaz & Bayraktar, 2018). found, a significant difference between the mental computation speeds of the experimental and the control groups. The results suggest that within primary school, Kinect-based exergames can be exploited as effective and motivational learning environments (Yilmaz & Bayraktar, 2018).

Another research used Kinect for developing a natural user interface (NUI) for use in learning, and tested the system on 128 children from 7 to 11 years old (Martin-SanJose,

Juan, Mollá, & Vivó, 2017). They compared two systems that help students interact with 3D objects without the need for glasses. They explain the difference as:

> "One of the methods is an autostereoscopic system that lets children see themselves as a background in the game and renders the elements in 3D without the need for special glasses; the second method is a frontal projection system that projects the image on a table in 2D and works similarly to a touch table. The Microsoft Kinect© is used in both systems for the interaction." (p. 17)

The researchers (Martin-SanJose et al., 2017) found that such games might be suitable for educational games.

Kinect is also used in lectures as an instructional technology. For example, a series of intuitive NUI actions based on body postures, gestures and voice commands used to make additions to the classical presentation such as underline, highlight, drawings, diagrams, various smart-arts was proposed (Gordaliza, Eva, & Florez, 2012), similar to the classical Windows™ PowerPoint program.

Kinect has also been used for training purposes in various professional settings such as; medical CPR traning (Loconsole et al., 2012), medical neurological examination training (Carrasco, Rybarczyk, Cardoso, & Martins, 2013), teaching training (Ke, Lee, & Xu, 2016), military training (Kwon et al., 2017), and workshop skill training (Mehta & Goyal, 2013).

History education (Martín-Sanjosé, Juan, Gil-Gómez, & Rando, 2014), dance (Grammatikopoulou et al., 2019), music (Bargsten, 2012), piano learning (Jia, 2015) are other subject areas that had some use of Kinect.

Commercially available games have been used in some of the educational studies in K-12, for various reasons such as; to analyze and assess the possibilities offered by the games to implement efficient learning activities to improve learning outcomes (Marina Kandroudi & Bratitsis, 2013), "to engage learners in embodied and experience driven learning" (Busch, Conrad, Meyer, & Steinicke, 2013), to improve object control skills (Vernadakis, Papastergiou, Zetou, & Antoniou, 2015), to encourage cooperation

between children (Sakai et al., 2016), and to enhance leisure-time physical activity (Martin & Schmick, 2018).

Some of the subject areas in education are separately reviewed for the use of Kinect, below.

2.5.1   Kinect Related Studies in Physical Education

It is often hard for coaches to clarify their motor skill advices verbally in the context of sport because they are tacit. In other words, coaches should understand what part of the body and how athletes should move their bodies in order to verbalize motor skills. In this context, Takuma & Kojiri developed and evaluated a system for motor skill teaching (2016), to assist coaches who are interested in verbalizing advice to correct athlete motions. They (Takuma & Kojiri, 2016) developed two systems for the revision of skeleton images acquired from athlete movements: the scene acquisition system and the support system for advice verbalization. The latter, analyzes operation logs and shows checkpoints to the coaches to help them verbalize the operated joint points. Takuma & Kojiri (2016) found that, their system gave coaches the chance to reflect on their revisions and verbalize new advice efficiently. They (Takuma & Kojiri, 2016) add that their system's current skeleton model can only represent a body with two-dimensional information, thus it should be improved so as to represent three-dimensional information.

Injured sportsmen and amateur sportsmen can take lengthy periods of time to heal and operate fully. During lengthy periods of rehabilitation, it is essential to encourage sustainable motivation. The user compliance is improving with live feedback and playful applications. For this reason a group of researchers (Scherer, Unterbrunner, Riess, & Kafka, 2016) used the latest version of Microsoft Kinect sensor (Kinect v2) for their project and implemented it into a prototype for supervised athlete rehabilitation. Shrerer et al. (2016) presents their preliminary results as by providing live feedback to users on the screen, the system can ensure the correctness of the training. Also adding that this should be tested clinically, after making improvements

such as adding a virtual sports coach and a virtual user avatar to the system and hiding the exercises inside a game to keep the motivation high (Shrerer et al., 2016).

To allow people to participate in physical activities without the presence of a physical trainer, Madanayake et al. (2017) designed and applied a system called Fitness Mate, which consisted of four components "monitoring weight training exercises, tutoring physiotherapy stretching exercises, augmented reality based physiotherapy exercises for patients and elderly people and analyzing machine exercises" (p. 2). They (Madanayake et al., 2016) discuss the Kinect based system architecture in their proceeding paper, however, did not test its effectiveness in a real life situation.

One of the studies that used Kinect in a sports setting, combined it with virtual reality and proposed a framework named ULISES which aims to evaluate motor skills (Aguirre, Lozano-Rodero, Matey, Villamane, & Ferrero, 2014). Aguire et al. (2014) tested their work by applying it on a tennis related motor skills diagnostic model. Their (Aguire et al., 2014) experiments on several participants yielded promising results about diagnosis for tennis skills such as "taking into account coordination, poses, movement trajectories and the procedure that a tennis serve should follow" (p. 14).

Another study (Ofli et al., 2016), developed a coaching system that provides the users with a number of video exercises, tracks and measures their motions and provides feedback in real time and records their performance over time. Ofli et al. (2016), included exercises in the system especially for the elderly; to improve balance, flexibility, strength, and endurance, for reducing fall risk and improving performance of daily activities. They (Ofli et al., 2016) conclude that participants of the pilot study voiced a favorable attitude towards the long term use of such a system, although there are some real world challenges, they also reported implications to improve the system.

One of the studies that considers using Kinect in physical education settings, emphasizes the importance of algorithm used for evaluating the accuracy of motion in realtime (M. Xu et al., 2019). The team designed a 2-layer Hidden Markov Model algorithm that produces tailored subsequential learning content for each person based on their present performance. Also they developed an educational gaming system for

kids that used the suggested algorithm, and carried out a user study finding that the system significantly improved the effect of physical training.

The studies mentioned above mostly designed and developed novel applications based on Kinect, and tested them on a few participants. However randomized controlled experiments are very few although very important to compare Kinect based systems to traditional settings. In one of such few studies (Barry, van Schaik, MacSween, Dixon, & Martin, 2016), researchers conducted a randomized controlled trial to "assess the effects of exer-gaming using the XBOX Kinect™ system, versus, traditional gym-based exercise, with no virtual stimuli on: (1) postural control, (2) technology acceptance (3) flow experience and (4) exercise intensity in young healthy adults" (p. 3). Barry et al. (2016) found that exergaming group had improved postural control, higher social influence, performance expectancy and behavioral intention, and also higher flow.

Similarly, another study (Clark et al., 2012) also investigated the concurrent validity of the Microsoft KinectTM against a benchmark reference, a multiple-camera 3D motion analysis system. Clark et al. (2012), obtained data from "20 healthy subjects during three postural control tests: (i) forward reach, (ii) lateral reach, and (iii) single-leg eyes-closed standing balance" (p. 1). Their (Clark et al., 2012) results indicate that the Kinect can validly evaluate postural control kinematic approaches, thus making it a helpful tool for evaluating postural control in the clinical environment, given the potential advantages.

2.5.2 Kinect Related Studies in Special education

One of the educational research areas that used Kinect intensely is special education. Matsuda, Yamachi, & Kumeno (2018), developed and evaluated a Kinect-based rehabilitation system for special-needs education, reporting that many teachers rated the system as highly valuable for children with disabilities. In most cases, the child's motions improved upon Kinect-based system usage. "The child's teacher reported never having seen him make such movements before. It is clear that the system induced these active movements in the child." (Matsuda, Yamachi, & Kumeno, 2018). Another

study developed and examined KiNEEt, a system for improving physical and cognitive skills in students with special needs (Ojeda-Castelo, Piedra-Fernandez, Iribarne, & Bernal-Bravo, 2018). They note that "the different activities in KiNEEt are configurable and the tutor can modify the settings according to the needs of the student". The activities are game-oriented in order to attract and motivate the students to learn. Results showed that Microsoft Kinect is the most appropriate platform for this device as learners will be able to use the laptop while enhancing their digital, cognitive and physical abilities at the same time.

A game for training the students with intellectual disabilities about hand hygiene was applied to four participants (Kang & Chang, 2019a), and the percentage of correct task steps increased among all of them. Authors also note that, while the game is a strongly accepted school-use training instrument, it stays error-prone at the moment. Higher participant motivation and task efficiency are likely to result from a more technically robust system. Similarly, another research investigates the efficacy of video game intervention in kids with autism spectrum disorders for shower training (Kang & Chang, 2019b). Result show that all six participants had significantly increased levels of correct task steps.

Another research using Kinect based educational games found that, 31 elementary students with special educational needs that participated in a five-month intervention, games had a positive impact on children's short-term memory skills and emotional stage (Kosmas, 2018): "we found medium effect sizes, indicating the difference is meaningful and may have practical importance for education."

2.5.3   Kinect Related Studies in Health education

Hermans et al. (2018) test the short-term effectiveness of the Alien Health Game, a videogame using the Kinect sensor, designed to teach elementary school children about nutrition and healthy food choices. A total of 108 Dutch children played either the Alien Health game or a web-based nutrition game, and results show that "brief game-based intervention like the Alien Health Game has the potential to improve

children's nutritional knowledge in the short term, but may not be strong enough to increase nutritional knowledge and actual eating behavior in the long term."

Another study developed an exercise simulation called BringItOn targeted towards individuals who need to increase their physical activity for health, recovery or rehabilitation (Albu, Atack, & Srivastava, 2015). Authors list three major benefits of the simulation as "(1) it promotes proper exercise technique; (2) individualized feedback similar to that received from a personal trainer was viewed as very motivating; (3) the software was 'game like', and made exercising fun."

Some of the studies targeted more intense circumstances of health such as patient's rehabilitation after a total knee replacement (Su & Cheng, 2016). This study combined the virtual reality (VR) and motion capture technology, in order to explore the factors in a patient's rehabilitation achievement. They found that experimental group achieves a higher knee score than the control group.

A task for nursing students, transferring a patient from the bed to a wheelchair, was considered for a study, and a system that assists the students was developed (Huang et al., 2014). The system used color markers and two Kinect RGB-D sensors, to measure the postures of the trainee and the patient. The system can also automatically designate a trainee's performance as correct or incorrect for each task during the process. Authors found that, the system achieved a skill evaluation accuracy of 81.5 percent on average, compared to that achieved by a teacher.

2.5.4   Kinect Related Studies in Math and Science Education

Laboratories are very important part of math and science education. Zhang, Zhang, Chang, Esche, & Chassapis (2015) state that "the Kinect's cameras are capable of producing high quality synchronized video that consists of both color and depth data. This enables the Kinect to compete with other sophisticated 3-D sensor data acquisition (DAQ) systems in terms of performance criteria such as accuracy, stability, reliability and error rates." They developed a virtual laboratory with an integrated experiment and tested. The Kinect was proven to be a suitable and powerful sensor

substitute for universal range data acquisition (Zhang, Zhang, Chang, Esche, & Chassapis, 2015).

Similarly, a virtual chemical laboratory was developed using Kinect, which is based on a system of hand movements (Wolski & Jagodziński, 2019). The results show "how much better students work with a virtual laboratory, when studied by us in chemical areas, that concerned remembering information, understanding information, applying their experience in situations familiar to them from school and in solving chemical problems" (Wolski & Jagodziński, 2019). Another study also found that "Working in a virtual laboratory using the Kinect interface results in greater emotional involvement and an increased sense of self-efficacy in the laboratory work among students" (Jagodziński & Wolski, 2015).

Participants of another study controlled of a robotic fish via a natural user interface using Kinect (Phamduy, Debellis, & Porfiri, 2015). The robotic fish incorporates a temperature sensor that collects data in a tank equipped with sources of heating and cooling. Participants observe the measurements they record to map the environment in real time. Results show that robotic fish are intuitive to operate with the natural user interface, water temperature gathering activity is exciting, and robotics can be a feasible and available career choice (Phamduy et al., 2015).

Other studies focused on mathematics learning; at university level (Johnson, Pavleas, & Chang, 2013), primary level (Okkonen, Sharma, Raisamo, & Turunen, 2016), and college level (Ayala, Mendívil, Salinas, & Rios, 2013). Some studies used Kinect in anatomy education (Hochman, Unger, Kraut, Pisa, & Hombach-Klonisch, 2014).

Various studies designed and developed games for math and science education. In deed one of them offers an approach for students to develop their own games (Altanis, Retalis, & Petropoulou, 2018). Authors present a new learning strategy that promotes the systemic game-making of Kinect motion-based touchless games that can contribute to the improvement of the thinking abilities of the learners (Altanis et al., 2018). Another study proposes a system, "based on the geometric learning theory, and 3D real-time objects used to provide the different viewing angle control" (Tsai & Yen,

2013). Their goal is to facilitate learners' motivation by providing realistic 3D-visual materials and to evaluate the effects of specific operating experiences.

Authors of another study bring a proposition to simulation game design and development (M Kandroudi, Bratitsis, & Lambropoulos, 2014), while also describing the design of a virtual world game, called Altenerville. Game targets at improving science knowledge acquisition by providing active user-game interactions.

2.5.5 Kinect Related Studies in Language Education

One of the most studied areas is language education, such as (Hwang et al., 2016), literacy (Homer et al., 2014), collaborative conversational language learning (Kallioniemi, 2016), and sign language (Bidarra et al., 2015). One of the recent studies, held in Turkey, developed and tested a platform where students perform meaningful activities to improve their communication skills on the basis of real-life situations (Yükseltürk, Altıok, & Başer, 2018). Results indicate that game-based learning has beneficial impacts on quality and motivation of learning, particularly in comparison with traditional teaching techniques (Yükseltürk et al., 2018).

2.6 Summary

Literature review mentioned above presents a wide range of areas that use Kinect in educational settings with mostly positive outcomes. However there were no studies in Turkey, that examines the users' acceptance of such technologies for the purpose of learning and using to workout for a prolonged time. In addition, there is a need for guidelines on how to design and implement such systems in order to attract and maintain users' attention. While the Kinect based systems are used in educational context, few research examined its effectiveness in physical education. Thus in this study, a recently developed Kinect Based 3D Virtual Sports Platform was evaluated via the perceptions of the users, and opinions of coaches and experts in terms of their perceived technology acceptance.

CHAPTER 3

METHOD

In this chapter the design of the study is presented. The overall design of the study, the participants of the study, data collection procedures and instruments, and data analysis procedures are explained in detail.

3.1 Design of the study

In terms of their manner of interpreting events, problems, and individuals in any research context, qualitative and quantitative methodologies are often addressed. The primary distinction between them is their fundamental hypotheses. The paradigm of qualitative, interpretive, or naturalistic study describes one of the most appropriate methods and techniques for data collection and analysis. Qualitative research, which focuses on meaning in context, demands an instrument for collecting and interpreting information that is susceptible to underlying significance. Qualitative scientists are basically interested in understanding the meaning that individuals have constructed; that is, how individuals create sense of their world and the experiences they have in the globe (Merriam & Tisdell, 2015). Qualitative research deals with people's views in a subjective manner instead of gathering numerical data and conducting investigations (Creswell, 2012). Interpretive study which is labelled as "basic qualitative study" by Merriam & Tisdell (2015, p. 24), is the most prevalent type of qualitative research, that assumes the social construction of reality. That is, there is no single, observable truth; instead, a single event has various realities, or interpretations (Merriam & Tisdell, 2015). Researchers are not "finding" knowledge; they are constructing it, thus constructivism is a word that is often used with interpretivism interchangeably (Merriam & Tisdell, 2015). The present research followed "Basic

Qualitative Research" (Merriam & Tisdell, 2015) as a qualitative theoretical framework. Basic qualitative research can be discovered in all disciplines and areas of applied practice. Basic qualitative research is likely the most frequently found type of qualitative research in education, in which, data is gathered through interviews, observations, or analyzes of documents (Merriam & Tisdell, 2015). Thus, in this study data is gathered through interviews as well.

3.2 Participants of the Study

The participants of this study divides into three types as users, preservice coaches and sports sciences experts, which are described below.

3.2.1 Users

Convenience sampling was used for the selection of participants in the Users group. In order to evaluate the Virtual Sports Platform (VSP) from users' perspectives, 26 (17 females, 9 males) participants who used VSP for 6 weeks, were contacted and 22 (14 females, 8 males) of them accepted to participate in this study. Thus, all of those who accepted were included in the data collection process. Participants were studying at the Department of Computer Education and Instructional Technology in a public university (Kırıkkale University) in Turkey. Their age ranged from 19 to 29 ($21,0 \pm 2,2$), and they were in their second ($f=8$) or third ($f=14$) year at the department. User participants' code names are listed in the Table 3.1 below, and some more information on their physical measurements are presented in Appendix E.

3.2.2 Preservice Coaches

Preservice Coach participants were junior and senior students at the Sports Management, and Coaching departments of the Faculty of Sport Sciences at a public university (Kırıkkale University) of Turkey. They were at the same time studying in the Pedagogical Formation Program offered at the Faculty of Education of the same university in the Spring of 2018. Coaches were selected using convenience sampling method, from the Sports Management, and Coaching group in the program by accepting the first eight volunteers to participate following an announcement made in

the class. Their code names, class, gender and age are presented in the Table 3.2. Preservice coaches consisted of eight students (4 females, 4 males), aged between 20 and 23.

Table 3.1. *Code names of the users*

Participant Code	Interview Group No	Class	Gender	Age
S01	-*	3	F	20
S02	1	2	F	19
S03	1	2	F	20
S04	1	2	F	19
S05	2	3	M	21
S06	2	3	F	20
S07	2	3	M	20
S08	2	3	M	23
S09	2	3	M	23
S10	3	3	M	20
S11	3	3	M	23
S12	3	3	F	22
S13	3	3	F	20
S14	3	3	F	20
S15	3	3	F	21
S16	3	3	M	21
S17	3	3	F	20
S18	4	2	F	20
S19	4	2	F	29
S20	4	2	F	19
S21	4	2	F	21
S22	4	2	M	20

* S01 has been interviewed one to one for pilot of the interview protocol, as explained in Data Collection Procedures.

Table 3.2. *Code names of the preservice coaches*

Code Name	Class	Gender	Age
PC1	4	F	21
PC2	4	F	23
PC3	4	F	22
PC4	3	F	21
PC5	4	M	21
PC6	4	M	22
PC7	3	M	20
PC8	3	M	21

3.2.3   Sport Sciences Experts

In order to evaluate the VSP from the experts point of view, two experts working in the related area of Sport Sciences were selected using convenience sampling. Sport Sciences Experts (Table 3.3) are among the academic staff of Physical Education and Sports department in the Faculty of Sport Sciences at Kırıkkale University, a public university in Turkey. Faculty at the particular department were contacted randomly via their information on the department page, and after the desired number of experts accepted to participate in the study, other faculty members were not contacted. One of the experts (code name E1) is an Assistant Prof. Dr., who has been working for two years at the Faculty. The second expert (code name E2) is a Teaching Staff who has a M.S. degree in the particular area, and has been working for 11 years at the Faculty.

Table 3.3. *Code names of the experts*

Code Name	Gender	Title	Teaching Experience
E1	M	Assistant Prof. Dr.	2 years
E2	M	Teaching Staff	11 years

3.3   Context

In this section, the context of the study is described, under two main titles. The first title describes the software used in this study, namely The Kinect Based 3D Virtual Sports Platform. The second title describes the implementation process.

3.3.1   The Kinect Based 3D Virtual Sports Platform

A group of researchers (Yukselturk et al., 2017) designed and developed the 3D Virtual Sports Platform (3D VSP) to bring a personal trainer to anyone who is usually physically inactive and wants to do fundamental physical fitness operations at home or at their workplace. The platform aims at helping sedentary individuals (currently spending a lot of time sitting; somewhat inactive) to pursue an exercise program.

Platform operates locally on any desktop, plugging in Microsoft Kinect. The 3D VSP displays on the screen the target motion through an Avatar called the Instructor and expects the user to do the same (Figure 3.1).

Figure 3.1. A Screenshot of the 3D Virtual Sports Platform as the user performs exercise

The VSP captures the user's movement, transfers their motion into the user's Avatar simultaneously, then analyzes its accuracy and provides personalized feedback on the screen, demonstrating where the user is making a mistake. It also produces and displays a percentage value of adequacy in each motion, then at the end of a session it provides a total score. The scores of users are stored in a database and can be accessed through a website (Figure 3.2).
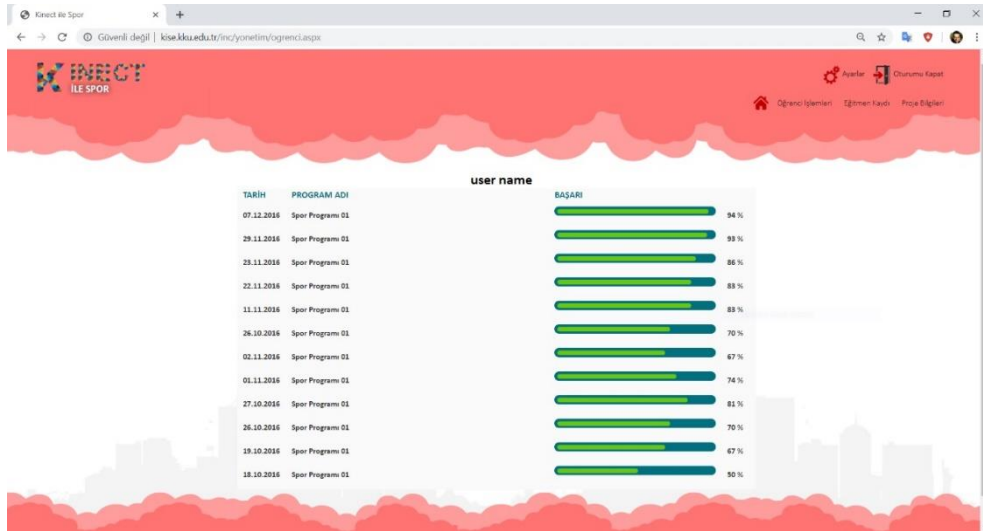
Figure 3.2. A sample screen of the website of the VSP showing performance records
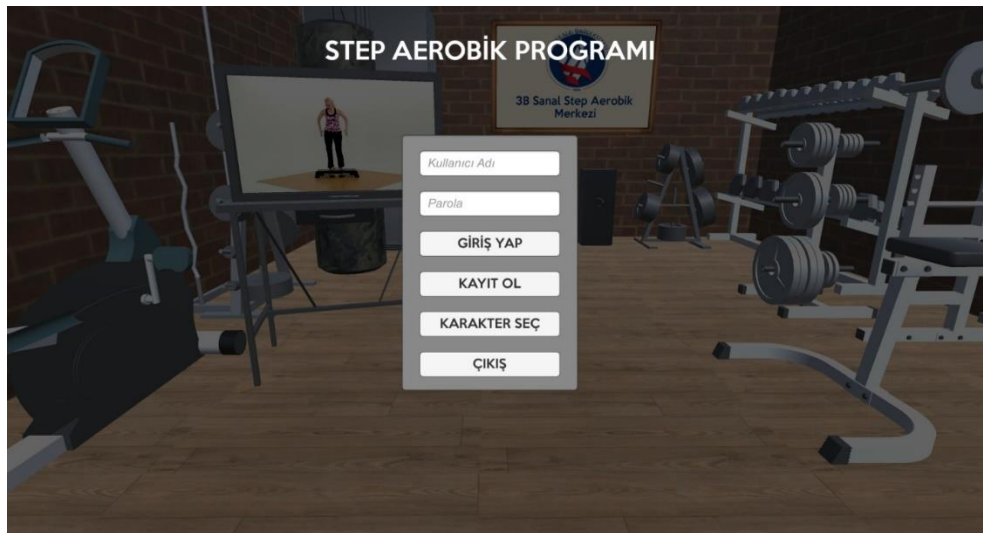
Figure 3.3. Platform Login Page

Figure 3.3 presents the platform login page. In this page users type their username and password to login. In addition new users are able to register. Users have the option to choose their Avatars gender as male or female.
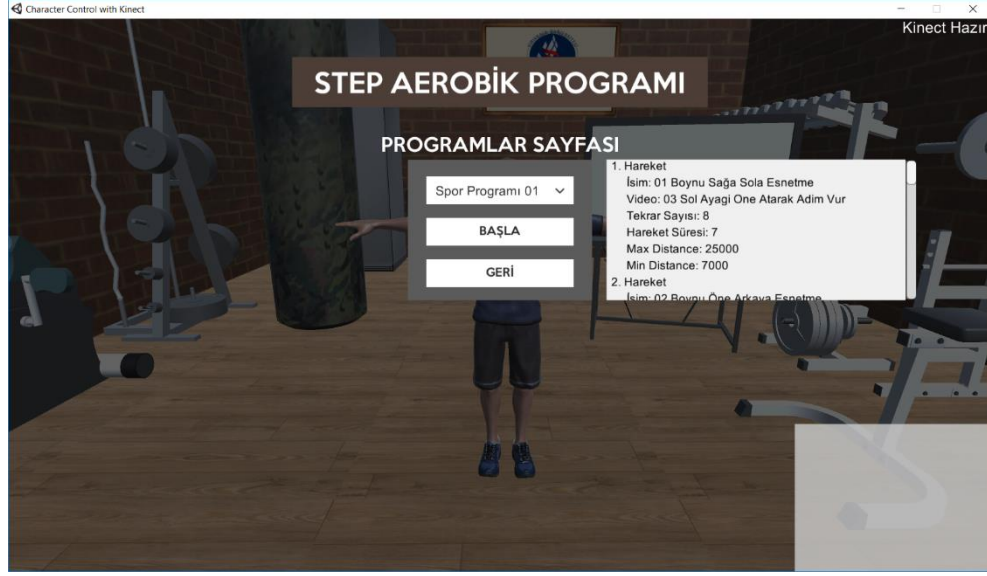
Figure 3.4. The screen of the main menu for the user

Figure 3.4 presents the first screen after a User logs in, which allows user to select an exercise program, view the included exercises, and start the exercise.

Figure 3.5. The screen of the main menu for the coach

Figure 3.5 presents the screenshot of a main page when a coach logs in. In this page coach is able to create new program, test and existing program, record new motion, test existing motion, or exit.
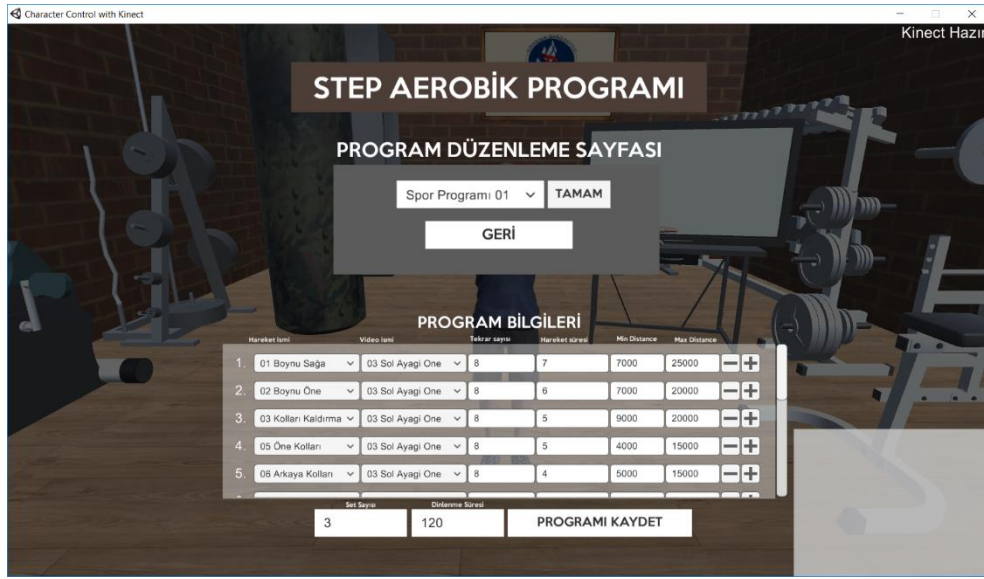
Figure 3.6. A sample screen of creating an exercise program

Figure 3.6 presents a screenshot of creating an exercise program. Coach selects the movements recorded on the system. For example, the program named "Sport Program 01" that is used in this study consists of 19 movements. It is also possible to select a video of movement to be shown on the board behind the user's avatar, though in this study video was not used. Coach decides on how many repetitions is necessary, how long should be the duration of the movement, and what should be the minimum and maximum degrees of the value produced by the algorithm. This interval acts as a level of difficulty as well. Coach decides on the minimum and the maximum values while testing the movements one by one, because the VSP shows the value generated by the Dynamic Time Warping Algorithm while testing the movement (Yukselturk et. Al., 2017). Finally, coach decides on how many sets should be done, and how long the resting period should be, then saves the exercise program. The saved programs automatically uploads on the database as well, this way users are able to reach from their home, to the latest exercise programs when they log in to the VSP.

There are some hardware and software requirements to use the VSP. Kinect's Software Development Kit (SDK) should be installed on the users PC. The necessary minimum hardware and software requirements are listed below (Microsoft, 2016).
Hardware requirements;

• 32 (x86) or 64 (x64) bit processor,

• Dual-core 2.66 GHz or faster processor,

• 2 GB memory (RAM),

• USB 2.0 bus

Software requirements;

• Visual Studio 2010 or higher,

• .Net Framework 4.0

In addition to these requirements, users need to have an internet connection in order to login to the VSP each time they run the program. Because the VSP downloads the latest exercise regiments that are uploaded to the database, and also users' performance scores are saved on the database to let them reach through the website.

To sum up, users can choose from a list of exercise programs and perform them in front of their computer with Kinect and get feedback on their performance that is almost as useful as of a personal trainer. What makes this platform desirable is that it is extremely customizable as it enables any exercise movement to be recorded by a trainer and to prepare a fitness program suitable for a specific user. This option is not provided to customers in commercially accessible exergames (active video games). Virtual Sports Platform (VSP) has been designed and developed by a group of researchers as part of a project supported by TÜBİTAK (The Scientific and Technological Research Council of Turkey) (Yukselturk et al., 2017).

3.3.2 Implementation Process

In this research, 19 exercise motions were recorded on the VSP platform including warm-up and step-aerobic exercises. These exercises were chosen by three instructors from the Kırıkkale University Department of Physical Education and Sports, which were then recorded on the VSP by one of them. Subsequently, the instructor arranged the exercises in order and created the exercise regimen adjusting the repetition and duration of each exercise motion. The exercise regimen used in this study consisted of

19 exercises listed below, which are presented with some illustrations of the exercises in the Appendix C as well:

1. Stretching the neck to the left and right
2. Stretching the neck forward and backward
3. Open the arms from the sides and reach up
4. Swinging the arms forwards
5. Swinging the arms backwards
6. Stretching the back to the right (Dive Squeezes)
7. Stretching the back to the left (Dive Squeezes)
8. Stretching the waist to the right side (side stretch)
9. Stretching the waist to the left side (side stretch)
10. Touch to the left toes with the right hand
11. Touch to the right toes with the left hand
12. Rotate the torso to right and left (torso rotations)
13. Reaching up while stepping to the right
14. Reaching up while stepping to the left
15. Standing parallel to the ground on the right leg
16. Standing parallel to the ground on the left leg
17. Right leg stretching (adductor stretch)
18. Left leg stretching (adductor stretch)
19. Jumping Jacks

The exercise regimen was formed of the movements listed above, and the implementation was as the following:

- One set consists of 19 movements (8 repetitions per movements)
- The program consists of 3 sets, each set will last 15 minutes for a total of 45 minutes
- Completed twice a week
- Lasts 6 weeks in total

Users were free to choose which days to do their exercise with the rule of leaving one free day between. Thus, a weekly program for each user was created and shared, in

order to efficiently distribute the Kinect devices and allocate the lab hours. Some users requested to take the Kinect home and bring back every week, some requested to do the exercises in the Lab environment at the faculty. The 6 Kinect devices at researcher's use was distributed among users considering their convenience. Users were able to reserve the Lab according to their course schedules, and two students could use the Lab at the same time (Figure 3.7)

Figure 3.7. A photograph of two participants while using the VSP in the Lab environment

Before the users started to use the VSP, each of them received an *orientation* on how to set-up the necessary software, plug-in Kinect, prepare the environment for usage. In addition, the orientation included running the VSP and logging in the system. Researcher also demonstrated a brief exercise regimen on the VSP as an example.

3.4   Data Collection Instruments

A semi structured interview guide was prepared and utilized for this study, because "this format allows the researcher to respond to the situation at hand, to the emerging worldview of the respondent, and to new ideas on the topic" (Merriam & Tisdell,

2015, p. 111). A semi structured interview guide includes a mix of more and less structured questions which are used flexibly during the interview. It requires specific data from respondents following a list of questions or issues. The open-ended interview questions permitted respondents to share their views without being forced to select from predetermined alternatives, as in highly structured interviews such as surveys.

The researcher prepared the two interview protocols, which were implemented in this research; the interview protocol for users, and the interview protocol for the preservice coaches and experts; which are described in detail below.

3.4.1 Interview protocol for users

Interview questions were based on the research questions stated earlier. Since the research questions were formed in consideration of the Technology Acceptance Model (Davis, 1989), interview protocols mostly consisted of the themes of perceived usefulness, perceived ease of use, perceived attitude towards using, perceived intention to use, as well. These themes were selected because of the effectiveness they provide to the researchers who study technology acceptance, even though there are a variety of other models, which was stated in a review by Avcı Yucel & Gulbahar (2013) as;

> "The results showed that the main variables of 'Technology Acceptance Model' were remained as the most effective ones though numerous attempts have been made to add other variables to existing ones." (p. 1)

Additionally, other themes included in the interview questions were, perceived implications for education, and suggestions for improvement of the VSP that was spread through the other themes. Initial interview protocol consisted of eleven main questions and twelve prompt questions, to foster elaborations. Three specialists in the Department of Computer Education and Instructional Technology examined the interview protocol and provided feedback. The protocol was revised based on their suggestions. The final protocol consisted of the following 11 main questions, nevertheless the full interview protocol is presented in Appendix A.

1. How was the process of learning to use VSP for you?
2. Did you encounter a problem while using the VSP?
3. What are the effects of using VSP for exercise on your physical and psychological development?
4. What are the implications of using VSP for exercise on productivity?
5. What impact did regular exercise have on other areas of your life?
6. Does using VSP for exercise meet your expectations?
7. What is your attitude towards using VSP for exercise?
8. What is your attitude towards the suitability of using VSP for exercise?
9. What is your attitude towards the benefits of using VSP for exercise?
10. What is your intention to use VSP in the future?
11. What do you think about using Kinect and VSP in education?

In order to test the understandability and clearance of the questions, an interview was conducted with one of the users. The pilot interview was fluent and the interviewee stated that the questions were clear. Therefore, the researcher decided to keep the protocol as it is, also including the pilot interview data in the study.

3.4.2   Interview protocol for preservice coaches and sports sciences experts

The preservice coaches and sports sciences experts were interviewed following another interview protocol similar to the users' interview protocol. The interview protocol for the preservice coaches and sports sciences experts was a modified version of the users' interview protocol, and similarly it was also based on Technology Acceptance Model (Davis, 1989). However, the coaches and experts have not been using the VSP for a long period of time as the users did. Infect they interacted with the VSP during demonstration, thus the questions prepared for them were mostly theoretical, meaning that they were asked of their opinions about the effects the VSP might have on users. Differently from the users, rather than using VSP for exercise, their perceptions of recording new movements and creating exercise regimen on the VSP was desired to be collected. Thus, these were added as prompt under the first question. Nevertheless, there were more questions directed at them about their opinions on the use of VSP in physical education. Final form of the interview protocol

consisted of 15 main questions and 25 prompt questions. Three specialists in the Department of Computer Education and Instructional Technology examined the interview protocol and provided feedback. The protocol has been revised based on their suggestions. The final protocol is presented in Appendix B, aside from the prompt questions, following are the main questions:

1. How was the process of learning to use VSP for you?
2. Did you encounter a problem while using VSP?
3. What can be the physical and psychologic development of someone who uses VSP for exercise?
4. What are the implications of someone using VSP for exercise on productivity?
5. Does using VSP for exercise meet your expectations?
6. Would you like to use VSP for exercise?
7. Is it appropriate for you to use VSP for exercise?
8. Would it be beneficial for you to use SSP for exercise?
9. What is your intention to use SSP in the future?
10. What is your intention to use VSP for regular exercise?
11. How can VSP be used in Physical Education classes?
12. What are the advantages of using VSP in physical education?
13. What are the disadvantages of using the VSP in physical education?
14. What are the limitations of using VSP in physical education?
15. How can VSP be developed for use in physical education classes?

3.5 Data Collection Procedures

Interviewing as a data collection method was used throughout this study. According to Merriam & Tisdell (2015) the main purpose of an interview is to obtain a special kind of information: "what is on someone else's mind", which could not be observed any other way. Some and occasionally all the information are gathered through interviews in most types of qualitative research; and most common practice of interviews are one-to-one, although group or collective formats can also be used (Merriam & Tisdell, 2015).

Data collection procedures are presented in the Figure 3.1, showing that, data from users, preservice coaches and experts were collected on different occasions via interviews.
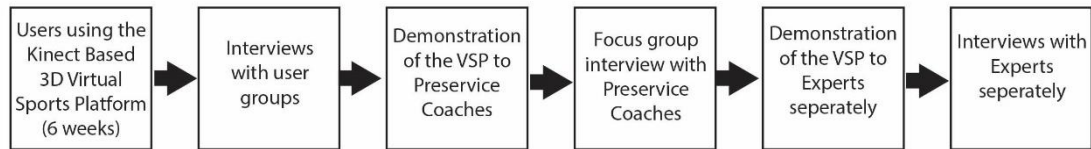
Figure 3.8. Data collection procedure

In the procedure of data collection, focus group interviews were conducted. A focus group is an interview on a subject, with a group of individuals who have understanding of the subject, as a technique of gathering information in qualitative studies. Since the information acquired from a focus group is constructed socially within the group's interaction, this information collection process is based on a constructivist view (Merriam & Tisdell, 2015). Cresswell (2005) states focus group interviews are appropriate when the interaction of interviewees can be rich in reactions. Users were interviewed in four groups with varying numbers of participants (Table 3.1). The groups were formed and scheduled according to the convenience of the participants. User focus group interviews lasted from 15 minutes to 30 minutes, about two hours in total, including the pilot. As mentioned in the interview protocol for users section above, pilot was held as a one to one interview with a female user, which lasted for 22 minutes. Since the interview protocol did not need major changes after the pilot, and the provided data was important, pilot was then included in the data analysis.

Table 3.4. *Interview groups of the users*

Groups	Gender of Interviewees	Duration of Interviews
Group 1	3 females	00:15:02
Group 2	1 female, 4 males	00:22:27
Group 3	5 females, 3 males	00:30:53
Group 4	4 females, 1 male	00:24:40
4 Groups	13 females, 8 males	About 1 and a half hour

Preservice coaches (*f*=8) were interviewed in one focus group. As mentioned in the participants section, preservice coaches have not been using the VSP for a prolonged time. Therefore, just before the interview, researcher introduced and demonstrated the usage of the VSP to them for about 15 minutes. Subsequently researcher offered coaches to try using the system, and a couple of them volunteered to interact with the VSP, while others are observing. Consequently, the interview was held and lasted about 40 minutes.

Sports sciences experts (*f=2*) were interviewed individually. Just before the interview, researcher demonstrated the usage of the VSP and offered the expert to try using the system. Experts interviews with E1 and E2 lasted for 18 minutes and 16 minutes, respectively.

All of the interviews were recorded and then transcribed verbatim.

3.6   Data Analysis

The technique of content analysis was used in this research, to analyze the qualitative data from the interviews. The researcher listened several times to the recordings as a first step to get used to the information. The transcriptions of the interview are read several times while noting the possible codes in the margins. The researcher then read the text and identified the themes and sub-themes. The information was then coded in accordance with the themes established. Finally, the coded information and themes were placed in a table and the researcher analyzed this table to determine the in-depth explanations for research questions.

3.7   Validity, Reliability, and Transferability

Regardless of the design of studies, validity and reliability are issues that can be addressed by thorough consideration of the conceptualization of a study and the way the information are gathered, analyzed, and interpreted, as well as the presentation of results. As Merriam and Tissdel (2015) states, "Internal validity deals with the question of how research findings match reality." One of the methods for increasing internal validity is triangulation, which itself has varying methods, explained by Merriam and Tissdel (2015) as:

> "… triangulation—whether you make use of more than one data collection method, multiple sources of data, multiple investigators, or multiple theories—is a powerful strategy for increasing the credibility or internal validity of your research" (p. 245).

Thus in this research, a kind of *multiple investigators* method, called *triangulating analysts* (Patton, 2015) was used, which requires "having two or more persons independently analyze the same qualitative data and compare their findings" (p. 665). Hence, data analysis and thematic and category generation were carried out separately by two researchers for some of the data; specifically for one of the users' focus group interviews, one of the experts' interviews, and for preservice coaches focus group interview. Once the researchers have separately completed their themes and categories, they came together and compared their findings. After agreement on them, the final themes and categories were created. To examine inter-coder reliability, Cohen's Kappa statistics was used. Cohen's Kappa is an inter-rater reliability index frequently used to assess the amount of agreement between two researchers' codes (Cohen, 1960). The results of this study's inter-coder reliability showed that kappa was equal to 0.82. This indicates a substantial agreement between two coders (Landis & Koch, 1977).

Another concern for the quality of research is known as *reliability* or *consistency*. According to Merriam and Tissdel (2015) "Reliability refers to the extent to which research findings can be replicated" (p. 250). Nevertheless, Merriam and Tissdel (2015) argues that replication of a qualitative study will not produce the same outcomes, but the findings of any specific research are not discredited by this, since the same data can be interpreted in various ways.

Transferability –known as external validity in quantitative studies- refers to applicability or of the result of the study to other situations. In qualitative research this is possible by providing rich, thick descriptions, which is explained by Merriam and Tissdel (2015) as:

> "Providing enough description to contextualize the study such that readers will be able to determine the extent to which their situations match the research context, and, hence, whether findings can be transferred" (p. 259).

Detailed description is provided in this research to ensure transferability. The context, limitations, participants, data collection and analysis procedure have been described in detail in this qualitative research. Also, thick quotations are supplied in the Results Chapter when needed and in the Appendix D entirely.

3.8 Researcher's Role

The researcher's role in qualitative study is distinct from the quantitative study researcher's role. The researcher tires to be objective during the study in quantitative research, while the investigator is the main tool for data collection and processes in qualitative studies (Merriam & Tisdell, 2015). The researcher should therefore describe his biases and role in qualitative studies. The researcher is a research assistant at the Kırıkkale University, who was involved in the development process of the Virtual Sports Program that is used in this study. He was a facilitator during the implementation of the study, making sure the participants felt comfortable. He arranged their schedule for using the platform according to their convenience and helped the distribution of the Kinect devices.

3.9 Limitations of the Study

One of the research's primary constraints was technical problems. Wi-Fi connection issue in particular had effects on users' perceptions.

This study focused on the users' behavioral intention to use the VSP rather than its actual use, thus relied on self-reported data mainly.

Preservice coaches and the sports sciences experts were interviewed aiming to find out their opinions on the use of VSP. However they have not been using the VSP for a prolonged time. Therefore, just before the interview, researcher introduced and demonstrated the usage of the VSP to them for about 15 minutes. Subsequently researcher offered them to try using the system. Thus, their responses to the interview questions were based on researcher's explanation and demonstration, and their limited interaction with the VSP.

CHAPTER 4

RESULTS

The results of the data analysis are presented in this chapter. Analyses of the interview data are presented under each research question and elaborated with the participants' quotes and the researcher's interpretations of them.

4.1 The perceptions of users, and opinions of coaches and experts on the ease of use of the VSP (Research Question 1)

Ease of use, was one of the main themes that emerged from the analysis of participants' responses. Users were asked about how was the process of learning to use VSP for them, and what were the easy or difficult aspects in using the platform. In addition, users were asked whether they encountered any problems while using the VSP, or was the interaction with the system clear and understandable. This would allow the users to share their perceptions on facilitating and impeding factors of using the platform. After categorizing the codes from the answers, under this research question two themes emerged as:

- Features that positively affect the perceived ease of use
- Features that negatively affect the perceived ease of use

The findings on this research question are reported under each theme in the following section.

4.1.1 Features that positively affect the perceived ease of use

Users were asked to remember the learning process and state what they found easy or difficult to do, and eventually how was it to learn to use the VSP. Similarly, coaches and experts were asked of their opinions on what they found facilitating while using the VSP. The participants' answers portrayed seventeen features that positively affect the perceived ease of use; from most cited to the least cited: interaction is clear and understandable, space and time independent usage, variety of motions is sufficient, easy to use, presentation of the motions is sufficient, learning the motions is easy, motion detection of the Kinect is sufficient, orientation, exercise duration is sufficient, keeps the user active, exciting, gives error messages, number of exercise days is sufficient, rest break in the program is sufficient, performing the motions is easy, recording new motions is easy, and personalization. These codes emerged mostly from the users' answers. Only two of these features were cited by the three groups of participants: "Interaction is clear and understandable" was cited by six users, one of the coaches and both of the experts; "Easy to use" was cited by three users, three coaches and both of the experts.

Table 4.1. *Features that positively affect the perceived ease of use of the VSP*

Categories	*f* Users	*f* Coaches	*f* Experts	*f* Total
Interaction is clear and understandable	6	1	2	9
Space and time independent usage	4		2	6
Variety of motions is sufficient	4			4
Easy to use	3	3	2	8
Presentation of the motions is sufficient	3		1	4
Learning the motions is easy	2			2
Motion detection of the Kinect is sufficient	2		1	3
Orientation	2			2
Exercise duration is sufficient	1		1	2
Keeps the user active	1	1		2
Exciting	1			1
Gives error messages	1			1
Number of exercise days is sufficient	1			1
Rest break in the program is sufficient	1			1
Performing the motions is easy		1		1
Recording new motions is easy		1		1
Personalization			1	1

Users (n=22), Coaches (n=8), Experts (n=2), Total Participants (n=32)

Interaction is clear and understandable

Six users, one of the coaches and both of the experts mentioned that interaction with the VSP is clear and understandable. One of the coaches thought the interface was clear, and users would not have a hard time interacting with the system. E1, although finding interaction with the system sufficient, states there is always room for improvement. E2 implies that anyone who is accustomed to use computers would interact with the system easily.

> "[S18] I think it was easy. It was quite clear."
> *"[S18] Kolaydı bence. Gayet açıktı"*

> "[PC5] I liked the Program, interface and such are quite simple, useful. I do not think some users would have a hard time."

"[PC5] Programı ben beğendim ara yüzü falan bayağı sade kullanışlı. Zorlanacağını hiç düşünmüyorum bazı kullanıcıların."

"[E1] Surely it can be improved, but as far as I can see, there doesn't seem to be any shortage. So it seems simple for the user to record it, test it, and show it online."
"[E1] Muhakkak daha geliştirilebilir, ama şu anki gördüğüm kadarıyla herhangi bir sıkıntısı yok gibi. Yani bunu kaydetmesi test etmesi online göstermesi kullanıcı açısından basit gibi duruyor."

"[E2] Of course, that is something that almost every person can understand with today's technology."
"[E2] Tabii ki yani bugünkü teknoloji ile hemen hemen her insanın anlayabileceği bir şey."

Space and time independent usage

Users (*f*=4) mentioned the space and time independent usage of the VSP offers a convenience, especially for who do not have the time and opportunity to go to the gym. One of the users [S14] mentioned not liking the gym because she does not feel comfortable there, thus she prefers using VSP at home. Some users (S15, S18) mentioned that seasonal differences are not affecting the usage of VSP at home, thus making easy to do sports in winter. Experts mention the platform works in any place, and this feature of the VSP helps those who do not have any other options than exercising at their home. [E1] implies that users would easily do exercise based on their schedule as well.

"[S14] At least, there are people who don't have time and means to go (to the gym), it might be advantageous for them. They want to go to the gym but doesn't have time or, woman's husband may not allow. It could be an alternative for them."
"[S14] En azından gitmeye vakti ve imkanı olmayan insanlar oluyor, onlar için avantajlı olabilir. Spor salonuna gitmek istiyor ama zamanı olmuyor ya da hanımlara eşleri izin vermiyor. Onlar için bir alternatif olabilir."

"[S14] I can't feel comfortable at the gym personally, but do as you like at home."
"[S14] Ben şahsen spor salonunda rahat edemiyorum, ama evde istediğin gibi yap."

"[S15] Instead of going out, whether it is summer or winter, we can do sports at home."

"[S15] Evden dışarı çıkmaktansa yazı var kışı var çünkü evde de sporumuzu yapabiliriz."

"[E2] The users will not go to a place, will not depend on a place, their working time will not be dependent."
"[E2]Bir yere gitmeyecek bir yere bağımlı olmayacak çalışma saati bağımlı olmayacak."

"[E1] So, this program can have two things, such as housewives who can not leave the house, I mean you can not constantly think about or around the metropolitan areas, so there are towns, villages, with no access to the gym. Or think of a physical education teacher, works in the village where the facilities are narrow, that is, can be used in such places."
"[E1]Yani bu programın iki şeyi olabilir, evden çıkamayan ev hanımları gibi, yani sürekli çıkamayanlar ya da işte etrafında yani büyükşehirleri düşünmeyelim sonuçta kasabalar var, köyler var, spor salonu ulaşımı yok. Ya da işte bir beden eğitimi öğretmenini düşünün köyde imkanların dar olduğu yerlerde, yani o tip yerlerde kullanılabilir."

Variety of motions is sufficient

Users (*f*=4) found the variety of the motions they performed that are on the exercise regimen was sufficient, which appears to have helped them complete the workouts easily, and affecting the ease of use positively.

"[S05] The variety of movement was so great that I was never bored."
"[S05] Hareket çeşitliliği çok fazlaydı ben hiç sıkılmıyordum yani."

Easy to use

Users (*f*=3) mentioned the VSP was easy to set up and use. Also coaches (*f*=3) made comments on the interface and interactions of some properties of the VSP as being easy to use. Both of the experts (*f*=2), indicated they would not have difficulty using the system, as well as it would be easy for most of the people to use.

"[S04] It was easy to use in my opinion."
"[S04] Bence kullanımı kolaydı."

"[S16] After all, we study computer. We didn't have any trouble setting it up. It's very easy to set up. We didn't have a problem with the internet either."

"[S16] Sonuçta bilgisayar okuyoruz. Kurmada falan bir sıkıntı yaşamadık. Kurulumu çok kolay. İnternette de bir sorun yaşamadık."

"[PC5] I think it's very nice, I mean you choose the program and such, I mean you can do everything in a very simple way. You can introduce a new program, add new motions. Pretty easy and good in my opinion. I find it successful."
"[PC5] Bence gayet güzel yani orada programı falan seçiyorsun, yani çok basit bir şekilde her şeyi yapabiliyorsun. Yeni program tanıtabiliyorsun. Yeni hareket ekleyebiliyorsun… Oldukça kolay ve güzel bence. Başarılı buluyorum."

"[PC3] There is no problem in the program to record the movement, or testing and such, it is nice."
"[PC3] Programın hareket kaydetmesinde sıkıntı yok hani uygulaması falan güzel."

"[E1] Learning… there is no difficulty, on the upshot. I mean, it's easy to learn. I don't have any problems in my mind. As long as it is done according to the level of the other party (user) and the instructor in the back expresses it nicely, I think it can be learned easily."
"[E1] Öğrenmek… zorluğu yok sonuçta. Yani öğrenmek kolay. Herhangi bir sorun yok aklımda. Yeter ki karşı tarafın seviyesine göre yapıldığı müddetçe ve arkadaki eğitmen de güzel bir şekilde ifade ettiği şekilde bu kolayca öğrenilir diye düşünüyorum."

"[E2] It was easy to use both for people who have done sports in their past life and for the first time using that program."
"[E2] Hem geçmiş yaşantısında spor yapmış insanlar hem de o programı ilk kez kullanan insanlar için de kullanımı kolaydı."

Presentation of the motions is sufficient

Users (*f*=3) found the instruction of the motions sufficient, while E1 also states the motions are expressed nicely.

"[S08] Presentation of the motions was nice."
"[S08] Hareketlerin gösterilmesi güzeldi."

"[S06] Exactly."
"[S06] Aynen."

"[S01] I mean, it was enough for me, because you were with us, showing us."
"[S01] Yani benim için yeterliydi ama yanımızda siz olduğunuz için gösterdiğiniz için."

"[E1] Learning… there is no difficulty, on the upshot. I mean, it's easy to learn. I don't have any problems in my mind. As long as it is done according to the level of the other party (user) and the instructor in the back expresses it nicely, I think it can be learned easily."
"[E1] Öğrenmek… zorluğu yok sonuçta. Yani öğrenmek kolay. Herhangi bir sorun yok aklımda. Yeter ki karşı tarafın seviyesine göre yapıldığı müddetçe ve arkadaki eğitmen de güzel bir şekilde ifade ettiği şekilde bu kolayca öğrenilir diye düşünüyorum."

Learning the motions is easy

Two of the users expressed that they learned performing the motions easily.

"[S11] After the first set was finished, we made it very comfortably in the second set."
"[Res] Did you learn the motions immediately?"
"[S11] Yes, we did."
"[S11] İlk set bittikten sonra ikinci sette çok rahat bir şekilde yaptık."
"[Res] Hareketleri hemen öğrendiniz mi?"
"[S11] Evet öğrendik."

"[S15] It was easy since it required repetition."
"[S15] Tekrarlama vadettiği için de kolaylık oldu."

Motion detection of the Kinect is sufficient

Users (*f*=2) mentioned that the motion detection of Kinect was sufficient. In addition, E2 stated that even if the motions are all performed while standing, the detection capacity of Kinect was enough for an effective work out.

"[S20] When I saw S22, he was in a sports outfit, it was fine."
"[S20] Ben S22 gördüğümde spor kıyafeti vardı, gayet te iyiydi."

"[S22] It was good because I do sports, there was no problem. I never had any trouble."
"[S22] Ben sporcu olduğum için iyiydi, sıkıntı yoktu. Bende hiç sıkıntı olmadı."

"[S05] (If the program freezes) When I stood at a T-shape, it detected me back."
"[S05] T şeklinde durunca geri algılıyordu."

"[E2] We can. In other words, almost all sports and almost everything done before and after, we are already standing. We are on the ground just while we are resting. Maybe, you know, a few things like artistic gymnastics, such as floor mats can be difficult,

but ... In other sports, during warmup session, competition session, I think this level of detection can be sufficient for all of that."

"[E2] Yapabiliriz. Yani hemen hemen zaten birçok sporun ve öncesi esnası ve sonrasında yapılan hemen hemen her şey zaten ayakta sadece biz dinlenirken yerde oluruz yani yerde yapılan spor sayısı çok az. Belki hani artistik jimnastik gibi birkaç işte yer minderi gibi şartlarda zor olabilir ama... Diğerlerinin işte ısınma aşaması müsabaka aşaması, hepsini görebileceğini düşünüyorum bu algılama boyutunun."

Orientation

Some users found the orientation helpful for understanding how to use the VSP.

"[S04] In understanding movements. Because it was not very understandable in the beginning, for example, we were doing other movements. Then you corrected them."

"[S04] Hareketleri çözmede hocam. Çünkü çok anlaşılır değildi başta mesela başka hareketler yapıyorduk. Sonra siz onları düzelttiniz."

"[S01] I mean, it was enough for me, but because you were with us, showing it."

"[S01] Yani benim için yeterliydi ama yanımızda siz olduğunuz için gösterdiğiniz için."

Exercise duration is sufficient

One user and one expert found the exercise duration sufficient. User S12 stated that even though the duration was sufficient, variety of motions could be increased. E2 mentions the personalization necessity of any workout, in other words, the duration and intensity of any program should be tailored to the user's needs. Nonetheless, he adds that, a 45 minutes workout session is enough for a fit person, to maintain their condition.

"[S12] I think it's boring because the movements are the same. 1 hour was fine. Let's do the first set as you said. But the other sets are definitely regional."

"[S12] Bence hareketler aynı olduğu için sıkıcı oluyor. 1 saat iyiydi. İlk seti sizin dediğiniz gibi yapalım. Ama diğer setler bölgesel kesinlikle."

"[E2] Now, the training is completely individual. So we test the person first and see what we are aiming at. You know, should they lose weight or gain weight? Do they have too much fat or too little?

I mean what is our direction? But after adjusting all this and after considering their age, we just try to play for the duration. What is the duration… while the physical and physiological parameters of a person is good trying to maintain their condition, 4 days a week for 45 minutes is enough for them. If we try to burn fat maybe 6 days a week, morning and evening. Maybe 70 minutes, 80 minutes. At least we will have to find 100 minutes a day. So, these are personal. But 45 minutes may be enough for someone in a fit position."

"[E2] Şimdi antrenman tamamen bireyseldir. Yani kişiyi önce test ederiz onun üzerinde neyi amaçladığımız da bakarız. Hani kilo mu verdireceğiz kilo mu aldıracağız. Yağımı eksik yağımı fazla yani nereye gideceğiz. Ama bütün bunları ayarladıktan sonra ve işin içine yaş da girdikten sonra süresine oynamaya çalışırız sadece. Nedir işte süre… fiziksel ve fizyolojik parametreleri düzgün bir kişi formunu korumaya çalışıyorsa haftada 4 gün 45 dakika onun için yeterli iken, yağ yakmaya çalışırsak belki haftada 6 gün sabahlı akşamlı. Belki 70 dakika 80 dakika. En azından gün içinde 100 dakikayı bulmamız gerekecek. Yani bunlar bireysel. Ama Fit pozisyonda birisi için 45 dakika yeterli olabilir."

Keeps the user active

User S05 stated that it keeps him active. Similarly, coach PC3 thinks VSP would help her father to be active who sits all day at work.

"[S05] It was beautiful. I mean, it keeps you active all the time."
"[S05] Güzeldi. Yani sürekli aktif tutuyor insanı."

"[PC3] But think of someone who works at a desk, for example, my father sits until the evening, his movements are limited, he says he's just sitting at the desk, I'm already twisted. If he comes home and learns a few things, it will have effect."
"[PC3] Ama masa başında çalışan birini düşün, mesela benim babam akşama kadar sürekli oturuyor, hareketleri kısıtlı, sadece oturduğunu söylüyor masa başında, zaten iki büklüm oluyor. Eve gelip bu hareketleri yapsa bir kaç bir şey öğrense (aktif olmaya) etkisi olur."

Exciting

One of the users found the learning process exciting.

"[S04] I was excited, actually, you know, what are we doing, we were trying to follow them, adjust the speed… you know, did I do it before or after… (instructor) was doing as an example first... I was curious at first, I was wondering. But later, there wasn't much…"

"[S04] Heyecanlıydı aslında, nasıl oluyor hani, ne yapıyoruz, onları falan takip etmeye çalışıyorduk hızını falan ayarlamaya… hani öncemi yaptım sonra mı yaptım… ilk önce örnek olarak yapıyordu ya… heyecan vericiydi ilk başta, merak ediyordum. Ama daha sonra çok şey olmadı…"

Gives error messages

One of the users answered positively when asked if the system provided feedback when an error occurs.

"[Res] Was the system giving feedback when you received an error?"
"[S03] Yes."
"[Res] Hata aldığınızda sistem geri bildirim veriyor muydu?"
"[S03] Evet."

Number of exercise days is sufficient

One of the users indicated that, the number of days, twice a week, they had to perform the exercises, was sufficient.

"[S06] I think it was comfortable because we did it on certain days. We didn't do it every day, it didn't matter because we did it every other day."
"[S06] Belirli günlerde yapmış olduğumuz için rahattı bence. Her gün yapmadık, iki günde bir yaptığımız için sorun yoktu."

Rest break in the program is sufficient

User S05 point out that, the VSP allowed users to rest.

"[S05] I remember resting in front of the VSP. There was no problem."
"[S05] Ben karşısında dinlendiğimi hatırlıyorum. Sorun olmuyordu."

Performing the motions is easy

One of the coaches mention that performing the motions that are recorded on the VSP is easy, especially for working people.

"[PC7] Simple motions, not difficult."
"[PC7] Basit hareketler, zor değil"

"[PC7] … a person, already working, makes these movements very comfortably."
"[PC7] … zaten çalışan bir insan bu hareketleri çok rahat yapar."

Recording new motions is easy

Another coach commented on the recording new motions feature, and stated it was easy.

> "[PC3] There is no problem in the program while recording the movement, and testing was nice."
> *"[PC3] Programın hareket kaydetmesinde sıkıntı yok hani uygulaması falan güzel."*

Personalization

One of the experts E1 commented on the personalization feature of the VSP, especially the exercise regimen. He stated that if the exercise regimen on the VSP is personalized, the user would easily learn and apply the exercises.

> "[E1] Learning… there is no difficulty in the end. So it's easy to learn. I don't have any problems in my mind. As long as it is done according to the level of the other party and the instructor in the back expresses it nicely, I think it can be learned easily."
> *"[E1] Öğrenmek… zorluğu yok sonuçta. Yani öğrenmek kolay. Herhangi bir sorun yok aklımda. Yeter ki karşı tarafın seviyesine göre yapıldığı müddetçe ve arkadaki eğitmen de güzel bir şekilde ifade ettiği şekilde bu kolayca öğrenilir diye düşünüyorum."*

4.1.2   Features that negatively affect the perceived ease of use

The users were asked if there were any difficulties they faced while using the VSP, and the codes emerged from their answers are categorized under three categories: technical issues, content issues, and design issues under the title of features that negatively affect the perceived ease of use. Similarly, preservice coaches and experts stated their opinions on the possible difficulties that users would face using the VSP, although most of the codes emerged from user responses. The results are presented in the Table 4.2, and each theme is elaborated under the relevant title below.

Table 4.2. *Features that negatively affect the perceived ease of use of the VSP*

Categories	f Users	f Coaches	f Experts	f Total
Technical issues	**44**	**4**		**48**
Motion detection problem with Kinect	9	4		13
Internet connection problem	6			6
Database connection problem	5			5
Application freezes	5			5
Score not saved	5			5
Difficulties in preparing the usage area	3			3
Problem with Kinect sharing	3			3
Limitations of Kinect	2			2
Difficult to install	2			2
Insufficient computer specifications	2			2
Problems with clothing	2			2
Content issues	**24**	**4**	**2**	**30**
Variety of motions is not sufficient	5		1	6
Daily exercise duration is long	5			5
No rest break	4			4
Boring	3	1	1	5
Tiring	3	1		4
Number of exercise days is not sufficient	2			2
Motion duration is long	1	1		2
Motion duration is short	1			1
Rapidness is not sufficient		1		1
Design issues	**14**	**4**		**18**
The instructor's motion is not understood	6	1		7
Error messages are not helpful	2			2
User control is not sufficient	2			2
Instructions font size is small	1			1
Instructor is not visible	1			1
No time to read the motion instructions	1			1
Personalization is not sufficient	1			1
Confusion in creating an exercise program		2		2
Feedback is not sufficient		1		1

Users (n=22), Coaches (n=8), Experts (n=2), Total Participants (n=32)

4.1.2.1 Technical issues that negatively affect the perceived ease of use

The technical issues that negatively affect the perceived ease of use, from most cited to the least cited are: Motion detection problem with Kinect, Internet connection problem, Database connection problem, Application freezes, Score not saved, Difficulties in preparing the usage area, Problem with Kinect sharing, Limitations of Kinect, Difficult to install, Insufficient computer specifications, Problems with clothing. The themes emerged mostly from user responses, with coaches only commenting on the Motion detection problem with Kinect. The themes are elaborated below:

Motion detection problem with Kinect

The most cited technical issue by users (f=9) and coaches (f=4), that negatively affect the perceived ease of use was motion detection problem with Kinect. Users mentioned various situations where the Kinect did not detect their motions. In fact, they speculate some reasons for this issue such as, the light in the environment, objects near to the user, someone passing by or behind the user, wearing dark color clothes, wearing baggy, loose-fitting clothes, standing close to the Kinect, and being too short or too tall. Users point out that, when the Kinect did not detect them, or detect something else instead of them, the VSP continued the session and gave low scores. They also mention that, in such cases the Avatar of the user made strange movements, not representing the user motions. Similarly, some of the preservice coaches stated their opinions on the motion detection capabilities of Kinect, based on their observations, matching the users' comments in the sense that Kinect sometimes can not detect the motions, thus the avatar displays strange movements, and the VSP gives low scores.

> "[S01] Where I used it, there was trouble with light or something. There was a problem with detection in the light."
> *"[S01] Işıktan yaptığım yerde ışıktan falan sıkıntı oldu. Işıkta algılama sıkıntısı oldu."*

"[S01] It is very difficult to perceive some movements. Sometimes when you make a ridiculous act it gave 90 or 100 points. Sometimes when you do it correctly it gave 30 or 0 points."

"[S01] Bazı hareketleri algılaması çok sıkıntı yaratıyor. Bazen çok saçma hareket yapınca da 90 verdi 100 verdi. Bazen tam yapınca da otuzlarda sıfırlarda verdiği de oldu."

"[S17] We were making it at home. Kinect could detect the bed or something or the blanket."

"[S17] Biz evde yapıyorduk. Yatağı falan algılıyordu. Battaniyeyi algılıyordu."

"[S18] It didn't sense some colors on the clothes. She didn't, for example, when she wore black trousers."

"[S18] Kıyafetlerde bazı renkleri algılamıyordu. Mesela siyah pantolon giyince algılamıyordu. Bol paçalı pantolon giyince…"

"[S18] It couldn't fully sense the movements. For example, when we stretched out our hands, he twists and turns, but we didn't do that."

"[S18] Tam anlamıyla hareketleri algılayamıyordu. Mesela biz elimizi uzattığımızda o ara elleri falan döndürüyor ama biz öyle bir şey yapmıyorduk."

"[S19] Its inability to detect certain movements made us think that we were doing things wrong… For example, turns, lifts. He was detecting differently, showing different figures (on the screen)."

"[S19] Bazı hareketleri algılayamaması bizim sanki hareketleri yanlış yaptığımızı düşündürüyordu… Mesela dönüşler, el kol kaldırmalar falan. Farklı algılıyordu, farklı figürler gösteriyordu."

"[S20] We were spreading our arms, but it couldn't detect, couldn't start the program."

"[S20] Kollarımızı açıyorduk ama algılayamıyordu, gelmiyordu."

"[S21] There is also a difference between the tall and short people. It detects the longer one more (better)."

"[S21] Bir de boyu uzun olanla kısa olan arasında fark oluyor. Uzun olanı daha çok (iyi) algılıyordu."

"[PC1] For example, he gives his attention to it, he thinks that he is doing wrong because the movement is perceived differently... His sport get disrupted."

"[PC1] Mesela oraya dikkatini veriyor, tam yapacağı zaman oradaki hareket farklı algılandığı için yanlış yapıyorum diye düşünüyor ve gidiyor yani... Yaptığı spor şey oluyor…"

"[PC3] For example, I'm doing here, but in the program posture (avatar) is moving slower. Then I'm saying that I'm doing the wrong

thing, as my friend said .. If it reflects exactly the same there would be something more if I see myself ... I don't have a chance to see myself on the screen instead of the posture?"

"[PC3] Mesela ben burada yapıyorum, ama programda postür (avatar) daha yavaş hareket ediyor. O zaman ben hani şey diyorum acaba yanlış mı yapıyorum.. Aynı arkadaşımın dediği gibi.. Birebir aynısını yansıtsa oraya ben kendimi görsem orda daha şey olurdu… postürün yerine kendimi ekranda görme şansım yok mu?"

"[PC3] The program does not have trouble recording the movement of the application or something nice. But there is a problem in the perception of the posture there is something that you do not fully perceive the movement. For example, we do not jump but it jumps. So that can be corrected."

"[PC3] Programın hareket kaydetmesinde sıkıntı yok hani uygulaması falan güzel. Ama postürün onu algılamasında sıkıntı var işte oradaki şeyde yaptığınız hareketi tam algılamıyor. Mesela biz zıplamıyoruz ama zıplıyor. Yani o düzeltilebilir. O zaman kullanıcıya da sıkıntı yaşayabilir"

"[PC7] Two-dimensional shooting of the camera…In some cases, the movement made by the user and the movement shown may not be the same. This affects the score."

"[PC7] Kameranın iki boyutlu çekmesi…Gösterilen hareketle yapılan hareket bir olmayabiliyor bazı durumlarda.. İki boyutlu gördüğü için sonucu bile etkileyebiliyor..."

"[PC8] You do this, it shows the movement otherwise. You are doing the right, but that detects it the incorrectly ... Friend just did right, it showed 10 percent."

"[PC8] Siz böyle yapıyorsunuz hareketi o başka türlü gösteriyor. Siz doğru yapıyorsunuz mesela hareketi o yanlış algılıyor... Arkadaş demin doğru yaptı, yüzde 10 gösterdi."

Internet Connection Problem

Users (*f*=6) were having difficulty connecting to the Internet from school, and their dormitories. This affected the ease of use negatively. Users also mention that when their computer disconnected the Internet while performing the workout, the database connection of the VSP would break as well, which results not saving their performance score online.

"[S01] There is a lot of trouble in the internet in the dormitory, we even do projects at school."

"[S01] Yurtta internet de çok sıkıntı oluyor, projeleri bile okulda yapıyoruz."

"[S06] For example, when the internet connection went to the database was not registered. Our sport was for nothing. Our score was not registered in the system."
"[S06] Mesela internet bağlantısı gittiği anda veri tabanına kaydolmuyordu. Yaptığımız spor boşuna gidiyordu. Puanımız sisteme kaydolmuyordu."

"[S12] We had trouble with the Internet. A problem from us, not from the program."
"[S12] İnternette sıkıntı yaşadık. Bizden kaynaklı bir problem, programdan değil."

"[S16] I've had (the same problem) once. Because of my internet connection, I did but it did not save, and it appeared to be 13% on the system. I had to do it again."
"[S16] Ben bir kere karşılaştım. O da internetim çekmemesinden dolayı, yaptım yaptım kaydetmedi %13 olarak göründü sistemde. Bir kere daha yapmak zorunda kaldım."

Database Connection Problem

Similar to the internet connection issue, some of the users (f=5) had database connection issue, which results in not being able to login to the system or if it happens while using the system, results in not saving their score to the database.

"[S20] … We couldn't connect to the internet, the database. It probably originated from the internet of the school."
"[S20] .... Bir türlü internete bağlanamadık, veri tabanına. Muhtemelen okulun internetinden kaynaklanmıştı."

"[S03] We could not connect to the database."
"[S03] Veri tabanına bağlanamadık."

Score not saved

Five users cited that their scores was not saved to the database at some instances. Sometimes it was saved on the system with a lower percentage score than their actual performance score.

"[S16] I've had (the same problem) once. Because of my internet connection, I did but it did not save, and it appeared to be 13% on the system. I had to do it again."

> *"[S16] Ben bir kere karşılaştım. O da internetim çekmemesinden dolayı, yaptım yaptım kaydetmedi %13 olarak göründü sistemde. Bir kere daha yapmak zorunda kaldım."*

> "[S06] For example, when the internet connection was lost, score was not saved to the database. Our sport was for nothing. Our score was not registered in the system."
> *"[S06] Mesela internet bağlantısı gittiği anda veri tabanına kaydolmuyordu. Yaptığımız spor boşuna gidiyordu. Puanımız sisteme kaydolmuyordu."*

Application freezes

Some users (*f*=5) mentioned that the application freeze sometimes, for instance when someone else passes by near them. When the application froze, they got a low score saved on the database, and they had to start over. One user mentioned that after a while application unfroze, in other words continued running again, however did not continue scoring the motions.

> "[S21] For example, when someone goes in front of the computer, it freezes. Freezing happens in the movements while doing it at home alone. I would open my arms thoroughly so that it could come. I was doing the movements again, but did not give points."
> *"[S21] Mesela bilgisayarın önünden biri geçince donuyor. Evde tek başıma yaparken de hareketlerde donma oluyordu. O gelsin diye kollarımı iyice açıyordum. Donması geçince yine hareketleri yapıyordum ama puan vermiyordu."*

> "[S11] I found a bug. I have done once, and when I start the second time it only does one set, and does not precede to other sets. Always staying thirteen fifteen percent. Error solved when we close and start over."
> *"[S11] Ben açığını buldum hocam. Bir kere yaptıktan sonra ikinciye yeniden başla dediğimizde hep bir set yapıyor sonra ikinci setlere gelmiyor. Hep yüzde on üç on beşte kalıyor. Durdurup başlattığımızda hata çözülüyor."*

Difficulties in preparing the usage area

One of the preconditions for using the VSP is preparing a usage area that is at least two meters distance from the Kinect, and free from other objects that would come in between the user and the Kinect. Three users mentioned that this was a challenge because of their accommodation situation. Some users did not have a room wide

enough to adjust the distance from the Kinect. Some users mentioned other people passing in front of or behind them, which was problematic for Kinect to detect.

> "[S06] We were in trouble because we did it in the dormitory environment. The girls were passing by."
> *"[S06] Biz yurt ortamında yaptığımız için sıkıntı oluyordu. Kızlar önümüzden geçiyordu"*

> "[S08] At first there was trouble adjusting the distance, since I had a lot of difficulty."
> *"[S08] İlk başta mesafeyi ayarlamada sıkıntı vardı, ondan yana çok zorluk çektim."*

> "[S01] When someone passed in front of him or back, he deemed my action invalid."
> *"[S01] Önünden ya da arkadan biri geçtiği zaman benim hareketimi geçersiz saydı."*

Problem with Kinect Sharing

Three users stated that sharing Kinect was a problem for them, which affected the ease of use of the VSP.

> "[S01] It was also a hardship for me to take and bring back the Kinect."
> *"[S01] Bir de Kinect i götürüp getirmesi sıkıntıydı."*

> "[S12] In fact, the lack of the gym, my teacher. Two or three people can do the same thing at the same time. If we do the same movements at the same time or if the movements are different, we do not need the gym, but we do one person ... waiting for an hour friend."
> *"[S12] Aslında spor salonundan eksiği şu hocam. Aynı anda iki üç kişi yapabilsek yine aynı şey olur. Aynı anda aynı hareketleri yapsak ya da hareketler farklı olsa spor salonuna biz gerek duymayız ama tek kişi yapıyoruz ... bir saat bekliyor arkadaş."*

> "[S12] Because it already takes a long time or an hour or so. One of us is doing one of us, we have to wait for one of us."
> *"[S12] Çünkü zaten uzun sürüyor ya yani bir saat falan. Birimiz yapıyoruz birimizi beklemek zorunda kalıyoruz. Diğerimiz yapıyoruz diğerimizi bekliyoruz."*

> "[S16] My teacher also had something like this. If everyone had a kinect .. for example, I want to do sports now, I do not have kinect. When Kinect comes to me, I have a job. So we have trouble. We didn't want it when it was kinect. Then we did it two or three times in one day."

"[S16] Hocam bir de şöyle bir şey oldu. Herkeste bir tane kinect olmuş olsaydı.. mesela ben şuan spor yapmak istiyorum bende kinect yok. Kinect bana geldiği zaman benim bir işim oluyor bana uymuyor. Yani sıkıntımız bu. İstediğimiz zaman kinect olmadı, kinect olduğu zaman biz istemedik. Ondan sonra bir gün içinde iki üç kere yaptık sıkıldık."

Limitations of Kinect

In order for Kinect to detect properly, the user should be standing facing the Kinect. Thus when a user sits, lays down, or turn their back, the Kinect could not detect their motions. In this regard, VSP exercise regimen included the proper exercises that Kinect could detect. However, some users (*f*=2) stated this limitation of Kinect as a negative issue.

"[S08] At home, for example, there are movements we can do on a flat surface, they can be added. We can find everything in the gym but not at home."
"[S08] Evde mesela düz bir zeminde yapabileceğimiz hareketler var, onlar eklenebilir. Spor salonunda her şeyi bulabiliyoruz ama evde yok."

"[S08] I would increase the movements. I mean, there are only movements for the arm . There is a leg, bend over, I think some movements are missing. This is probably something that comes from Kinect."
"[S08] Hocam hareketleri arttırırdım. Yani sadece kola yönelik hareketler var. Bacak ta var ama eğilip kalkma şu bu, hani bazı hareketler eksik bence. Bu da belki Kinect 'ten kaynaklanan bir şeydir."

Difficult to install

Two users mentioned that they had difficulty installing the VSP on their personal computer.

"[S21] We didn't know which to open because there were a few files. I was always calling S18 to ask which one to open."
"[S21] Birkaç dosya olduğu için hangisini açacağımızı bilemiyorduk. Hep S18'yı arayıp soruyordum hangisini açacağız diye."

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"[S20] Installation was difficult, Kinect was difficult to detect (by computer). We had lost a lot of time at one point, but then everything was fine."

"[S20] Kurulumu zordu, Kinect i algılatması zordu. Bayağı zaman kaybı yaşamıştık bir ara, ama sonra düzelmişti her şey."

Insufficient Computer Specifications

Two of the users mentioned that their personal computer did not meet the requirements for installing the VSP.

"[S01] My computer's specifications was not enough, so I had to find another computer."

"[S01] Benim Bilgisayarım mesela kaldırmadı. O yüzden başka bilgisayar bulmam gerekti."

"[S22] My computer's specifications was not enough."

"[S22] Benim bilgisayarım kaldırmıyordu."

Problems with clothing

Two of the users stated that sometimes their clothes were problematic, especially for Kinect's motion detection.

"[S18] It didn't detect some colors on the clothes. For example, when I wore black trousers, it did not detect it. When I put on trousers with wide trotters."

"[S18] Kıyafetlerde bazı renkleri algılamıyordu. Mesela siyah pantolon giyince algılamıyordu. Bol paçalı pantolon giyince…"

"[S19] I had a wide-sleeved outfit, it made a problem too."

"[S19] Benim de kolları geniş bir kıyafetim vardı onda sorun olmuştu."

4.1.2.2 Content issues that negatively affect the perceived ease of use

Another theme under the features that negatively affect the perceived ease of use is: content issues that negatively affect the perceived ease of use. Under this theme nine codes emerged, these from most cited to the least cited are: Variety of motions is not sufficient, Daily exercise duration is long, No rest break, Boring, Tiring, Number of exercise days is not sufficient, Motion duration is long, Motion duration is short, Rapidness is not sufficient. These codes emerged mostly from users' responses, but also from coaches' and experts' responses. Only, *Boring* was cited by three types of

participants: users ($f=3$), coaches ($f=1$), and experts ($f=1$). Other codes are elaborated below, and also presented in the Table 4.2, above.

Variety of motions is not sufficient

Five of the users perceived that the variety of motions is not sufficient. They stated that exercises included in the VSP was limited to certain regions of the body. In addition to that, doing the same exercises for each set and for the whole process of 6 weeks affected the ease of use negatively. Similarly, E1 commented on this issue as the exercises should be improved over time.

> "[S15] could be different in the first set, different in the second, different in the third."
> *"[S15] 1. Sette farklı, ikinci sette faklı, üçüncü sette farklı olabilirdi."*
>
> "[S12] I think it's boring because the movements are the same. 1 hour was fine. Let's do the first set as you said. But the other sets are definitely regional."
> *"[S12] Bence hareketler aynı olduğu için sıkıcı oluyor. 1 saat iyiydi. İlk seti sizin dediğiniz gibi yapalım. Ama diğer setler bölgesel kesinlikle"*
>
> "[S01] For example, in movements… If Kinect's detection is improved, more movements can be added. Those movements were simple. Neck movement, arm movement, which was tiring but simple. We did the same thing three times…"
> *"[S01] Hareketlerde mesela… O algılaması geliştirilirse daha yeni hareketler eklenebilir. O hareketler basitti. Boyun hareketi, kol hareketi, yani yorucuydu ama basitti. Üç kere aynı şeyleri yapıyorduk…"*
>
> "[E1] Advancing by improving (the exercises). Or it becomes boring."
> *"[E1] (Hareketleri) Geliştirerek ilerlemek. Yoksa sıkıcı hale gelir."*

Daily exercise duration is long

Users ($f=5$) stated that daily exercise duration is long, which was about 45 minutes. Thus, the duration of the exercise negatively affects the ease of use.

> "[S03] Yes, the time was too long."
> *"[S03] Evet süre çok fazlaydı."*

"[S02] And (the duration) was too long,"
"[S02] Bir de çok uzundu,"

No rest break

Four users cited that the VSP did not offer rest break while doing the exercise. One of the users mentioned that when they left the usage area to rest, the VSP was freezing. One of them stated that since the duration is too long, they needed to pause sometimes however it was not an option. In fact, the exercise regimen created on the VSP allows a resting period of three minutes in between the sets, meaning that users were able to rest for three minutes after every fifteen minutes of exercise. However, the user was required to stand in front of the Kinect, for the countdown to continue. Thus some of the users mentioned not being able to leave the area, affected the ease of use negatively.

"[S06] When you move away from the front of Kinect, the program was freezing..."
"[Res] How would you like it to be?"
"[S06] I could sit, for example."
"[S06] Aralarda şey yapınca, Kinect'in önünden ayrılırsan program gidiyordu."
"[Res] Nasıl olmasını isterdin?"
"[S06] Oturabilirdim mesela."

"[S01] And there was no waiting. They were very annoying. There was no such thing as taking a break, I had to do it continuously."
"[S01] Bir de bekletme durumu falan olmadı. Bunlar çok sıkıntı oldu. Bir ara vermek gibi bir durum olmadı devamlı yapmam gerekti."

"[S08] When I take a break, count the 3 minutes, but I shouldn't have to stand in front of Kinect."
"[S08] Ara verince 3 dakikalık süreyi saysın ama önünde durmam gerekmesin."

Boring

Some users ($f=3$) perceived the VSP is boring, for the reasons of performing the same exercises, and doing the exercises alone. Also, one coach stated her opinion as it is boring for various reasons, such as Kinect's detection, seeing the Instructor Avatar's movement, seeing the user's avatar was problematic. E1 commented on the exercise routine, that if it stays the same it would become boring.

"[S12] Doing the same motions is boring."
"[S12] aynı hareketleri yapmak sıkıyor."

"[S13] When you are with someone, you don't understand how time passes. But when you're on your own, it feels like that one hour is getting too long, it doesn't end."
"[S13] Yanında başkaları olunca zamanın nasıl geçtiğini alamıyorsun. Ama tek başına olunca o bir saat çok uzuyormuş gibi geliyor, bitmiyor."

"[S14] The motions are very boring."
"[S14] Hareketleri, çok sıkıcı."

"[PC3] Boring. So my teacher, from the beginning ... So we are doing the movements, we will learn from the beginning, I've been bored in the two minutes that I used here, for example ... I do it, but there is trouble in its detection, there is trouble in movement, there is trouble in seeing the avatar. A person gets bored, I mean."
"[PC3] Sıkıcı. Yani hocam en baştan... Yani hareketleri yapıyoruz, en baştan öğreneceğiz, ben şurada iki dakika yaptım sıkıldım mesela... Yapıyorum ama yani algılamasında sıkıntı var, oradaki harekette sıkıntı var, benim postürü görmemde sıkıntı var. Sıkılıyor insan yani."

"[E1] Advancing by improving (the exercises). Or it becomes boring."
"[E1] (Hareketleri) Geliştirerek ilerlemek. Yoksa sıkıcı hale gelir."

Tiring

Users (*f*=3) felt tired, especially during the learning process, and a coach commented on the repetitions being too much for a beginner, which could be tiring. Users mostly mentioned that their arms were tired. One of the coaches explained her opinion as the exercise regimen might not be suitable for a beginner, because it required 8 repetitions for each exercise, thus it would be tiring.

"[S15] If it wasn't always the same moves. Because, we were getting tired at the third set."
"[S15] Hep aynı hareketler olmasaydı. 3. Sette yoruluyorduk çünkü"

"[S15] It was tiring for our arm. We were waiting so long like this (arms up in the air)."
"[S15] Kolumuzu yoruyordu. Çok bekliyorduk böyle (kolları havada)."

"[S16] The first week I felt a bit sore (I was rusty), later it did not hurt."

"[S16] Hocam ilk hafta biraz hamladım ben ondan sonra bir zarar olmadı."

"[PC3] The first time, it starts with 8 repetitions? That's trouble teacher. At first, people can not complete eight movements. They already come with zero movement."

"[PC3] İlkinde 8 tekrarla mı başlıyor hocam? O sıkıntı hocam. İlk başta sekiz hareket tamamlayamaz insan. Zaten sıfır hareketle geliyor."

Number of exercise days is not sufficient

Two of the users stated that the number of exercise days is not sufficient.

"[S04] I think the number (of days) should be more. We were doing two days a week, it should increase."

"[S04] Sonradan sayısı fazlalaşmalı bence hocam. İki gün yapıyorduk haftada o bence artmalı."

"[S19] What I'm saying is actually, I think it wasn't very productive. Because it's not continuous. I think it's a short time. Not enough time for sports. It could be on certain days of the week and at certain hours. It could be longer than a month and a half. The program consisted of three set, but I think it was very tiring."

"[S19] Benim söylediğim şey aslında bu, yani çok verimli değildi bence. Çünkü sürekli değil. Kısa bir süre bence. Spor için yeterli bir süre değil. Haftanın belli günlerinde ve belli saat aralığında olabilirdi. Bir buçuk aydan daha uzun olabilirdi. Mesela o üç periyottan oluşuyordu ama çok yoruyordu bence."

Motion duration is long

One of the users felt that the allocated time for each motion was a bit long, especially after the initial learning phase. In addition, one of the coaches commented on the rapidity of the motions.

"[S11] After my teacher memorized the movements, the time was too long. We were waiting for 8 seconds for a little action."

"[S11] Hocam bir de hareketleri ezberledikten sonra süre çok uzun geliyordu. 8 saniye bekliyorduk küçük bir hareket için."

"[PC1] If I take this, I'd say that doesn't work, I can't be patient. It will be more active."

"[PC1] Ben bunu alsam, bu bir işe yaramıyormuş diye şey yaparım yani, sabredemem ben. Daha aktif olacak."

Motion duration is short

One of the users commented on the motion duration being short, as she could not complete the motions in a given time.

> "[S04] Duration was a hardship. I didn't understand the time at first, what we would do during that time. I couldn't keep up, I was getting zero or something."
> *"[S04] süre sıkıntıydı. Ben başta süreyi anlayamamıştım, o süre boyunca yapacağımızı. Yetiştiremiyordum, sıfır falan alıyordum."*

Rapidness is not sufficient

One coach point out that, rapidness of the motions is not sufficient. She mentions that, for each motion the Instructor Avatar appears and shows the motion, and then disappears, which slows the rapidness.

> "[PC2] Trainer going in and out, waiting time, arm up and waiting for him to show, that the points will come. In fact, we do not wait while doing sports, so we do it in a row. There should be a little more speed."
> *"[PC2] Eğitmenin girip çıkması, onu bekleme süresi, kolunu kaldırıp bekliyor işte onu gösterecek puan gelecek diye. Aslında spor yaparken onu beklemiyoruz yani arka arkaya yapıyoruz. Biraz daha hız olmalı."*

4.1.2.3 Design issues that negatively affect the perceived ease of use

Another theme under the features that negatively affect the perceived ease of use is: Design issues that negatively affect the perceived ease of use. Under this theme, nine codes emerged, these from most cited to the least cited are: The instructor's motion is not understood, Error messages are not helpful, User control is not sufficient, Instructions font size is small, Instructor is not visible, No time to read the motion instructions, Personalization is not sufficient, Feedback is not sufficient, and Confusion in creating an exercise program. These codes emerged mostly from users' ($f=14$) responses, and from coaches' ($f=3$), however not from the experts'.

The instructor's motion is not understood

Users were asked what do they think about the instructions of the motions, and some of them (*f*=6) stated that they had difficulty understanding and learning the motions. In addition, one coach thinks the motions' presentation is sometimes unintelligible.

> "[S18] The instructor's movements were not understood."
> *"[S18] Eğitmenin hareketleri anlaşılmıyordu."*
>
> "[S18] At first we couldn't figure out how to do the movements. Later we learned."
> *"[S18] İlk zamanlar çözememiştik hareketleri nasıl yapacağımızı. Sonradan öğrendik."*
>
> "[S21] It feels like he's jumping, sir, that can be fixed."
> *"[S21] Zıplıyormuş gibi oluyor ya hocam, o düzeltilebilir."*
>
> "[PC2] …I'm also stuck on the clarity of the movements and the intelligibility. There may be problems, since every age group would use it."
> *"[PC2] …Ben bir de şeye takıldım hareketlerin netliğine anlaşılabilirliğine. Orada da yine her yaş grubu kullanacağı için sıkıntı olabilir."*

Error messages are not helpful

Two users cited that the error messages are not helpful. The VSP displays error text when Kinect is not plugged in to the computer, and when the internet or database connection is not established. However, the error message did not indicate how to solve the error. Thus, some users had difficulty solving the problems when error messages are displayed.

> "[S02] The system did not say anything."
> *"[S02] Sistem hiç bir şey söylemiyordu."*
>
> "[S18] We were able to solve it, but why? You were with us. But those who did it at home, for example S21, were looking for someone to ask for, on how to solve it. We talked every time she took Kinect. It didn't connect, how are we going to do this… There should be information to help."
> *"[S18] Biz çözebiliyorduk, ama neden? Siz vardınız yanımızda. Ama evde yapanlar mesela S21 soracak biri arıyordu, bunu nasıl çözeceğiz. Her Kinect'i aldığında biz konuşuyorduk. Bağlantı olmadı, bunu nasıl yapacağız… Yani bir bilgilendirme olmalı orda, ya da yardım…"*

User control is not sufficient

Two users indicated that the user control is not sufficient. User S17 stated that she was not able to pause the VSP when she needed to. Similarly, User S10 agreed with S17, on the note that there was not an option to pause the exercise.

> "[S17] Too much interruption is happening by the way, I wish I could pause it though. So, for example, when I make this movement, it would be appropriate to have a little stop. If only we can stop it anytime we want, and then go on. Because when we leave, it gives zero."
> *"[S17] Çok bölünme oluyor ya arada, keşke durdurma olsa. Yani mesela bu hareketi yaptığımda biraz durdurma olsa gayet uygun. İstediğimiz zaman durdurup sonra devam edebilsek. Çünkü sonra ayrılıyoruz sıfır veriyor."*

> "[S10] Yes, my teacher. I took the phone in my pocket, in case someone calls, I couldn't get it, my hands were like this. (He opens his hands, in a T shape)"
> *"[S10] evet hocam. Telefonu cebime aldım biri ararsa açayım diye, ellerim böyle kaldı alamadım. (ellerini iki yana açar, T şeklinde)"*

Instructions font size is small

Users commented on the motion instruction messages that appeared on the screen. One user stated that the instructions font size is small, thus unreadable from a distance.

> "[S20] Sound can be added. Text can sometimes be too small, unreadable."
> *"[S20] Ses eklenebilir. Yazı bazen çok küçük kalabiliyor, okunmuyor."*

Instructor is not visible

One user commented on the visibility of the Instructor Avatar on the screen, noting that it was not visible where it stands, behind the User's Avatar.

> "[S12] He was not visible in the back."
> *"[S12] Arkada gözükmüyordu."*

No time to read the motion instructions

Another user commented as that there was no time to read the motion instructions, which appeared on the screen while the Instructor Avatar shows the motion.

"[S18] We couldn't take the time to read because of time constraints."
"*[S18] Zaman kısıtlaması olduğu için yazı okumaya vakit ayıramamıştık.*"

Personalization is not sufficient

One of the user indicated that, the personalization is not sufficient. She needed to change the difficulty level of the exercise regimen. However, such an option was not provided during the implementation process.

"[S01] Yes. It could have been an option as well, such as I want to skip to the next level."
"*[S01] Evet. Bir de seçimli olabilirdi hani ben sonraki seviyeye atlamak istiyorum gibi.*"

Feedback is not sufficient

One of the preservice coaches stated her opinion on the feedback that is given to the user's motions being not sufficient. Currently the 3D Virtual Sports Platform gives two types of feedback, first one is the Score that shows the accuracy of the motion, second one is the Red Highlight of the limbs on the User's Avatar that shows the body parts moving incorrectly.

"[PC1] For example, the trainer, in the back, could have sound effect. Right wrong. Looks red, but maybe he can miss it at the moment while doing sports. He can say that you're doing it right, you're doing it wrong, raise your arm or something."
"*[PC1] Ses efekti de olabilir mesela eğitmenin, arkada... Doğru yanlış... Kırmızı gözüküyor ama, belki o an kaçırabilir sporu yaparken... Söyleyebilir yani doğru yapıyorsun yanlış yapıyorsun kolunu kaldır falan.*"

Confusion in creating an exercise program

Two of the coaches indicated that there is some confusion in creating an exercise program. Currently the 3D Virtual Sports Platform allows coaches to create a new exercise regimen by selecting any desired exercise that was recorded on the platform, and choose a range of motion accuracy by typing in the minimum and maximum degrees of warp, which was explained under the context title (Section 3.3.1). However, there is a confusion about this process, according to the comments of PC5 and PC2.

"[PC5] I think it is wrong, if my teacher is in a percentage or something, why is it between 10 thousand and 20 thousand? It can be a bit confusing."
"[PC5] Yanlış bence hocam yüzdelik dilimde falan olsa hani neden 10 bin ile 20 bin arası? O kafa karıştırıcı olabilir biraz."

"[PC2] The program needs to determine ... because you know it will be used by all ages. The trainer needs to determine."
"[PC2] Programın belirlemesi gerekiyor... Çünkü bunu hani her yaş kullanacağı için. Eğitmenin belirlemesi gerekiyor."

4.2   The perceptions of users, and opinions of coaches and experts on the usefulness of the VSP (Research Question 2)

Users' perceived usefulness, and the opinions of coaches and experts on the usefulness of the 3D Virtual Sports Platform was examined under this research question. Three main categories formed this theme, namely:

- The perceived physical effects of the VSP
- The perceived affective effects of the VSP
- The perceived effects of the VSP on productivity

4.2.1   The perceived physical effects of the VSP

Users mostly cited positive physical effects ($f=22$) that they perceive using the VSP had on them, similarly opinions of coaches ($f=6$) and experts ($f=6$) on the physical effects of the VSP was mostly positive. On the other hand, some of the users cited perceived negative physical effects ($f=9$), while coaches and experts did not state any opinions on the negative physical effects of the VSP. Furthermore, some users perceived that the VSP did not have any physical effect ($f=8$), which is shared by three coaches as well. Table 4.3 below shows that themes resulted mostly from users' responses. The resulting categories under these three themes are elaborated further in the titles below.

Table 4.3. *The perceived physical effects of the VSP*

Categories	f	f	f	f
	Users	Coaches	Experts	Total
Positive Physical Effects	**22**	**6**	**6**	**34**
Increased flexibility	7	1	1	9
Increased endurance	4		1	5
Increased motion comfort	3	1		4
Increased motion accuracy	2	1		3
Weight gain	2			2
Weight loss	2		1	3
Contributes to psychomotor skills	1			1
Increased activity	1		1	2
Contributes to physical development		3	2	5
Negative Physical Effects	**9**			**9**
Tiring	5			5
Weight gain	3			3
Increased appetite	1			1
No Physical Effects	**8**	**3**		**11**

Users (n=22), Coaches (n=8), Experts (n=2), Total Participants (n=32)

4.2.1.1 The perceived positive physical effects of the VSP

There are nine positive physical effects emerged from the analysis of users' perceptions and coaches' and experts' opinions (Table 4.3). The positive physical effects from most cited to the least cited are: increased flexibility, increased endurance, increased motion comfort, increased motion accuracy, weight gain, weight loss, contributes to psychomotor skills, increased activity, and contributes to physical development. Only "increased flexibility" was cited by each type of participants; seven users, one coach, and one expert. Three coaches and both experts cited "Contributes to physical development". Each of these codes are expanded with particular quotations from the participants below.

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Increased flexibility

Increased flexibility was cited by the users (*f*=7) as getting more flexible in their legs, arms, and in general, after using the VSP. In addition, one of the coaches points out that especially sedentary people would benefit from these movements as they would become more flexible, and one of the experts states it is about the exercise regimen, that would increase flexibility or strength, though the current exercise regimen would have this effect.

> "[S22] I felt that I was more flexible. I couldn't touch my feet before, but now I can."
> *"[S22] Ben daha esnek olduğumu hissettim. Mesela ayaklarıma değemiyordum ama artık değebiliyorum."*

> "[S15] I was able to make it easier and more flexible, especially because we repeated the arm movements frequently."
> *"[S15] Özellikle kol hareketlerini sık tekrarladığımız için daha kolay ve daha esnek yapabiliyordum."*

> "[S12] We were more flexible."
> *"[S12] Daha esnektik."*

> "[S05] There was actually a stretch in the legs."
> *"[S05] Bacaklarda bir esneme oldu aslında."*

> "[PC3] This program is used for the continuity of movement. If he does it all the time it will have an effect on the weakness of the movement, he will stretch."
> *"[PC3] Hareketin devamlılığı için kullanılıyor bu program. Eğer sürekli yaparsa hareketin zayıflığına da etkisi olur. Yani esner."*

> "[E2] This flexibility is about the program we add ... Flexibility, strength and endurance, this will have an impact on all of them."
> *"[E2] Bu esneklik, içine eklediğimiz programla ilgili... Esneklik de güç de dayanıklılık da, hepsine etkisi olur."*

Increased endurance

Increased endurance was the second most cited positive physical effect, cited by five users and one expert. Especially, users (S01, S05, S16, S18) mentioned that they were not able to complete the daily exercise routine at first, however it got easier through 6 weeks of the study. In addition, E2 mentions that doing exercises for a long time improves endurance, and using VSP might have such effect on users.

"[S18] Increased walking distance…"
"[S18] Yürüme mesafesini artırdı…"

"[S05] I agree. I haven't been doing sports for a long time. I felt sore in my leg muscles. That's a good thing, actually showing that it works. After a while, I could easily do it."
"[S05] Ben de katılıyorum. Spor yapmıyordum uzun zamandır. Bacak kaslarımın hamladığını hissettim. Bu iyi bir şey aslında çalıştığını gösteriyor. Bir süre sonra rahatlıkla yapabiliyordum."

"[S01] It was difficult for me to complete the first time, but then I realized I was not tired. So something happened. But I didn't have things like weight gain or speed difference… My endurance increased, but it wasn't too hard to do otherwise, so I was comfortable."
"[S01] Şöyle ilk zaman tamamlaması baya zorladı beni, ama sonradan yorulmadığımı fark ettim. Demek ki bir şeyler oldu. Ama hani kilo artışı ya da hız farkı gibi şeyler bende olmadı… İşte dayanma gücüm arttı ama onun dışında yaparken çok zorlanmamıştım, yani rahat yapabiliyordum."

"[S16] First week I was a little sore, but no problem later on."
"[S16] Hocam ilk hafta biraz hamladım ben ondan sonra bir zarar olmadı."

"[E2] If people do sports for a long time from the moment they do for a long time, our strength increases once they increase their quality of life... It is about the program ... we add flexibility, power as well as endurance , it would impact all of them."
"[E2] Kişilerde, uzun süre yaptığı andan itibaren spor uzun süre yaparsa bizim bir kere dayanıklılığımız artıyor dayanıklılığının artması da yaşam kalitesinin artması demek… …içine eklediğimiz programla ilgili... Esneklik de güç de dayanıklılık da, hepsine etkisi olur."

Increased motion comfort

Three users (S08, S14 and S19) cited increased motion comfort, and one coach states that this is possible to see in someone who does not move generally.

"[S08] Yes. It only made it more comfortable for us to move, since we repeat it all the time."
"[S08]Evet. Sadece sürekli tekrar yaptığımız için daha rahat yapmamızı sağladı."

"[S14] I had problems with the neck and arms. It seemed to improve when I did the sport."

"[S14] Boyun ve kollarda sıkıntılarım vardı. Sporu yaptığım zaman daha düzeldi gibi."

"[PC3] Not a hundred percent but for a person who does not move at all, this has an effect (on motion)."
"[PC3] Yüzde yüz olmaz ama hiç hareket etmeyen bir insan olarak da etkisi olur."

Increased motion accuracy

Two users (S04 and S15) and one of the coaches cited increased motion accuracy. Users mention not being able to do the movements before using the VSP, although they are able to do currently. In addition, one user mentions her score on the VSP got higher in time, relating to doing the movements more correctly. Similarly, PC3 indicates, users' being able to correct their movement because of the feedback from the VSP might increase motion accuracy.

"[S04] We couldn't do those moves at first, but it's better now."
"[S04] O hareketleri de yapamıyorduk biz başta, ama şimdi daha iyi."

"[S15] In the program, for example, our scores were lower in the beginning such as 50s, 60s. Later on our points got up to 80 or 90."
"[S15] Programda da gözüküyor mesela puanlarımız başlarda daha düşüktü 50'lerde 60'lardaydı. Son zamanlarda 80'e 90'a çıktı."

"[PC3] Yes, my teacher, because he sees himself, sees his mistake there, sees how he can fix it. But they only show it perfectly on TV. They don't make mistakes, she can't see herself. If he's wrong, he thinks it's true. But since he sees his own posture here, he sees his mistake."
"[PC3] Olur hocam, çünkü kendini görüyor, oradaki yanlışını görüyor, nasıl düzeltebileceğini görüyor. Ama televizyonda tek mükemmel şekilde gösteriyorlar. Hata göstermiyorlar, o kendini göremiyor. Yaptığı yanlışsa da doğru zannediyor. Ama burada kendi postürünü gördüğü için, yanlışını da görür."

Weight gain

Weight gain is another positive physical effect perceived by two users, although it is also perceived as a negative effect by others, which is presented under the next title. Users S14 and S20 mentioned they needed to gain weight, and they did so while using the VSP.

"[S14] And I'm thin, I need to gain weight. For example, when I did it without eating, on an empty stomach, I was eating more lunch. Thus it made me gain weight."
"[S14] Bir de ben zayıfım hani, benim kilo almam lazım. Aç karnına yemek yemeden yaptığımda örneğin öğle yemeğini daha fazla yiyordum. Kilo almamı da sağladı zaten."

"[S20] I was the opposite, I gained weight."
"[S20] Bende tam tersi oldu, ben kilo aldım."

Weight loss

On the contrary, *weight loss* was cited by two users (S11 and S21), which was perceived as a positive physical effect. In addition, one expert mentions that by exercising with the VSP one would reach their ideal form weight.

"[S11] Teacher, I lost weight."
"[S11] Hocam ben kilo verdim."

"[S21] It had an effect (on my weight), because I was sweating. There hasn't been much change, but maybe I haven't noticed."
"[S21] Oldu çünkü terliyordum. Çok bir değişim olmadı ama belki olmuştur ben fark etmemişimdir."

"[E2] … One will work, and work, and work with this, then one will find that they reach 70 kilos, their ideal form weight…
"[E2] …. Bunu çalışacak çalışacak çalışacak sonra bir bakacak o 70 kiloyu bulacak yani ideal form kilosunu bulacak."

Contributes to psychomotor skills

Contributes to psychomotor skills was mentioned only by one user S19, however there is no further elaboration on how so.

"[S19] It contributed more to my psychomotor skills. It didn't have much effect on me psychologically."
"[S19] Daha çok psikomotor becerilerime katkısı oldu. Psikolojik olarak bende çok etki yaratmadı."

Increased activity

Increased activity indicated by one of the users, S12, as following:

"[S12] But whenever it came to my mind, I was doing those movements. Just because I did it in sports, you just do those movements for no reason."

"[S12] Ama böyle aklıma geldikçe o hareketleri yapıyordum. Sporda yapmıştım diye, durduk yerde o hareketleri yapıyorsun."

Contributes to physical development

Users responses on the perceived positive physical effects of the VSP were more specific, as described above, although three coaches and both of the experts cited their opinion in a general manner as the VSP contributes to physical development. PC2 and PC3 stands on the precondition that if VSP is used regularly it could contribute to physical development, while PC1 mentions its capability to help the user keep their current physical form. E2 especially mentions that the VSP could be used by athletes for warming up before the competitions, and this would have an impact on flexibility, strength and endurance. E1 states that if the users follow the exercise regimen on the VSP it would contribute to their physical development.

"[PC3] Maybe, if it can be done regularly."
"[PC3] Olabilir düzenli yaparsa."

"[PC2] If there is a continuity."
"[PC2] Sürekliliği olursa olur."

"[PC1] It's like continuity in your strength. So you have a certain force, you have a certain physical property, you keep it going."
"[PC1] Sizin yaptığınız kuvvette devamlılık gibi. Yani belli bir kuvvettesin belli bir fiziksel özelliğin var, onu devam ettiriyorsun onun devamı yani."

"[PC2] I'm sitting at home until the evening on television, for example, I opened the program, I lifted my arm for a month, it had an impact on my arm muscles."
"[PC2] Ben evde oturuyorum akşama kadar televizyon başındayım, mesela açtım programı, bir ay boyunca kolumu kaldırdım indirdim, bu benim kol kaslarıma etkisi oldu. Nefes alıp verdiğim için de etkisi olur..."

"[E2] Yes, it (physical development) certainly happens, stretching movements warming movements can be done on this program. Because our athletes see warming as fatigue, whereas warming is meant to increase intramuscular coordination. Because you need to be ready for the competition. Otherwise, you may get injured, and you can not do the motions you want. This flexibility is about the program we add ... Flexibility, strength and endurance, this would have an impact on all of them."

"[E2] Olur, kesinlikle olur, açma germe hareketleri ısınma hareketleri yapılabilir bu program üzerinde. Çünkü bizim sporcular ısınmayı yorgunluk olarak görüyor, hâlbuki ısınma kas içi koordinasyonu arttırabilmek içindir. Çünkü müsabakaya antrenmana hazır olman gerekir. Yoksa hem sakatlanabilirsin hem istediğin hareketleri yapmayabilirsin. Bu esneklik, içine eklediğimiz programla ilgili... Esneklik de güç de dayanıklılık da, hepsine etkisi olur."

"[E1] Physical education is already said to have contributed to physical and mental development. It is already fixed from the academic literature. I think it will make a progress physically, if user follows the program. Especially the employees or those who cannot go out will make a progress."

"[E1] Beden eğitiminin zaten fiziksel ve ruhsal gelişime katkı sağladığı söyleniyor. Bu akademik literatürlerden zaten sabitlenmiş durumda. Fiziksel anlamda zaten programa uyar ise bir gelişim sağlayacaktır diye düşünüyorum. Özellikle de çalışanlar ya dışarıya çıkamayanlar konusunda bir gelişim sağlayacaktır."

4.2.1.2 The perceived negative physical effects of the VSP

The negative physical effects theme emerged from users' responses only (Table 4.3). Under this theme, the categories from the most cited to the least cited are: tiring, weight gain, and increased appetite. These categories are elaborated below.

Tiring

Tiring was stated by five users: S01, S05, S08, S18 and S21. S08 mentioned the exercise regimen did not have enough time to rest between movements. From a different point, S18 and S21 stated that their schedule issues, specifically after school, made it tiring for them. On that note, S05 compared using VSP at home being less tiring than doing so at the Lab, due to the unsuitable clothes and shoes.

"[S08] It was tiring, my teacher. Because there was not much time between sets, we couldn't rest, we were tired. We were tired because we were always working arms."

"[S08] Yorucuydu hocam. Setler arasında pek vakit olmadığı için dinlenemiyoruz, yoruluyorduk. Sürekli kol çalıştığımız için yoruluyorduk."

"[S18] It's about our timing. It was hard for us to get out of school and deal with it."

"[S18] Bizim zamanlamamızla alakalı. Okul dönemi dersten çıkıp, bununla uğraşmamız bize zor geliyordu."

"[S21] I think it was tiring for what we did during school. Because after class, our brains got tired."
"[S21] Biz okul sırasında yaptığımız için yorucu oluyordu bence. Çünkü derslerden sonra beynimiz yoruluyordu."

"[S05] It was more comfortable at home, less tiring. When I did it at school it was harder to get in pants and shoes."
"[S05] Evde daha rahattı daha az yorucuydu. Okulda yapınca pantolonla ayakkabıyla falan daha zor oluyordu."

Weight gain

Weight gain was perceived to be a negative physical effect by three users S02, S04 and S19.

"[S02] I gained six kilos."
"[S02] Ben altı kilo aldım."

"[S19] I felt like I was gaining weight."
"[S19] Ben kilo aldığımı hissettim."

"[S04] I gained weight. After I quit, I gained weight. At that time (while using) I lost weight, but then I got back
"[S04] kilo aldım. Bıraktıktan sonra kilo aldım. O sürede (kullanırken) vermiştim, ama sonra geri aldım"

Increased appetite

Only user S21 mentioned an *increased appetite* she felt after doing the exercise.

"[S21] Yes. But after doing the movements, I was saying, I should eat. I exercised anyway."
"[S21] Evet. Ama hareketleri yaptıktan sonra "yemeliyim" diyordum, nasılsa spor yaptım diye."

4.2.1.3 The perceived no physical effect of the VSP

Apart from positive and negative physical effects, some of the users and coaches perceived that using VSP has no physical effect on them. S20 and S21 predicated this to their regular sports activity. S08 predicated it to the nonexistence of weights in the exercise regimen. In addition, he stated that the movements were not so different from the movements he executes in his daily life. On the contrary, S06 stated she had never

done those movements, although she perceives they were not very hard to perform. S01 commented that the VSP would not have any effect on motor skills either, because she perceived as the motion detection capacity is not sufficient.

> "[S09] I don't think I feel a physical development"
> *"[S09] Fiziksel olarak bir gelişim hissettiğimi düşünmüyorum"*

> "[S20] My teacher just seemed extra to me because I played volleyball."
> *"[S20] Hocam ben voleybol oynadığım için bana extra gibi oluyordu sadece."*

> "[S21] I didn't understand whether it worked or not, because I did regular sports."
> *"[S21] Ben de düzenli spor yaptığım için anlayamadım işe yaradı mı yaramadı mı."*

> "[S08] I think the reason for the lack of physical development is my teacher, because there was no weight lifting. We already use our arms in daily life."
> *"[S08] Hocam fiziksel olarak gelişim olmamasının sebebi bence ağırlığın girmemesi. Günlük hayatta zaten kollarımızı kullanıyoruz."*

> "[S06] I mean it was actually the moves we had never done before, but they were not that hard to do."
> *"[S06] Yani daha önce hiç yapmadığımız hareketlerdi aslında. Ama yapamayacak ağırlıkta hareketler değildi."*

> "[S01] Motor skills, that is, fine muscle ... about movements, those were not very fine movements, because in normal daily life it was a little bit simpler because there wasn't too much detail, there wasn't too much detail, it didn't perceive too much detail. He was doing very different movements than what we did there . He was either directly spinning or doing very different movements. So I didn't see a very different effect."
> *"[S01] Motor becerileri yani ince kas... hani hareketlerle ilgili, o çok ince hareketler değildi, normal günlük hayatta da hani biraz daha basit kaldığı için çok fazla bir etki olmadı zaten çok fazla detay yoktu, zaten çok fazla detayı algılamıyordu. Hani bizim yaptığımızdan, orda gördüğümüz çok farklı hareketler yapıyordu. Direk dönüyor ya da çok farklı hareketler yapıyordu. O yüzden çok farklı etkisini görmedim ben."*

Coaches PC1, PC2 and PC8 stated their opinions that are coded as *no physical effects*. PC1 thinks that the current exercise regimen would not affect the physical attributes

of the user, though if it changes it is possible. PC2 states that the VSP would not have any effect on her physical attributes, based on her background, although she adds that it might affect other people. PC8, on the other hand, while agreeing on that the VSP has no physical effects, does not think that changing the exercise regimen would change that.

> "[PC1] If the contents of the program changes it would have an effect, but not with these actions."
> *"[PC1] Ya programın içeriği değişse zaten olur da, bu hareketlerle olmaz."*

> "[PC2] Not physical. If done seldom."
> *"[PC2] Fiziksel olmaz. Yani aralıklarla yaparsa olmaz hocam."*

> "[PC2] I don't think it has any performance-enhancing effect or I'm going to gain flexibility. But because of my point of view and my past… it could still be useful ... But still the categories for all age groups need to be separated. Is it the same program for everyone?"
> *"[PC2] Ben herhangi bir performans arttırıcı etkisi olduğunu ya da esneklik kazanacağımı düşünmüyorum. Ama kendi açımdan ve geçmişimden dolayı… yine de yararı olabilir… Ama bunun yine ayrılması lazım her yaş grubuna kategorileri. Herkese aynı program mı?"*

> "[PC8] None of these movements, my teacher, does not increase the level of movement of people. Add whatever you want on these existing movements ... Movements in the system are moving very slowly, the pulse rate of that person does not go up. You're doing it right, it's showing otherwise, you're doing it right, it's perceiving the movement wrong ... The friend just did it right, it showed 10 percent. If you increase further, injuries may occur."
> *"[PC8] Bu hareketlerin hiç biri hocam, insanın hareket düzeyini arttırmaz. Bu mevcut hareketlerin üzerine ne eklerseniz ekleyin... Sistemde hareketler çok yavaş ilerliyor, o insanın nabız seviyesi yukarı çıkmaz. Nabız seviyesini geçin, hareketler eklem açılarındaki sistemdeki eklem açıları bile genişlemez. Siz böyle yapıyorsunuz hareketi o başka türlü gösteriyor. Siz doğru yapıyorsunuz mesele hareketi o yanlış algılıyor... Arkadaş demin doğru yaptı, yüzde 10 gösterdi. İleri seviyeye arttırırsanız sakatlıklar meydana çıkar."*

4.2.2 The perceived affective effects of the VSP

Users mostly cited positive affective effects (f=13) that they perceive using the VSP had on them, similarly opinions of experts (f=3) on the affective effects of the VSP

was mostly positive. On the contrary, coaches' (*f*=6) opinions indicated that the VSP has mostly negative affective effects. Similarly some users (*f*=8) and one expert cited some negative affective effects of the VSP. Table 4.4 below shows that themes resulted mostly from users' responses. The resulting categories under these themes are elaborated further under the following sub headings.

Table 4.4. *The perceived affective effects of the VSP*

Categories	*f* Users	*f* Coaches	*f* Experts	*f* Total
Positive Affective Effects	**13**	**1**	**3**	**17**
Feeling vigorous	4			4
Socializing	3	1	1	5
Entertaining	2			2
Brought responsibility	1			1
Comfort of doing sports alone	1		1	2
Gained the habit of doing sports	1			1
Stress release	1		1	2
Negative Affective Effects	**8**	**6**	**1**	**15**
Boring	3	2		5
Feeling compulsory	2			2
Decreasing sociality	1	4	1	6
Frustrating	1			1

Users (n=22), Coaches (n=8), Experts (n=2), Total Participants (n=32)

4.2.2.1 The perceived positive affective effects of the VSP

Under the positive psychological effects, seven themes were emerged. Most of the themes are resulted from the user groups (Table 4.4). The emerged themes from most cited to the least cited are: feeling vigorous, socializing, entertaining, brought responsibility, Gained the habit of doing sports, Stress release, Comfort of doing sports alone. Among these themes only "socializing" was mentioned by three users in two groups, by one of the coaches and by one of the experts.

Feeling vigorous

Feeling vigorous was mentioned by four users, as mostly among the positive psychological effects, for instance:

"[S04] yes, I felt more vigorous."
"[S04] evet, daha dinç hissediyordum."

"[S18] It was effecting mostly psychologically. For example, I felt more vigorous. It feels great about having a good taste from life."
"[S18] Daha ziyade psikolojik olarak etkiliyordu. Mesela daha dinç hissediyordum. Hayattan tat alma konusunda çok iyi geliyor."

Socializing

Socializing, was mentioned as an influential factor for the perceived usefulness of the VSP by users because doing the workout with friends is considered more enjoyable than doing it alone, for instance:

"[S02] It was like a social activity."
"[S02] Sosyal aktivite gibi oldu."

"[S18] It is about the environment you are doing it. S04 and I were doing (the exercises) together, we had fun. We were talking, playing music, or something."
"[S18] Yaptığın ortamla da alakalı. Biz S04 ile beraber yaptığımız için eğlenceli geçiyordu. Konuşa konuşa. Müzik falan açıyorduk."

In the Group 2, users also mentioned doing the workout in the lab environment was *socializing*, and then they were asked if they could have the same effect at home environment and they replied as:

"[S04] No. I wouldn't be able to go up to ninety percent, I mean, I would get a score of seventy-sixty."
"[S04] Olmazdı. Yüzde doksanlara falan çıkamazdım yani, yetmiş-atmış falan (alırdım)."

"[S03] I wouldn't have reached the third set."
"[S03] Üçüncü sete kadar ulaşamazdım."

While the users mentioned *socializing* during the usage of VSP, one of the coaches commented that after a workout users might relax psychologically and have a confidence boost, which could increase their likelihood of attending social activities.

"[PC2] As he moves, he can relax psychologically, as his confidence increases, it could (have an effect on socializing.)"
"[PC2] Hareket ettikçe psikolojik olarak rahatlayacak, kendine olan güveni artacağından, (sosyalleşmeye etkisi) olabilir."

"[Res] Does it affect things like self-confidence, looking at things positively, participating in social activities?"
"[E2] Certainly, since it would change all parameters of physical and physiological."
"[Res] Kendine güven, olaylara olumlu bakma, sosyal etkinliklere katılma gibi şeylere etkisi olur mu?"
"[E2] Kesinlikle olur fiziksel ve fizyolojik bütün parametreleri değişeceği için."

Entertaining

Two of the users perceived of using the VSP as *Entertaining*.

"[S18] It is about the environment you are doing it. S04 and I were doing (the exercises) together, we had fun. We were talking, playing music, or something."
"[S18] Yaptığın ortamla da alakalı. Biz S04 ile beraber yaptığımız için eğlenceli geçiyordu. Konuşa konuşa. Müzik falan açıyorduk."

"[S04] , We were not doing it willingly at first, but then it was nice. It finished quickly. It didn't feel too long."
"[S04] Başta öfleyerek geliyorduk hocam, ama sonradan güzel yani zevkliydi. Hemen bitiyordu. Çok uzun gelmiyordu."

Brought responsibility

One of the users noted that using the VSP brought him responsibility to do exercise.

"[S05] It made me feel responsible. There was an obligation to do it. I had to do it within a certain period of time. I think it brings responsibility."
"[S05] Sorumluluk sahibi hissettiriyordu. Yapma zorunluluğu vardı. Belli bir süre içinde yapmam gerekiyordu. Sorumluluk kazandırdığını düşünüyorum."

Comfort of doing sports alone

One female user cited *comfort of doing sports alone*. She compared doing sports at home to doing sports at the gym, and mentioned she was more comfortable at home using the VSP because she could move more freely, dressing as she liked. Besides, one of the experts points out that, people initially gain weight when they begin

exercising which can cause them to feel self-conscious about their looks and stop going to the gym. However, he adds, since users can use the VSP at home environment they would not have such concerns. This indicates that the VSP has a comforting effect while doing sports alone.

> "[S14] And when I go to the gym, I can't always be comfortable, even if it's all ladies. But because I was at home, it was a more relaxed atmosphere. I could dress what I wanted."
> *"[S14] Bir de spor salonuna gittiğimde hep bayan da olsa rahat edemem hareketlerimde. Ama evde olduğum için daha rahat bir ortam oldu. İstediğimi giyinebiliyordum."*

> "[E2] Besides, it's good as we do sports… When you start to do sports, the body reacts negatively. People walk away from the gyms for this reason. For example, while their fat should be reduced, contrarily it increases. There is an increase in liquid ratio and so on, weight gain is happening. People quit sports because they care about their physical appearance. But here they do it alone, so there will be no such concern for doing it."
> *"[E2] Bunun yanında spor yaptıkça iyi… Zaten hani insan spor yapmaya başladığı zaman vücut olumsuz tepki veriyor. Spor salonlarından onun için insanlar uzaklaşıyor. Mesela yağlarında artış oluyor azalması gerekirken, iste sıvı oranında vesaire oluyor, kilo artışı oluyor. İnsanlar fiziksel görünümüne önem verdiği için sporu bırakıyorlar. ama burada kendi kendine yaptığı için öyle bir endişe de olmayacak."*

Gained the habit of doing sports

One of the students stated that she *gained the habit of doing sports* because of using the VSP.

> "[S13] For example, sometimes I have a tightness on my neck or arm, and I say if I did sports this wouldn't happen. It turns into a habit since we do it all the time."
> *"[S13] Mesela şey oluyor bazen boynum veya kolum tutuluyor, şey diyorum spor yapsaydım bunlar olmazdı falan diyorum… Sürekli yaptığım için alışkanlığa dönüşüyor."*

Stress release

Stress release is another positive affective effect, cited by one of the users. Similarly, E2 noted that doing sports might affect the user to feel good.

"[S09] But mentally, it helps to release stress, and I didn't think of anything else. While trying to do the same thing as the instructor."
"[S09] Ama ruhsal olarak stres atıyordu hani başka şeyler düşünmüyordum. Karşıdakiyle aynı şeyleri yapmaya çalıştığım için."

"[E2] He will also automatically feel good because he is already releasing hormones because he is doing sports."
"[E2] Spor yaptığı için de zaten vücut hormonları salgıladığı için zaten kendine otomatikman iyi hissedecek."

4.2.2.2   The perceived negative affective effects of the VSP

Under the negative affective effects, four themes emerged (Table 4.4). Themes from most cited to the least cited are: boring, feeling compulsory, decreasing sociality, and frustrating. Among these themes, only "decreasing sociality" was cited by all types of participants.

Boring

Boring was the mostly cited theme as a negative affective effect of using VSP by three users and two coaches. Some of the users were bored because of doing exercises at home by themselves. Similarly [PC3] stated that users might not want to use VSP at home by themselves, however if it had a multiuser option it could be fun.

"[S21] I was bored because I did it alone at home. I was hoping it finished so would sit down."
"[S21] Ben de evde tek başıma yaptığım için sıkılıyordum. Bitse de otursam diyordum."

"[PC3] He may not want to do it alone at home, but when a neighbor comes and says let's do it, it's an activity. They don't go out and do aerobics at home, so it can be fun."
"[PC3] Evde tek başına onu yapmak istemeyebilir ama bir komşusu gelip hadi gel şunu yapalım dediği zaman hem bir aktivite olur. Hem dışarı çıkmamış oluyorlar hem de evde aerobik yapmış oluyorlar, o zaman eğlenceli hale gelebilir."

Another user [S01] got bored because she did not see the results she expected to see. She also mentioned that she felt like a robot while doing the movements in front of the computer repeatedly, and she would rather go outside and do them on her own.

"[S01] At first, I thought, I'm doing sports, something will change, you know I'm going to gain weight, I thought that because it was my goal, so I started. I continued with that intent. When I finally didn't see anything, I was a little bored."

"[S01] İlk başta hani spor yapıyorum bir şeyler değişecek, hani kilo alacağım, benim hedefim o olduğu için öyle düşünmüştüm, öyle başlamıştım. Baya da o niyetle devam ettim. Sonunda bir şey göremeyince canım sıkıldı tabi biraz."

"[S01] I didn't see a difference between using VSP and doing exercise by myself. VSP just gives me a point, you know, trying to adjust if I did it right. It was boring because it was not exactly precise. When I go out to walk, I get fresh air and feel better. Rather than standing in front of the computer and repeat the movements like a robot , it is more attractive for me to do outside or on my own."

"[S01] Onun karşısına geçip yapmamla, kendim yapmama arasında bir fark göremedim. Sadece bir puan veriyorsun, hani doğru yapıp yapmadığımı ayarlamaya çalışıyordu. O tam da net gelmediği için sıkıntıydı. Evde hani dışarı çıkıp yürüyüş yaptığımda hem hava almış oluyorum hem bana daha iyi geliyor. Sürekli bilgisayar başına geçip robot gibi hareketleri tekrarlamaktansa, o benim için daha cazip geliyor dışarda ya da kendi başıma yapmak."

One of the coaches stated that sedentary people are not psychologically ready to do sports, thus they get bored easily while exercising, and do not continue.

"[PC3] As PC1 said, it's a little bit different, like instead of jumping up and hitting your hands together, something from above ... So it can be done in a game style. Because their psychology is not suitable for sports. So it feels boring. Let alone two months, people can not use it even a month. Even if they have the ambition, they quit after a while. The sedentary people buy jogging equipment to their houses, but despite that, they do not continue."

"[PC3] PC1 dedi ya, biraz daha değişik, yukarı zıplayıp ellerini birbirine vuruyor mesela, onun yerine yukardan bir şeyler... Yani oyun tarzında yapılabilir. Çünkü zaten psikolojisi spor yapmaya uygun değil. O yüzden de sıkıcı geliyor. İki ayı bırakın bir ay kullanamaz insan onu. Hırs yapsa da bir süre sonra bırakır. Zaten sedanter insanlar evlere koşu aletleri alıyorlar ama ona rağmen devamı da gelmiyor."

Feeling compulsory

Feeling compulsory was mentioned in two user focus groups by two users. Both of them stated that they did not find the VSP useful because they felt some obligation to

do the exercises for the sake of the research, thus did not continue willingly, thus feeling compulsory was coded as negative affective effect.

> "[S21] It didn't work for me. I felt like I was making it obligatory."
> *"[S21] Benim için bir işe yaramadı. Kendimi zorunlu yapıyormuş gibi hissettiğim için."*

> "[S11] Absolutely. My teacher, it bothered me that it was a necessity.
> [S15] Then why did you volunteer?
> [S11] We volunteered, but we made it mandatory, the eight times.
> [Res] It was hard for you to do two days a week?.
> [S11] Exactly. So if I do it of my own free will, I do it every day."
> *"[S11] Kesinlikle. Hocam bir de zorunluluk olması beni rahatsız etti.*
> *[S15] O zaman niye gönüllü olarak katıldın?*
> *[S11] Gönüllü girdik te onu zorunlu yaptık ama sekiz taneyi.*
> *[Res] Haftada iki gün yapmak sana zor geldi?*
> *[S11] Aynen. Yani kendi isteğimle yaparsam her gün yaparım."*

Decreasing sociality

Decreasing sociality was perceived to be a negative affective effect of using VSP by one of the users. Nonetheless, three of the coaches and one of the experts stated their opinions on this issue. One of the users mentions that instead of spending time with her friends she had to spend that one hour alone while using VSP. In addition, some of the coaches mention the decreasing sociality effect of doing sports at home alone, as "(users) will not gain anything socially", "users might become introverted", "they would not want to meet new people because they are able to do sports at home," and "anti-socializing." In addition, [PC2] mentions that not having someone around to ask questions might reduce motivation. Similarly, [E1] points out the fact that VSP would not meet some people's need to socialize, which is also why they go to the gym besides exercising.

> "[S13] You do not feel how the time passes when with others. But when you're on your own, it feels like an hour is getting too long."
> *"[S13] Yanında başkaları olunca zamanın nasıl geçtiğini alamıyorsun. Ama tek başına olunca o bir saat çok uzuyormuş gibi geliyor, bitmiyor."*

> "[PC1] He would not gain anything socially, for example."
> *"[PC1] Sosyal anlamda kazanamaz mesela."*

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"[PC7] This might make him an introverted person."
"[PC7] İçine kapanık bir insan olacak."

"[PC3] He does not want to come to the gym ... He thinks I can do it at home, and he does not meet with people... We could think this way too."
"[PC3] Spor salonuna gelmek istemiyor... Evde yapabilirim deyip çıkmıyor insan içine... Bir de böyle düşünebiliriz..."

"[PC2] Anti-Socializing ... He won't get an answer to his question. There's no one to motivate if he wants to talk."
"[PC2] Asosyalleştiriyor... Sorusuna cevap alamayacak. Konuşmak istese, motive edecek kimse yok."

"[E1] Of course, people are going for that as well. People who go to the gym are not just going to do sports, socializing, meeting new people, bored people. This doesn't contribute to them. This is a program that works in places where there is no gym, or as a homework, that is, this works when user has to do the movements without coaches, when there is no face-to-face option."
"[E1] Tabi zaten insanlar onun için de gidiyor. Spor salonuna giden insanlar sadece spor yapma amacıyla gitmiyor zaten, sosyalleşmek, yeni insanlarla tanışmak, sıkılan insanlar. Onlara birebir katkısı olmaz. Benim asıl işe yarayacak olan evden çıkamayacak olan, spor salonu olmayan ya da bir ödev yapması gereken yani hareketleri antrenörsüz de birebir yüz yüze olmadığı ortamlarda yapılması gereken yerlerde işe yarayan bir program bu."

Frustrating

Frustrating was another negative affective effect perceived by one user. She based this feeling on the technical problems.

"[S21] Teacher, I was very frustrated at first because of technical problems."
"[S21] Hocam, ilk zamanlarda teknik sorunlar nedeniyle çok sinirleniyordum."

4.2.3 The perceived effects of the VSP on productivity

Users' perception of the effects of VSP on productivity was mostly positive (f=37), and somewhat negative (f=12). Preservice coaches (f=6) and experts (f=6), on the other hand, stated their opinions on the positive effects on productivity (Table 4.5). Following couple of subtitles include elaboration on the positive and negative effects of VSP on productivity.

Table 4.5. *The perceived effects of the VSP on productivity*

Categories	*f* Users	*f* Coaches	*f* Experts	*f* Total
Positive Effects on Productivity	**37**	**6**	**6**	**49**
Feedback ensures motion accuracy	12	2	2	16
Saves time compared to gym	5		1	6
Monitoring the progress	5	2	2	8
Systematic	4			4
Improved time management skills	3			3
Felt energized	3			3
Financially viable	2			2
Space and time independent	1	2	1	4
Negative effects on productivity	**12**			**12**
Inconsistent feedback	6			6
Exercise program is not effective	2			2
Kinect sharing has wasted time	2			2
Not financially viable	2			2

Users (n=22), Coaches (n=8), Experts (n=2), Total Participants (n=32)

4.2.3.1 The perceived positive effects of the VSP on productivity

There were 8 categories that emerged under the theme positive effects of VSP on users productivity. Those categories were mostly resulted from users' responses, ordered from most cited to least cited; feedback ensures motion accuracy, saves time compared to gym, systematic, monitoring the progress, improved time management skills, felt energized, financially viable, space and time independent. Three of these themes were cited by each participant type: Feedback ensures motion accuracy, Monitoring the progress, and Space and time independent (Table 4.5).

Feedback ensures motion accuracy

Feedback ensures motion accuracy is the most cited positive effect of VSP perceived by users (*f*=12) on their productivity, as well as two coaches and both of the experts.

Users S02, S03, and S04 simply stated it had a positive effect, while S05, S08, S14, and S22 mentioned they paid more attention to make the motion correctly when the feedback on the screen appeared. S06, S10, S12, S18, S20, and S22 mentioned that getting a low score made them more ambitious to get higher score, and to do the moves correctly. From the coaches group, PC3 and PC6 cited that feedback helps the users realize what they are doing wrong and correct it. PC3 compares using the VSP to following an exercise program on TV, to point out the fact that users can not see themselves or their mistakes on TV. Experts also commented on feedback working properly to increase accuracy of the movement.

> "[S05] I think the feedback was good. So when we did it wrong, we could see, for example, it was red."
> *"[S05] Bence geribildirim iyiydi ya. Yani yanlış yapınca görebiliyorduk, mesela kırmızı oluyordu."*

> "[S14] You pay more attention when you make the moves."
> *"[S14] Hareketleri yaparken daha dikkat ediyorsun."*

> "[S18] I think it's a pretty high rate of ambition, when the percentage is low."
> *"[S18] İnsan hırslanıyor yüzde düşük oldukça baya bir hırslanıyor bence"*

> "[S20] Yes, I want to see a hundred percent."
> *"[S20] Evet yüzde yüzü görmek istiyor."*

> "[S08] The duration of the movement was sufficient. It was effective in completing a movement by following the teacher. At that time we also had the chance to correct it because it also gave feedback in red."
> *"[S08] Hareketin süresi de yeterliydi. Hocayı takip ederek bir hareketi tamamlamada etkiliydi. O sırada kırmızıyla geri bildirim de verdiği için düzeltme şansımız da vardı o süre içerisinde."*

> "[S06] So it was nice to give feedback. If I got 30% on my first move, I was able to raise it to 70% in the third because it showed me wrong."
> *"[S06] Yani geri bildirim verme olayı güzeldi. İlk yaptığım harekette %30 aldıysam, yanlışımı gösterdiği için üçüncüde %70 e yükseltebildim."*

> "[PC3] Yes, my teacher, because he sees himself, sees his mistake there, sees how he can fix it. But they show it only perfectly on TV.

They do not show error, he can not see himself. He thinks he is doing right even when he is wrong. But here, he sees his posture, and he sees his own mistake."

"[PC3] Olur hocam, çünkü kendini görüyor, oradaki yanlışını görüyor, nasıl düzeltebileceğini görüyor. Ama televizyonda tek mükemmel şekilde gösteriyorlar. Hata göstermiyorlar, o kendini göremiyor. Yaptığı yanlışsa da doğru zannediyor. Ama burada kendi postürünü gördüğü için, yanlışını da görür."

"[E1] As far as I can see, it is enough, should the trainer correctly enters the values. My first observation is that there is no problem."

"[E1] Şu an gördüğüm kadarıyla yeterli. Yeter ki o değeri eğitmen doğru bir şekilde girsin. İlk gözlemim bir sıkıntı olmadığı yönünde."

"[E2] Here it is something I'm trying to show in that percentage slice, for example, if we install the shot put technique to try to make it full, it will look at eighty percent right I'm doing 90% right, my shot technique, this is the right shot technique."

"[E2] Burada işte o yüzdelik dilimde göstermeye çalıştığım bir şey oydu mesela gülle atma tekniği yüklesek sporcu onu tam yapmaya çalışsa bakacak işte yüzde seksen doğru yapıyorum %90 doğru yapıyorum benim atış tekniğin doğru atış tekniği bu diye."

Saves time compared to gym

Another positive effect on productivity was that VSP *saves time compared to gym*, cited by five users (S04, S08, S14, S18, S19, and S20). Also one expert mentioned it allows users to be independent in their workout time. Here are their quotations:

"[S04] We can't keep up with the schedule of the gym, for example, but here we can do it at any time."

"[S04] Bir de zaman, mesela spor salonunun saatine uyamayız, ama burada istediğimiz saatte arada falan yapabiliriz."

"[S14] It's been time-saving. So you're spending your time at home instead of at the gym."

"[S14] Zaman yönünden tasarruf oldu. Yani illa spor salonuna gideceğin süreyi evde harcıyorsun."

"[S08] You're waiting for other users to finish in the gym. There's no waiting for that. You'll have to continue without a break while doing sports. It's effective."

"[S08] Spor salonunda diğer kullanıcıların bitirmesini bekliyorsun. Bunda bekleme olayı yok. Spor yaparken de mola vermeden devam etmek gerekir. Etkili oluyor."

"[E2] What it does, the first advantage is a device that can be used by someone on their own. They will not go to a place, will not depend on a place, working time will not be dependent."

"[E2] Ne yapar, birinci avantajı kendi kendine kullanabileceği bir cihaz. Bir yere gitmeyecek bir yere bağımlı olmayacak çalışma saati bağımlı olmayacak."

Monitoring the progress

User S08 mentioned that he perceived the VSP helps him monitor his progress, which allows increasing his motivation to reach higher scores. On that note S06, S07, and S09 agree with him. Similarly, PC3 comments on the importance of knowing one's own situation in order to improve, also agreed by PC6. Both of the experts also stated their opinions on the effects of monitoring the progress on productivity.

"[S08] Motivation. For example, starting with 30% and increasing to 50% is pleasing. And when you see the body develop on top of it."

"[S08] Motivasyon. Mesela %30 la başlayıp %50 e çıkmak ister istemez mutlu edici. Bir de bunun üstüne vücudun geliştiğini gördüğün zaman."

"[S04] We saw the list there or my teacher, for example, if I got sixty points before, I'll get seventy, I'll do eighty. We would focus on doing the movements better. I was like that."

"[S04] Orda hani listeyi görüyorduk ya hocam, mesela atmış aldıysam, yetmiş alayım, seksen yapayım. Hareketleri daha iyi yapayım diye bir odaklanıyorduk. Bende öyle oluyordu."

"[PC3] Even if it doesn't affect it, it's very important that even a normal person knows where he is at what level of success, so he tries to correct his movements a little bit just because he knows his level."

"[PC3] Hiç etkilemese bile, normal bir insan bile başarısını nerde hangi seviyede olduğunu bilmesi çok önemli, yani burayım ben yerimde sayıyorum diye biraz daha düzeltmeye çalışır hareketlerini."

"[E1] He has to follow his accuracy or duration and so on. As long as he's working with a coach... There's a bit of something in our community, and it has to be done depending on the place. We're not very independent."

"[E1] Doğruluğunu veya süresini vesaire takip etmesi gerekiyor... Antrenörle çalıştığı müddetçe, bizim toplumumuzda biraz şey var, illa işte bir yere bağlı olarak yapılması gerekiyor. Kendi başımıza çok hareket edebilen insanlar değiliz. Belki online da onu zorlayıcı

bir unsur olur, yani programı takip etmesini sağlayabilirsek faydalı olacağını düşünüyorum."

"[E2] For the Coach and the athlete... Now everyone follows their statistics. The followers win, others can not. .... After learning to follow oneself, it's like a game, it will force the student to do the best. brings the continuity of work, brings the habit of doing sports for life."
"[E2] Antrenör için de sporcu için de... Artık herkes istatistiği, kendi verilerini takip ediyor. Takip eden kazanır takip etmeyen kazanamaz zaten. ... Kendini takip etmeyi öğrendikten sonra, hani bir oyun gibi bu. En iyisini yapmaya daha yukarı çıkmaya zorlayacaktır. Öğrenci yaptığı için, sporun devamlılığını getirir yaşam boyu spor yapma alışkanlığı getirir."

Systematic

Systematic emerged from the results of users only. Four users (S01, S12, S14 and S15) perceived VSP to be more systematic in comparison to doing exercise at home by themselves. They mention, VSP has an order and time limit to movements, which made users more inclined to complete the routine, although when they were by themselves they would quit after getting tired, to talk to a friend or they would just workout focusing on few movements.

"[S12] That is systematic. There are shapes there. According to him, you are trying to do it in a certain time."
"[S12] Bu sistematik yani. Orda şekiller var. Ona göre belli bir sürede yapmaya çalışıyorsun."

"[S12] There are also arm movements in that program… for example, when I do it at home, I only work for your abdomens, but that program puts us in order. It allows us to do different movements."
"[S12] O programda kol hareketleri de var… mesela ben evde yaptığım zaman sadece karın çalışırım, ama o program bizi düzene sokuyor. Farklı hareketleri yapmamızı sağlıyor"

 "[S15] The equipment in the gym is also in our house, but I don't do it, but I can do this because, for example, I have to do it because there is order here."
"[S15] Spor salonundaki aletler bizim evde de var ama ben yapmıyorum. Ama mesela burada bir düzen olduğu için yapma zorunluluğunda hissettiğim için yapabiliyorum."

"[S01] It forces us to do. So we have to do the game. We had to do the game I said we had to do, because we were there for 40-50 minutes, he was making us do the movements. If I had done it at home, I would have talked to my friend after a couple of moves and then I wouldn't be able to continue the sport. Or I could say I'm tired. I didn't have that chance here, so I tried to finish it because I didn't have a chance to stop it."

"[S01] Bizi mecbur bırakıyor. Yani oyunu yapmaya mecburuz. Mecburuz dediğim oyunu yapmamız gerekiyor, orda bulunduğumuz için 40-50 dakika boyunca o hareketleri yapmamızı sağlıyordu. Evde normalde yapmış olsaydım, bir iki hareketten sonra arkadaşım arasa onunla konuşup, sonra spora devam etmeyebilirdim. Ya da yoruldum deyip bırakabilirdim. Burada o şansım olmadı, durdurma şansım da olmadığı için bitirmeye çalıştım."

Improved time management skill

Three users cited that using the VSP improved their time management skills.

"[S01] At least, because you have a certain program, you need to organize the rest of your life a little more."

"[S01] En azından belli bir programın olduğu için hayatının geri kalanını biraz daha düzenlemen gerekiyor."

Felt energized

Three users cited that they felt energized after using VSP. S01 mentioned that she was getting tired at the beginning of the implementation, however later on she felt more energized. S02 stated that she was feeling energetic during the implementation process, though after it finished she started to feel unwilling to do activities, again.

"[S18] I feel more physically vigorous, I am more inclined to do activities… I am, for example, lazy, I do not go out much when they call. I think one feels vigorous or finds the power within himself to go out."

"[S18] İnsan fiziksel olarak kendini daha dinç hissettiği için aktiviteye daya şey… ben mesela üşengecimdir, dışarı çıkarım diye aradıklarında çok ta şey yapmam (gitmek istemem). İnsan kendini dinç hissediyor ya o dışarı çıkabilecek gücü kendinde bulabiliyor bence."

"[S02] We didn't felt lazy for doing things (while exercising). Now I'm still lazy."
"[Res] Yeah? So it gave you energy?"
"[S02] Yes, I was feeling energetic."

[S02] (Spor yaparken) Bazı şeyleri yapmaya üşenmiyorduk. Şu an hala üşeniyorum.”
“[Res] Öyle mi? Yani enerji kazandırdı mı?”
“[S02] Evet enerjik hissediyordum.”

“[S01] At first I was tired, but then I felt more vigorous.”
“[S01] Hareket ettiğim için başlarda yoruldum ama sonra daha dinç hissettim.”

Financially viable

Two users perceive using the VSP is financially viable which is a positive effect on productivity. S04 compares the VSP system to going to the gym and states that gym would be more costly, compared to buying Kinect, she also states that buying the Kinect as a group would be more cost efficient. S03 adds that Kinect is usable for many years.

“[S04] (Going to the gym) would be a financial burden for us, my teacher. Though we need to buy Kinect.”
“[S04] (Spor salonuna gitmek) maddi açıdan bize yük olurdu hocam. Gerçi Kinect'i almamız gerekir…”

“[S04] Can be bought as a group. because one person is too costly.”
[S04] Grup olarak alırsak olabilir. çünkü tek kişi çok maliyetli olur.”

“[S03] But then how many years can you use Kinect…”
“[S03] Ama sonra Kinect'i kaç yıl kullanabilirsin…”

Space and time independent

One of the users cited that space and time independent usage feature of the VSP positively affects the productivity. PC2 compares the VSP to following an exercise program from the TV, and states that one can miss the TV program because of interruptions at home, however one can pause the VSP and then continue. In addition, E2 states his opinion that the user will not be dependent on anywhere or a time schedule.

“[S07] It's actually good in terms of efficiency. You can work anywhere, anytime you want.”
“[S07] Verimlilik yönünden iyi aslında. İstediğin yerden, istediğin zaman çalışabiliyorsun.”

"[PC2] Something like this, the (TV) program is running, for example ... We're at home doing sports, let's say I am a sedentary person. Someone can ring the bell at the door, or come in. But I can stop the program here ..."

"[PC2] Şöyle bir şey, program kaçıyor mesela... Evdeyiz spor yapıyoruz sedanterim. Kapı da çalabilir birisi de gelebilir. Ama burada programı durdurabildiğim için..."

"[PC3] There is a difference."
"[PC3] İlla ki farkı oluyor."

"[E2] What it does, the first advantage is a device that can use itself. Will not go to a place will not depend on a working time will not be dependent."

"[E2] Ne yapar, birinci avantajı kendi kendine kullanabileceği bir cihaz. Bir yere gitmeyecek bir yere bağımlı olmayacak çalışma saati bağımlı olmayacak."

4.2.3.2   The perceived negative effects of the VSP on productivity

This theme of negative effects of the VSP on productivity emerged from users' data, only. The four categories that emerged, from most cited to the least cited are: Inconsistent feedback, Exercise program is not effective, Kinect sharing has wasted time, and Not financially viable.

Inconsistent feedback

Six users perceived that the inconsistent feedback of the VSP affected the productivity negatively. S01, S09, S18 and S19 mentioned that even though they did not move incorrectly, the VSP sometimes perceived it as a mistake. Nonetheless, S01, S04, S05, and S19 mentions that sometimes even though they make the motion incorrectly, the VSP gave high scores, especially for the last movement of the exercise regimen, jumping jacks. They note that they got high scores even if they did not jump, and just lifted their arms up.

> "[S01] Yes, it did. Even though I did what the (Instructor Avatar) did, I got a very different look. That was very problematic. You know, am I doing it wrong? Or, while exercising different movements appeared (on the Avatar), it was very annoying, for giving low points. Sometimes, even though I was standing there, or something, it gave high points. That was problematic."

"[S01] Evet, oldu ama ben orda mankenin yaptığını yaptığım halde çok farklı bir görüntü aldığım oldu. Onlar çok sıkıntı oldu yani. Hani ben mi yanlış yapıyorum ya da çalışırken çok daha değişik değişik hareketler oldu o çok canımı sıktı, düşük puan verdiği için. Bazen de öyle durduğum halde, ya da bir şey olmadığı halde yüksek verdiği de oldu. O yani biraz sıkıntıydı."

"[S05] There is a problem. He thought it was right when we did it wrong. For example, he didn't jump in the bouncing movement, but he accepted it right."
"[S05] Şöyle bir problem var. Yanlış yaptığımızda doğru sanıyordu. Mesela zıplama hareketinde zıplamasak da doğru kabul ediyordu. Bazı hareketlerde doğru yapınca yanlış diyebiliyordu."

"[S19] I can give an example . For example, the last movement, the jumping movement, I've seen the VSP give high points even if not jumping. So.."
"[S19] Örnek verebilirim. Mesela en son hareket, zıplama hareketi, onda zıplanılmasa bile yüksek oranları verdiğini gördüm. Yani.."

Exercise program is not effective

Exercise program is not effective according to two users' perception. S21 thinks that exercises were excessively easy, which did not require spending much energy. S19 commented on the duration of the program, as being too short and intermittent.

"[S21] We're already just doing warm-up movements. So we don't waste much energy."
"[S21] Biz zaten sadece ısınma hareketleri yapıyoruz. Yani çok enerji harcamıyoruz"

"[S19] What I'm saying is actually, I think it wasn't very productive. Because it's not continuous. I think it's a short time. Not enough time for sports. It could be on certain days of the week and at certain hours. It could be longer than a month and a half. three periods, but I think it was very tired."
"[S19] Benim söylediğim şey aslında bu, yani çok verimli değildi bence. Çünkü sürekli değil. Kısa bir süre bence. Spor için yeterli bir süre değil. Haftanın belli günlerinde ve belli saat aralığında olabilirdi. Bir buçuk aydan daha uzun olabilirdi. Mesela o üç periyottan oluşuyordu ama çok yoruyordu bence."

Kinect sharing has wasted time

Two users perceived as Kinect sharing has wasted time.

"[S12] In fact, the lack of it from the gym, my teacher. If only two or three people can do the same thing at the same time. If we do the same movements at the same time or if the movements are different, we do not need the gym, but we do one person ... friend waits for an hour."

"[S12] Aslında spor salonundan eksiği şu hocam. Aynı anda iki üç kişi yapabilsek yine aynı şey olur. Aynı anda aynı hareketleri yapsak ya da hareketler farklı olsa spor salonuna biz gerek duymayız ama tek kişi yapıyoruz ... bir saat bekliyor arkadaş."

"[S01] We have squeezed it (in our schedule). If I was doing it at home, it wouldn't be that much trouble. I could do it in the evening, I could do it in the night, but I had to find you here, you had to have Kinect, the other people weren't supposed to be here, or you had to queue up..."

"[S01] Sıkıştırdık. Eğer ben de evde yapıyor olsaydım o kadar sıkıntı olmayacaktı. Akşam gidince de yapabilirim, gece de yapabilirdim, ama burada mecburen sizin olması gerekiyordu, Kinect'in olması gerekiyordu, diğer kişilerin burada olmaması gerekiyordu ya da sıraya girip o arada olması gerekiyordu..."

Not financially viable

Two users perceived that the VSP is not financially viable. During this research participants did not spend any money for the hardware or the software. Although this is the case, some of the participants reasoned the option to buy Kinect to continue using the VSP in the future and decided it would not be viable to buy Kinect. S04 thinks that it would be costly for one person. S20 thinks that even though buying the Kinect and signing up to the gym would be equivalent in price, she would prefer the gym, because of the variety of the training equipment available.

"[S04] It can be bought as a group, because for one person it is very costly."

"[S04] Grup olarak alırsak olabilir, çünkü tek kişi çok maliyetli olur."

"[Res] Kinect is currently around 500 TL."
"[S20] Going to the gym will cost 500 TL per month. But there's something like that, wider, more comprehensive, more equipment..."

"[Res] Kinect şu anda 500 TL civarında..."
"[S20] Spor salonuna gitmek yine aylık 500 TL'yi bulur. Ama orda şöyle bir şey var, daha geniş daha kapsamlı, daha çok şey var..."

4.3 The attitudes of participants towards using the VSP (Research Question 3)

Users', coaches' and experts' attitudes toward using the VSP are presented in the Table 4.6. Most of the users stated having positive attitude (*f*=16), and some stated having negative attitude (*f*=2) towards using the VSP. Moreover some users (*f*=4) cited both positive and negative statements, which indicates an ambivalent attitude towards using. Both experts stated positive attitudes, while coaches were distributed as one positive, one negative and one ambivalent attitude.

Table 4.6. *Attitudes of participants towards using the VSP*

Categories	*f*	*f*	*f*	*f*
	Users	Coaches	Experts	Total
Positive attitude	16	1	2	19
Ambivalent attitude	4	1		5
Negative attitude	2	1		3

Users (n=22), Coaches (n=8), Experts (n=2), Total Participants (n=32)

Positive Attitude

Most of the participants showed positive attitude towards using the VSP. Users (*f*=16) perceived that the VSP is useful and beneficial for doing exercises, thus they stated their willingness to use it. Both of the experts showed positive attitude as well. Thus only one of the eight total coaches showed positive attitude.

> "[S04] I prefer VSP. Because there is an animation or something, that I like. It gives points, encourages people, people try to do it, with determination."
> *"[S04] SSP'yi tercih ederim. Çünkü orda bir animasyon falan var ya insanın hoşuna gidiyor. O puan veriyor, insanı teşvik ediyor, yapmaya çalışıyor, azim falan."*

> "[S06] Yes, I think it is useful to me. Because, uh, we don't move during the day, except for walking."
> *"[S06] Evet bana yararı olduğunu düşünüyorum. Çünkü ııı, gün içinde hiç hareket etmediğimiz de oluyor yürümek dışında."*

"[S17] I think it's appropriate as an entry level."
"[S17] Başlangıç seviyesi olarak uygun bence."

"[S16] For example, I want to warm up with this, before going out to astroturf (for football)."
"[S16] Mesela halı sahaya gitmeden önceden halı sahada ısınmak yerine bununla ısınıp gitmek istiyorum."

"[PC3] You are a coach, you will have your own members. You can give to your members. You can give control at home. You know that does it or not? Does it complete the program .. So does not come to the hall, say I'll do it at home. You can keep it under control at home."
"[PC3] Bir antrenörsünüz, kendi üyeleriniz olacak. Üyelerinize verebilirsiniz. Evdeki kontrolü sağlayabilirsiniz. O şekilde hani yapıyor mu yapmıyor mu? Programı tamamlıyor mu.. Yani gelmiyor mesela salona, evde yapacağım diyor. Bunu uygulatabilirsiniz evde, kontrol altında tutabilirsiniz."

"[E1] Or a trainer at home can do that, if it can be improved at work, he will give homework in instrument work, that is, to repeat those movements to work at home."
"[E1] Ya da evde bir antrenör şunu yapabilir, işte geliştirilebilirse aletli çalışmalarda, yani evde çalışması için o hareketleri tekrarlaması için, ödev verecek yani…"

"[E1] So this program can have two things, like housewives who can not leave the house, so you can not think constantly, or around the metropolitan areas, so there are towns, villages, sports hall Or think of a physical education teacher at work in the village where the facilities are narrow, that is, it can be used in places."
"[E1] Yani bu programın iki şeyi olabilir, evden çıkamayan ev hanımları gibi, yani sürekli çıkamayanlar ya da işte etrafında yani büyükşehirleri düşünmeyelim sonuçta kasabalar var, köyler var, spor salonu ulaşımı yok. Ya da işte bir beden eğitimi öğretmenini düşünün köyde imkanların dar olduğu yerlerde, yani o tip yerlerde kullanılabilir."

"[E2] It would be adequate, it would provide convenience. There's no dependence on anyone. He will only be dependent on the VSP, related with sports. So he won't need to go to a gym. But after he works 5 months 6 months 1 year, when he comes to a physically and physiologically appropriate position, he will need to do other sports branches."
"[E2] Yeterli olur, kolaylık sağlar. Birine bağımlılığı olmayacak. Tek bağımlılığı da olacak sporla ilgili. Yani bir spor salonuna

gitmeye ihtiyaç duymayacak. Ama bunu çalışır 5 ay 6 ay 1 sene, o fiziksel ve fizyolojik olarak uygun pozisyona getirince, diğer spor branşlarını da yapma ihtiyacı duyacak."

Ambivalent attitude

Some participants stated both positive and negative statements, which indicate an ambivalent attitude towards using the VSP. For instance, S12 accepts that the VSP is useful and he would use it to warm up before playing football match, he still does not think the VSP is equivalent to doing sports. Similarly, S21 finds the VSP useful, nonetheless does not want to use it. On the other hand, S10 and S19 gives indecisive responses to use the system. PC1 states that she would wonder, thus try the VSP, however this does not indicate she would use it.

> "[S12] It can be used before football match"
> *"[S12] Halı saha maçından önce kullanılabilir"*

> "[S12] I think it was enough for warm-up. But it wasn't really sporting."
> *"[S12] Isınma için yeterliydi bence. Ama gerçekten spor faaliyeti değildi."*

> "[S21] Useful."
> *"[S21] Yararlıydı."*

> "[S21] I do not use."
> *"[S21] Kullanmam."*

> "[S10] Can be used if some actions are added instead of others."
> *"[S10] Bazı hareketler yerine başkaları eklenirse kullanılabilir."*

> "[S19] Maybe."
> *"[S19] Belki."*

> "[PC1] You may be a professional but you just wonder, I wonder if I can get 100% success when I do it on the computer. What does the computer tell me?"
> *"[PC1] Profesyonel olabilirsin ama sadece merak edersin, acaba bilgisayarda yaptığımda yüzde yüz başarı alabiliyor muyum.. Bilgisayar bana ne diyor."*

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Negative attitude

Two users said that they do not want to use the VSP, indicating a negative attitude.

PC6 stated that he would not use the VSP, because he likes going to the gym more.

> "[S01] Had I seen the benefit, I would have loved to continue. If I can not even outside where I have to do that, would I like one I would have thought. But since I didn't see the benefit, I didn't create such enthusiasm."
> *"[S01] Faydasını görseydim devam etmek isterdim. Eğer burada* yapamıyor *olsaydım bile dışarda şunu yapmam lazım, yapayım gibi bir düşüncem olurdu. Ama faydasını görmediğim için de öyle bir istek, heyecan yaratmadı bende."*

> "[S20] I don't know, the training sounds more accurate to me. What can I gain in a home environment? We are jumping, running, we have very different movements, my teacher."
> *"[S20] Bilmiyorum, antrenman daha doğru geliyor bana. Ev ortamında bana ne kazanç sağlayabilir ki? Biz atlıyoruz, zıplıyoruz , koşuyoruz, çok farklı farklı hareketlerimiz var hocam."*

> "[PC6] Even if we don't know all the movements, when we research and learn, it is more attractive to do it individually, not in front of a camera, but in the gym ..."
> *"[PC6] Tüm hareketleri bilmesek bile araştırıp öğrendiğimizde onu bireysel olarak, illa bir kamera karşısında değil de spor salonunda yapmak daha cazip geliyor..."*

4.4 The intentions of participants to use the VSP in the future (Research Question 4)

Users', coaches' and experts' intentions to use the VSP in the future are presented in the Table 4.7. Participants mostly stated that they would use it if improved ($f=10$), though some would use it in the future ($f=5$) as it is. Three participants stated they would not use the VSP in the future for exercise. Coaches ($f=2$) and one expert only stated they would use in the future.

Table 4.7. *The intentions of participants to use the VSP in the future*

Categories	*f*	*f*	*f*	*f*
	Users	Coaches	Experts	Total
Would use if improved	9		1	10
Would use in the future	5	2	1	8
Would not use in the future	3			3

Users (n=22), Coaches (n=8), Experts (n=2), Total Participants (n=32)

Would use if improved

Nine users and one expert stated that they would use the VSP in the future if it is improved.

> "[S01] It would be nice if the insufficiencies were removed. I do not think it is attractive as it is."
> *"[S01] Eksiklerin giderilmesi durumunda çok güzel olur. Bu haliyle cazip değil bence"*
>
> "[S05] I don't want it in its current form. But I want to work in its improved form."
> *"[S05] Şu anki haliyle istemem. Ama geliştirilmiş haliyle çalışmak isterim."*
>
> "[S06] I can use if the motions are diversified."
> *"[S06] Hareketler çeşitlendirilirse kullanabilirim."*
>
> "[S07] I think the same way."
> *"[S07] Ben de aynı düşüncedeyim."*
>
> "[S08] I agree."
> *"[S08] Katılıyorum."*
>
> "[S08] I can use if we can add movements by different regions."
> *"[S08] Farklı bölgelere göre hareketleri ekleyebilirsek kullanırım."*
>
> "[S09] I agree with S08. I do sports. I use it in gyms ... or at least use it in the same way to warm up."
> *"[S09] S08ya katılıyorum. Spor yaptığımdan. Spor salonlarında... ya da en azından aynı şekliyle ısınmak için kullanırım."*
>
> "[S14] I can't feel comfortable at the gym personally, but do as you like at home."

"[S14] Ben şahsen spor salonunda rahat edemiyorum, ama evde istediğin gibi yap."

"[S18] Maybe, if the options are increase. Everyone may want to steer to something. For example, S20 to volleyball field ... It may be preferable like that. However, there is currently only one option. Coverage is low."
"[S18] Seçenekler artarsa olabilir. Herkes bir şeye yönlenmek isteyebilir. Mesela S20 voleybol alanına… Öyle bir şey olursa tercih edilebilir. Ama şu an tek bir seçeneğin var. Kapsamı düşük"

"[S22] In my opinion, if it is a big system with a bigger database, why not."
"[S22] Bence de spor olarak dallandırılırsa içerisine veri tabanı bayağı büyük bir sistem gelirse neden olmasın."

"[E1] I use it at home and at work, but there must be elements that motivate me. To warn, the visuality at work may be improved to some extent. So there must be elements to trigger… I would like to use it in every stage of the training, both in the heating phase and in the technical phase."
"[E1] Kullanırım yani ev de ve iş yerinde kullanırım ama beni motive etmesi gereken unsurlar da olması gerekiyor. Uyaracak, işte görselliği belki bir nebze daha iyileştirilebilir. Yani tetikleyecek unsurların olması gerekiyor… Antrenmanın her aşamasında kullanmak isterim ısınma aşamasında da teknik aşamasında da."

Would use in the future

Users S02, S03, S04, S12, and S15 stated that they are willing to use the VSP in the future. In addition, two coaches stated their willingness to use it for exercise. One of the experts would like to use the VSP for training their members.

"[S15] Instead of going out, whether it is summer or winter, we can do sports at home."
"[S15] Evden dışarı çıkmaktansa yazı var kışı var çünkü evde de sporumuzu yapabiliriz."

"[PC3] So we can have it done at home, but we can't get it done in class."
"[PC3] Yani evde yaptırabiliriz ama derste uygulatamayız yani"

"[PC1] This may be some additional material in learning. You open the slide and the child learns the movement, here you open the same movement in front of the child, he does it. If you'd like, you can make them repeat it outside as well."
"[Res] You say it can be used to attract attention."

"[PC1] Exactly."

"[PC1] Öğrenmede ek olarak bir şey olabilir. Slaytı açıyorsun ya hareketi öğreniyor çocuk, bunda da aynı hareketi açıyorsun çocuk karşısında sadece yapıyor, ek olarak yine yaptırıyorsan dışarıda yaptırırsın zaten."

"[Res] İlgi çekmek için kullanılabilir diyorsun."

"[PC1] Aynen."

"[E2] I would like to use it at every stage of the training, during the warm-up phase and also at the technical stage. Because Turkish athletes, most of the time, they are weak in terms of technique for starting the sport too late and after that they see themselves very famous, so they do not enter technical studies. I'll show my trainee that, in this dimension he can do it sixty percent accurate, I'll provide feedback."

"[E2] Antrenmanın her aşamasında kullanmak isterim ısınma aşamasında da teknik aşamasında da. Çünkü Türk sporcularını, birçok şeyi, etkeni, çok geç spora başladıkları için teknik konusunda zayıf oluyorlar ve ondan sonra kendilerini çok ünlü gördükleri için teknik çalışmalara girmiyorlar. Yani orada ben sporcumu alırım gösteririm işte o boyutta işte ancak yüzde altmış doğrusunu yapabiliyor diye kendisinde geri dönüşüm sağlarım."

Would not use in the future

Three users stated that they would not use the VSP in the future for exercise. S10 mentions that he prefers playing exergames to using VSP. S16 states that he does not like doing sports, however he would recommend the VSP to whom would like to do sports at home. S11 states that the VSP is only useful as a supplementary tool to be used before sports, otherwise it is not useful for exercising.

"[S10] I wouldn't use it. Games are better."

"[S10] Yalan olmasın kullanmazdım. Çünkü baktım onun içinde bir tane CD var ben onu yükledim oyun çok güzel."

"[S16] I generally wouldn't use it because I don't like to do sports. But I recommend it to people who want to do sports at home."

"[S16] Ben genel olarak spor yapmayı sevmediğim için kullanmazdım. Ama evde spor yapmak isteyenlere tavsiye ederim."

"[S11] Very good to be supportive before sports. Other than that it is not useful."

"[S11] Spor öncesinde destekleyici olması için çok iyi onun dışında bence kullanılmaz."

4.5 The opinions of participants on the implications of using the VSP in educational settings (Research Question 5)

Participants' opinions about the use of VSP in educational settings vary (Table 4.8). The categories from most cited to the least cited are: Can be used in education, Entertaining, Might increase active participation, Special education, Anatomy education, Physical education, Interesting, Gamification, Professional Training, Physiotherapy, and Disadvantages in Educational Settings. The themes cited by users, coaches and experts in common are Can be used in education, and Physical education.

Table 4.8. *Implications of using the VSP in educational settings*

Categories	f Users	f Coaches	f Experts	f Total
Can be used in education	4	2	1	7
Entertaining	2	1		2
Might increase active participation	2			2
Special education	2			2
Physical education	1	1	1	3
Anatomy education	1			1
Interesting	1			1
Gamification	1	1		3
Professional Training			2	2
Physiotherapy			1	1
Disadvantages in Educational Settings		1	2	3

Users (n=22), Coaches (n=8), Experts (n=2), Total Participants (n=32)

Can be used in education

Four users cited that the VSP could be used in education, generally. Similarly, two coaches and one expert stated there are some educational implications of the VSP, primarily for giving homework, or as a lesson material.

> "[S20] I also think it should be used. We even used it in an English class."

"[S20] Bence de kullanılmalı. Hatta biz kullanmıştık bir İngilizce dersinde."

"[S22] I think it can also be used in education."
"[S22] Bence de yani eğitimde kullanılabilir."

"[S19] Yes, it should."
"[S19] Evet kullanılmalı."

"[S18] My idea is that technology should be a last resort. For example, without a microscope, we wouldn't be able to see small cells. It can be used when there is no solution other than technology."
"[S18] Benim fikrim teknoloji son çare olmalı. Mesela mikroskop olmasaydı küçük hücreleri görme şansımız olmazdı. Teknolojiden başka çare olmadığı zaman şey yapılabilir (kullanılabilir)."

"[PC3] It can be done at home, but in 40 minutes, how do you get students to do it? My teacher, a physical education instructor needs to make children love sports, but if she makes the students love computer, students will be turned upside down."
"[PC3] O tamam evde yaptırılabilir ama 40 dakikanın içinde sen ona nasıl yaptıracaksın? Hocam zaten bir beden eğitimi hocası çocuklara sporu sevdirmesi gerekiyor, ama bilgisayarı bunu sevdirirse tepetaklak olurlar."

"[PC4] We could assign the movements that they do in the mornings, to do at home as exercise."
"[PC4] ...Sabah yaptığı hareketleri akşam evde tekrar egzersiz programı olarak verebiliriz"

"[E1] We do not make much use of this type of equipment such as visuality in our lessons right now, as I said we do one-to-one movement, this student as a homework application at home or outside of the application in a summer program will benefit from the application in a summer program, do not necessarily think of our thing in high school In other words, there isn't a gym everywhere but unfortunately it is both indoor and outdoor."
"[E1] Bizim derslerde şuan görsellik yani bu tip ekipmanlardan çok fazla faydalanmıyoruz biz birebir hareket yapıyoruz dediğim gibi bu öğrenciye bir ödev olarak artık hareketi evde uygulaması ya da sınıf dışında uygulaması bir yaz programında uygulaması yönünde fayda sağlayacaktır, illa bizim şey de düşünmeyin liseyi ortaokuldaki öğretmenleri de düşünebilirsiniz. Yani sonuçta her yerde bir spor salonu yok maalesef kapalı hem de açık. Sınıftan çıkamayanlar da var sınıf ortamında uygulayarak ve de ucuz bir maliyetle herhalde."

"[E1] Not in the crowded classrooms. As I said, you can't apply it to the whole class. Only the perception of the movements take place in

the brain, so they take that photo. There is no disadvantage too much. It will not be a part of a training just by adhering to it."
"[E1] Kalabalık sınıflarda olmaz. Dediğim gibi yine kullanılır tüm sınıfa uygulatamazsınız. Sadece hareketlerin algılaması beyninde yer etmesi yani o fotoğrafı çekmiş olurlar. Dezavantajı yok çok fazla. Sadece buna bağlı kalarak sonuçta bir eğitim yapılmayacaktır bu bir eğitimin parçası olacağı için."

"[E1] In a classroom environment, students can not use this one by one by one, but I can say that a few applications can be done. Because, the classroom environment would be crowded. Might be used just to ensure that things take place in their mind. To say that: look, the professional actor has done this practice, let's try it here shortly."
"[E1] Sınıf ortamında sıra ile yapılmaz ama birkaç uygulama yapılabilir öyle diyeyim yani. Yoksa sınıf ortamı kalabalık her biri tek tek yapamazsın. Sadece zihinde o şeyin yer almasını sağlamak için olabilir. Bakın profesyonel oyuncu şu şekilde yapmış bunun uygulaması şu hadi burada da uygulayalım denilebilir kısa kısa."

Entertaining

Two users and a coach thinks that using the VSP in educational settings would be fun for the students.

"[S21] Or to make learning more fun in children."
"[S21] Ya da çocuklarda öğrenimi daha eğlenceli hale getirmek için."

"[S22] I think it can also be used in education. It's fun too."
"[S22] Bence de yani eğitimde kullanılabilir. Hem eğlenceli oluyor…"

"[PC1] … You can have kids do it for more fun ..."
"[PC1] ... Daha eğlenceli olsun diye hani çocuklara yaptırabilirsin..."

Might increase active participation

Two users mentioned that the VSP and similar tools may increase active participation in classrooms. S19 stated that active participation is important to ensure learning. S04 commented on a lesson that their teacher used a Kinect based language learning tool in their English lesson, and that made her want to participate in the classroom.

"[S19] (I helps to get) active participation of children for permanent learning."
"[S19] kalıcı öğrenme için çocukların etkin katılımı sağlanır."

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"[S04] I think it should be used, my teacher. For example, they had applied something like this to us in English ... We are ashamed to get up on the board or something, but here the person wants to play, to speak, even if our pronunciation is bad, we want to talk or something. It was good."

"[S04] Bence kullanılmalı hocam. Mesela Bize İngilizcede uygulamışlardı bundan… Biz kalkamaya utanıyoruz tahtaya falan ama burada bir oynamak istiyor insan çıkmak konuşmak telaffuzumuz kötü olsa bile konuşmak falan istiyor. Güzeldi yani insan istiyor."

Special education

Two users cited the VSP could be used for teaching to children with special needs.

"[S18] In special education. In a group that really needs it."
"[S18] Özel eğitimde. Gerçekten ihtiyacı olan bir grupta."

"[S21] Can be used in special education. To teach movements ..."
"[S21] Özel eğitimde kesinlikle kullanılabilir. Hareketleri öğretmek için…"

Physical education

A user, a coach and an expert cited that the VSP would be useful in physical education. S17 states it could be used to warm up, PC1 thinks it could be used as a teaching material like a presentation slide. E1 thinks it is possible to use it both in class and at home by the student. In addition, E1 adds that students could learn sports moves from the VSP, which would be recorded by professional athletes.

"[S17] Physical education can be used to warm up in class."
"[S17] Beden eğitimi dersinde ısınmak için kullanılabilir."

"[PC1] It can be used as a separate additional learning technique, for example, like a presentation slide."
"[PC1] O ayrı ek öğrenme biçimi olarak kullanılabilir ama, mesela bir slayt gibi."

"[E1] Available for both (classroom and home). It can be improved as follows. Imagine a professional football player who is expert in that business if we can record his movements in the system, or we can make a basketball player or tennis player, that is, letting a student visually see it before telling the subject. We can get him to play it through the system. We can then apply it in the field. It can be added to the system in this direction… I mean the video shows that here is

a tennis player's forehand, then the instructor records it, then the student tests it, a triangulation like this."

"[E1] Her ikisinde de (sınıf ve ev) kullanılabilir. Şu şekilde de geliştirilebilir. O işin uzmanı profesyonel bir futbolcu düşünün onun yaptığı hareketleri sisteme kaydedebilirsek ya da bir basketbolcu ya da tenisçinin, yani öğrenciye bir konuyu anlatmadan önce görsel olarak bunu görmesini sağlayabiliriz. Sistem üzerinden bunu oynamasını sağlayabiliriz. Daha sonra sahada da bunun uygulamasını yapabiliriz. Sisteme bu yönde eklenebilir… Yani videoyu gösterir işte bir tenisçinin forehand şöyle yaptı daha sonra eğitmen onu kaydeder sonra öğrenci uygular üçlü bir şey olmuş olur."

Anatomy education

One user mentioned that the VSP or a similar tool could be improved to be used in anatomy education.

"[S17] … If the system can be formed, if the human body can be created, in order to recognize our body, there is this bone here, like this vessel is there, so it can be used in anatomy."

"[S17] …Eğer sistem oluşturulabilirse, vücudumuzu tanımak amaçlı insan vücudu oluşturulabilirse, burada bu kemik var, şurada şu damar var gibi, anatomide kullanılabilir yani."

Interesting

User S20 stated that students would find the VSP more interesting than pencil and paper, thus pay more attention to the lesson.

"[S20] They pay more attention to lesson. Because they have something like that in front of them. So it's more interesting than pencil and paper."

"[S20] Evet, derse daha çok dikkat ederler. Çünkü böyle bir şey var karşılarında. Yani kalem kağıt olmasındansa bu daha çok ilgilerini çeker."

Gamification

One user, S19, states that the VSP could be used as a game in the class. Similarly, PC3 thinks it could be used as a game, though she adds that is the teacher is in the class she should teach the movements, instead of letting students use the VSP.

"[S19] ... children's active participation is provided for learning. Student stands up, plays a game, and implicit learning is realized, I think."

"[S19] … kalıcı öğrenme için çocukların etkin katılımı sağlanır. Çıkar oyun oynar, hem de gizil öğrenme gerçekleşmiş olur bence."

"[PC3] It can be done in the game form. But you can't make students one by one do these movements in the classroom. You are there, you should show them yourself."
"[PC3] Oyun şeklinde yapılabilir. Ama birebir, bu hareketleri sınıf ortamında yaptıramazsın. Kendin varsın, kendin birebir göreceksin."

Professional Training

Both experts stated their opinions about the use of the VSP on a professional level. E1 thinks that a coach can use the VSP to give homework to their trainee, and ask them to repeat the movements at home. Similarly, E2 thinks the VSP would be beneficial for coaches to provide feedback to their trainees. E2 adds that national teams could utilize the VSP for improving technical skills of their team members.

"[E1] Or a trainer at home can do it, and if it can be improved with equipment, he will give homework, that is to repeat those movements."
"[E1] Ya da evde bir antrenör şunu yapabilir, işte geliştirilebilirse aletli çalışmalarda, yani evde çalışması için o hareketleri tekrarlaması için, ödev verecek yani…"

"[E2] I would like to use it at every stage of the training, during the warm-up phase and also at the technical stage. Because Turkish athletes, most of the time, they are weak in terms of technique for starting the sport too late and after that they see themselves very famous, so they do not enter technical studies. I'll show my trainee that, in this dimension he can do it sixty percent accurate, I'll provide feedback."
"[E2] Antrenmanın her aşamasında kullanmak isterim ısınma aşamasında da teknik aşamasında da. Çünkü Türk sporcularını, birçok şeyi, etkeni, çok geç spora başladıkları için teknik konusunda zayıf oluyorlar ve ondan sonra kendilerini çok ünlü gördükleri için teknik çalışmalara girmiyorlar. Yani orada ben sporcumu alırım gösteririm işte o boyutta işte ancak yüzde altmış doğrusunu yapabiliyor diye kendisinde geri dönüşüm sağlarım."

"[E2] It can be used in physical education classes, but if we call it one percent, I think the current dimension of it is 99 out of 100 for private work or individual work or club national team level work."
"[E2] Beden eğitimi derslerinde kullanılabilir ama buna yüzde bir dersek 100'de 99'unu özel çalışmaya da bireysel çalışma ya da

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kulüp milli takımlar düzeyinde çalışmalarda diye düşünüyorum bunun şu anki boyutunu."

"[E2] National teams or senior professional teams can use it for the development of their athletes in technical training."
"[E2] Milli takımlar ya da üst düzey profesyonel takımlar kendi sporcularının teknik eğitimdeki gelişimleri için kullanabilir."

Physiotherapy

One of the experts, E1, mentioned that the VSP could be integrated into physiotherapy, such that, patients need to repeat some movements at their home during their treatment, thus the VSP could be useful for them.

"[E1] There are people in nursing homes. They can be applied even in physical therapy even in a hospital setting. Physical therapy is applied at home and eventually people are not in the hospital for 24 hours. It can be used even in such things… Yes, it is very useful in the health sector."
"[E1] Bakımevlerinde insanlar var. Hastane ortamında bile fizik tedavide bile uygulanabilir bunlar. Fizik tedavi evde uygular sonuçta 24 saat hastanede olmuyor insanlar. O tip şeylerde bile kullanılabilir… Evet, sağlık sektöründe de çok kullanışlı olur bu."

Disadvantages in Educational Settings

One coach, and two experts pointed out some of the disadvantages of using the VSP in educational settings. They mostly stand on the crowded classrooms, cost of the device, and limitations of the physical conditions.

"[PC3] It can be done at home, but in 40 minutes, how do you get him to do it? My teacher is already a physical education instructor needs to make children love sports, but if the computer makes it love, they will be turned upside down."
"[PC3] O tamam evde yaptırılabilir ama 40 dakikanın içinde sen ona nasıl yaptıracaksın? Hocam zaten bir beden eğitimi hocası çocuklara sporu sevdirmesi gerekiyor, ama bilgisayarı bunu sevdirirse tepetaklak olurlar."

"[E1] In a classroom environment, students can not use this one by one, but I can say that a few applications can be done. Because, the classroom environment would be crowded. Might be used just to ensure that things take place in their mind. To say that: look, the professional actor has done this practice, let's try it here shortly."
"[E1] Sınıf ortamında sıra ile yapılmaz ama birkaç uygulama yapılabilir öyle diyeyim yani. Yoksa sınıf ortamı kalabalık her biri

tek tek yapamazsın. Sadece zihinde o şeyin yer almasını sağlamak için olabilir. Bakın profesyonel oyuncu şu şekilde yapmış bunun uygulaması şu hadi burada da uygulayalım denilebilir kısa kısa."

"[E2] It can be used in physical education classes, but if we call this one percent, I think that 99 out of 100 is for private work or individual work or work at club national teams level. The current dimension of this is to be used tomorrow. It develops something ... But the use of what I see in the lesson brings a burden to the schools, so it cannot even get a ball to the schools. Since it is a course that aims to do all of life from trekking to football, from basketball to bocce everywhere , it can be used in an area of at least 10 square meters, at least as of today, it can be used very much in physical education classes and also because of its financial dimension. think it is not possible."

"[E2] Beden eğitimi derslerinde kullanılabilir ama buna yüzde bir dersek 100'de 99'unu özel çalışmaya da bireysel çalışma ya da kulüp milli takımlar düzeyinde çalışmalarda diye düşünüyorum bunun şu anki boyutunu. Yarın geliştirilir derste kullanılacak hani başka bir çalışma ile başka birisi başka bir şey geliştirir... Ama bu gördüğümün derste kullanılması çok bir yük getirir mali bir yük getirir okullara. Yani şu an okullara bir tane top bile alamıyor. Beden eğitimi dersinin asli amacı yaşam boyu spor olduğu için onlara daha fazla hareket etmeyi bunu açık alanda ya da her yerde trekking den futbola kadar, Basketboldan bocce sporuna kadar hepsini yaşam boyu yapmasını amaçlayan bir ders olduğu için. Bunun da en azından 10 metrekarelik bir alanda kullanılabileceği için, en azından bugünkü itibarıyla, beden eğitimi derslerinde çok fazla kullanılabileceğini, bir de mali boyutundan dolayı mümkün olmadığını düşünüyorum."

4.6 The suggestions of participants for improvement of the VSP (Research Question 6)

On the light of their perceptions for ease of use and usefulness of the VSP, users shared their suggestions for improvement of the VSP; as well as coaches and experts stating their opinions for improvement, as presented in the Table 4.9 below. Participants' suggestions are categorized under three main themes:

- Content suggestions
- Design suggestions
- Technical Suggestions

Table 4.9. *Suggestions for improvement of the VSP*

Categories	*f*	*f*	*f*	*f*
	Users	Coaches	Experts	Total
Content suggestions	**33**	**5**	**3**	**41**
Variety of motions can be increased	12			12
Daily Exercise duration may be shortened	6			6
Add exercise programs focusing on different regions	6		1	7
Number of days can be increased	4		1	5
Add weight lifting	4	2	1	7
Levels	1	3		4
Design suggestions	**31**	**13**	**5**	**49**
Change the position of the instructor on the screen	5	2		7
Improve personalization	5	1	1	7
Allow seeing the scores of others	5			5
Motion instructions can be delivered with audio	4	1		5
Allow simultaneous multiuser	3	3		6
Improve background design	3		1	4
Improve user control	2			2
Motion instructions can be delivered with video	2	1		3
Allow seeing my video online	1			1
Improve feedback	1	1		2
Provide user manual		1		1
Gamification		2	1	3
Real image instead of Avatar		1	1	2
Allow sharing			1	1
Technical suggestions	**2**	**2**	**3**	**7**
Improve Kinect's motion detection capacity	2	1		3
Artificial intelligence		1		1
Implement usage of equipment			2	2
Integrate smart watches or smartphones			1	1

Users (n=22), Coaches (n=8), Experts (n=2), Total Participants (n=32)

4.6.1   Content Suggestions

Users, coaches and experts stated their opinions on the desired improvements to be made on the content, namely the exercise regimen, which has been implemented in this study. Participants' content suggestions are categorized into six themes, ordered from the most cited to the least cited as: Variety of motions can be increased; Daily Exercise duration may be shortened; Add exercise programs focusing on different regions; Number of days can be increased; Add weight lifting; and Levels. Only "add weight lifting" theme was repeated by three types of participants; four users, two coaches and one expert.

Variety of motions can be increased

Twelve users suggested that the variety of motions should be increased, in order to increase the usefulness of the VSP.

> "[S17] It wasn't enough. It was missing. It could have been more."
> *"[S17] Yeterli değildi. Eksikti. Daha fazla olabilirdi"*
>
> "[S08] I would increase movements. I mean, there are only movements for the arm. There is a leg, bend over, but I think some of the movements are missing. This is probably a Kinect issue."
> *"[S08] Hocam hareketleri arttırırdım. Yani sadece kola yönelik hareketler var. Bacak ta var ama eğilip kalkma şu bu, hani bazı hareketler eksik bence. Bu da belki Kinect'ten kaynaklanan bir şeydir."*
>
> "[S10] Several movements can be removed and other movements can be entered."
> *"[S10] Birkaç hareket çıkartılıp başka hareketler de girilebilir"*

Daily exercise duration may be shortened

Six users mentioned that the daily exercise duration may be shortened, because the duration of the exercise regimen that is implemented in this study took about 45 minutes. Some users supposed the duration would better be 30 minutes, some stated that the repetitions of the movements would better be less than eight.

> "[S02] It was also very long … It was an hour. Half an hour (would have been better.)"

"[S02] Bir de çok uzundu… Bir saatti, yarım saat (olsa daha iyi olurdu.).”

"[S12] I would also shortened the time.”
"[S12] Bir de süresini kısaltırdım.”

"[S13] And also may be less repetitions. We were doing eight times I guess .”
"[S13] Bir de tekrar sayısı az olabilirdi. 8 defa yapıyorduk herhâlde.”

"[S16] Let us determine ourselves. If I have half an hour or fifteen minutes, I choose a set, three sets enter and it is not finished.”
"[S16] Kendimiz belirleyelim. Atıyorum benim yarım saat ya da on beş dakika vaktim varsa bir set seçerim, üç set girip yarım kalmamış olur.”

"[Res] Does a fifteen minute sport have effect?”
"[S16] No it does not, but 45 minutes is long, for example”
"[Res] On beş dakikalık bir spor etki eder mi?”
"[S16] Etki etmez de hocam 45 dakika da uzun mesela”

Add exercise programs focusing on different regions

Six users and one expert suggested adding exercise programs focusing on different regions.

"[S09] There could be different programs. For example, a package for the arms . A package for the legs . Regional work…”
"[S09] Farklı programlar olabilirdi. Mesela kollar için bir paket. Bacaklar için bir paket gibi. bölgesel çalışma…”

"[S08] There were 20 moves. We were making 3 sets. It would be better if the arms were 10 moves, leg 10 moves, chest 10 moves.”
"[S08] 20 tane hareket vardı. 3 set yapıyorduk. Şöyle olsa daha iyi olurdu, kollar 10 hareket, bacak 10 hareket, göğüs 10 hareket gibi.”

"[S12] Diversity needs to increase, I would like to choose which region to operate, obviously. The abdominal region for me.”
"[S12] Çeşitliliğin artması lazım, hangi bölgeyi çalıştıracağımı seçmek isterim açıkçası. Benim için karın bölgesi.”

"[S13] For example, the first round is over, which would be an option as you would like to work in the region, so we could continue again.”
"[S13] Mesela birinci tur bitti, hangi bölgeyi çalışmak istiyorsunuz gibi bir seçenek gelebilir biz ona göre tekrar devam edebilirdik yani.”

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"[E2] Here's the specific sport, say, about warming ... How to warm up with the various parts of the body or how to warm up from the top of the two dimensions we see, or we see more sizes of those muscles, even if we can capture the points of intramuscular loads better."

"[E2] İşte özgü spor branşına, diyelim ki, ısınma ile ilgili… Vücudun çeşitli bölgeleri ile ısındırmamızı ya da yukarıdan aşağı nasıl ısındırma yapacağımız hani iki boyutta görüyorduk ya biz daha fazla boyutta görüp o kasların hatta kas içi yüklenmelerin noktalarını yakalayabilirsek daha iyi olur."

Number of days can be increased

Four users and an expert stated that the number of days should be increased in order for the VSP to be more useful. Users mentioned three or four days a week would be fine, E2 however mentioned that users should do this almost every day for months to see the real benefit.

"[S19] What I'm saying is actually, I think it wasn't very productive. Because it's not continuous. I think it's a short time. Not enough time for sports. It could be on certain days of the week and at certain hours. It could be longer than a month and a half. Three periods, but I think it was very tiring."

"[S19] Benim söylediğim şey aslında bu, yani çok verimli değildi bence. Çünkü sürekli değil. Kısa bir süre bence. Spor için yeterli bir süre değil. Haftanın belli günlerinde ve belli saat aralığında olabilirdi. Bir buçuk aydan daha uzun olabilirdi. Mesela o üç periyottan oluşuyordu ama çok yoruyordu bence."

"[S20] It may be 3 or 4 days."
"[S20] 3 gün 4 gün olabilir."

"[E2] What was the work that you did that day, the step. Stepping with a total of 40 minutes of work gives flexibility back, but of course they are always in the long run. It definitely increases their power. It definitely increases max vo2 but they will do it every day, for example. The will do it for months, and only then will they see the effects."
"[Res] You say maybe it was, a month and a half, short."
"[E2] Yes."
"[E2] O günkü yaptığınız çalışma neydi, step çalışmasıydı. Toplam 40 dakikalık bir çalışmayla step çalışması esneklik geri verir ama tabii bunlar hep uzun vadede…Gücünü kesinlikle arttırır maxvo2 sini kesinlikle arttırır ama bunu mesela her gün yapacak. Ve aylar boyunca yapacak etkilerini ancak o zaman görürler."

"[Res] Belki bir buçuk ay kısa olmuş olabilir diyorsunuz."
"[E2] Evet."

Add weight lifting

Four users, two coaches and one expert suggested adding weight lifting exercises on the VSP. S12 mentioned that the exercise regimen could also include other training equipment available in the user's home such as treadmill. Similarly, PC3 and PC2 stated that for some movements, the VSP could suggest the user to do the exercise with a couple of dumbbells or water bottles. On the same note, E1 suggested using equipment and the VSP together.

"[S05] Weight needs to be added."
"[S05] Ağırlık eklenmesi gerekiyor."

"[S12] For someone who has a treadmill at home, he will do these movements at first, and then the screen will write to me, that you run on the treadmill for an hour, -you don't need a tool for your abdominal muscle – it will show me a move about abdominal muscle then I do it, then I close the program. It can be used if we do it this way. But for this we need something extra, such as sports equipment."
"[S12] Evinde koşu bandı olan biri için ilk başlarda bu hareketleri yapacak sonra şey yazacak bana, 1 saat koşu bandında koşunuz yazıyor, ondan sonra son setiniz diye -karın kası için bir alete gerek yok- karın kası ile ilgili bir hareket gösterse bana ben onu da yapsam ondan sonra programı kapatsam. Bu şekilde yapsak gayet kullanılabilir. Ama bunun için bizim ekstra bir şeylere ihtiyacımız var mesela spor aletleri."

"[PC3] The movements that can be done at home are already flexibility movements. There's stretching (exercises). Can we add weight or something? … At the beginning of the program, what the user will use, like two dumbbells, it can be written, for example, to be done with these weights."
"[PC3] Evde yapılabilecek hareketler zaten esneklik hareketleridir yani. Esneklik hareketleri var. Ağırlık falan eklenebilir mi? … Programın başında kullanıcı ne kullanacaksa, iki dumbbell gibi, o yazılabilir mesela, şu ağırlıklar eşliğinde yapılacak gibi."

"[PC2] Or, two bottles of water…"
"[PC2] Ya da, iki şişe su..."

"[E1] In fact, if the program can be improved. There needs to be work with some tools or something."

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"[E1] Program daha çok geliştirilirse olabilir aslında. Biraz aletli falan çalışmak gerekiyor onun için yani."

Levels

One user suggested that users should be able to choose the level of difficulty of the exercises, or the VSP could adjust the difficulty according to the user's performance. Similarly, PC3 suggested a preliminary exercise program to assess the motion capabilities of the user, and according to the result of that, assign a particular difficulty level fort the exercise. PC6 states that the exercise program should start from easy level and as the user shows progress get more difficult, otherwise if the difficulty stays the same for a month user's physical attributes would not develop.

> "[S01] There could also be stages of this. According to progress, according to our score, it could move to the next level. One could have chosen that as well, I would like to jump to the next level."
> *"Bir de bunun aşamaları olabilirdi. İlerlemeye göre, aldığımız puana göre bir ileriki ya da bir geriki seviyeye geçirebilirdi.... Bir de seçimli olabilirdi hani ben sonraki seviyeye atlamak istiyorum gibi."*

> "[PC6] Programs that need to be upgraded from easy to difficult."
> *"[PC6] Kolaydan zora doğru arttırılması lazım programların. Sabit kaldıktan sonra bir gelişme olmaz..."*

> "[PC7] There can be difficulty levels."
> *"[PC7] Zorluk seviyeleri olabilir."*

> "[PC3] There may be a preliminary program that will measure the level of the person before starting a program and according to his degree... He already knows how to do jumping-jacks or jump, he will be assigned to a program a notch above, a program according to him. It is not equal to everyone, but it is measured at first according to the situation of the person and then a suitable program for him."
> *"[PC3] Eğer bir programa başlamadan önce kişinin hangi seviyede olduğunu ölçecek bir ön program olabilir onun derecesine göre de... Zaten bu ayak çırpmayı ya da zıplamayı biliyor, onun bir tık üstüne konulacak, ona göre bir program hazırlanabilir. Hani herkese eşit seviyede değil de, kişinin durumuna göre ilk başta ölçülür daha sonra ona uygun bir program... Kat kat artan bir program…"*

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4.6.2 Design Suggestions

Participants' design suggestions are categorized into fourteen themes, ordered from the most cited to the least cited as: Change the position of the instructor on the screen; Improve personalization; Motion instructions can be delivered with audio; Allow simultaneous multiuser; Improve background design; Improve user control; Motion instructions can be delivered with video; Allow seeing the scores of others; Allow seeing my video online; Improve feedback; Provide user manual; Gamification; Real image instead of Avatar; Allow sharing. Only "improve personalization" theme was repeated by three participant type.

Change the position of the instructor on the screen

Five users and two coaches mentioned that the position of the instructor's avatar on the screen should change. Users had a hard time seeing the movements shown by the Instructor, thus they suggest it to be placed nearer to the camera in the 3D environment. Two coaches on the other hand, mentions that the Instructor should not change places between different movements, but stay on the same spot.

> "[S12] Instructor shows the movement initially, however you can miss it, for example, he could be closer to the front."
> *"[S12] Zaten önce gösteriyor da, sonra sen onu kaçırabiliyorsun mesela arkadan daha yakın olabilirdi."*
>
> "[PC2] What action the athlete is going to do is causing confusion there. We're just doing it. He's coming. He's showing the score of the previous move. But I'm moving to the next move. When I say I'll look at the score, I miss the next move ... So this is perceived after one or two levels."
> *"[PC2] Sporcunun hangi hareketi yapacağı orada kafa karışıklığına neden oluyor. Tam yapıyoruz o gidiyor. Geliyor. Bir önceki hareketin puanını gösteriyor. Ama ben bir sonraki harekete geçmiş oluyorum. Puana bakacağım derken sonraki hareketi kaçırmış oluyorum... Yani bu bir iki seviyeyi yaptıktan sonra algılanabiliyor."*
>
> "[PC1] And the trainer goes in and out ... He shows and goes ... Let him stay, so he shows the movement, he stops, then he moves on"
> *"[PC1] Bir de eğitmen çıkıp girip duruyor böyle... Gösterip gidiyor... Dursun, yani hareketi göstersin, dursun, sonra başka harekete geçsin"*

Improve personalization

Five users, one coach and one expert suggested improving personalization. Especially users would like to select the difficulty level of the exercise program, select the music to be played, select the background image, and choose from different avatar.

> "[S01] There could also be stages of this. According to progress, according to our score, it could move to the next level. One could have chosen that as well, I would like to jump to the next level."
> *"Bir de bunun aşamaları olabilirdi. İlerlemeye göre, aldığımız puana göre bir ileriki ya da bir geriki seviyeye geçirebilirdi.... Bir de seçimli olabilirdi hani ben sonraki seviyeye atlamak istiyorum gibi."*

> "[S02] Yes, the music was bad."
> *"[S02] Evet müzik çok kötüydü."*

> "[S04] Characters can be more fun."
> *"[S04] Karakterler daha eğlenceli olabilir."*

> "[PC1] Then you can add something like Add your own music ..."
> *"[PC1] O zaman kendi müziğini ekle gibi bir şey ekleyebilirsiniz..."*

> "[E1] She could have something (music) of her own taste."
> *"[E1] Kendi istediği (müzik) falan da olabilir yani."*

Allow seeing the scores of others

Five users stated that they would like to see the scores of their friends, claiming that it would motivate them by comparing their cores to the other user's scores.

> "[S12] Motivates us."
> *"[S12] Motive yapar bizi."*

> "[S10] We both started on the same day, I say how he is losing weight before me."
> *"[S10] İkimiz de aynı gün başladık o nasıl benden önce kilo veriyor derim."*

> "[S12] At the end, for example, to connect with the feeling of racing."
> *"[S12] Hocam en sonda şey olurdu mesela yarış duygusuna bağlanabilirdi."*

Motion instructions can be delivered with audio

Four users and a coach stated that motion instructions could be delivered with audio.

> "[S20] Sound can be added. Text can sometimes be too small, unreadable."
> *"[S20] Ses eklenebilir. Yazı bazen çok küçük kalabiliyor, okunmuyor."*

> "[S19] He will both show and say."
> *"[S19] Hem gösterecek hem söyleyecek."*

> "[PC1] Also instructions can be spoken."
> *"[PC1] Bir de komutlar sesli olarak verilebilir."*

Allow simultaneous multiuser

Three users and three coaches states that the VSP should allow simultaneous multiuser experience. Users think that using the VSP with a friend would be more useful by increasing the enjoyment and efficiency.

> "[S12] If we do the same movements at the same time or if the movements are different, we do not need the gym. Currently one person does the exercise, his friend waits for an hour."
> *"[S12] Aynı anda aynı hareketleri yapsak ya da hareketler farklı olsa spor salonuna biz gerek duymayız ama tek kişi yapıyoruz, bir saat bekliyor arkadaş."*

> "[S12] In fact, if only I would not do it alone, but do it as two or three people, it would be more fun."
> *"[S12] Aslında ben tek başıma yapmasam iki üç kişi yapsak daha eğlenceli olur."*

> "[PC3] Even if there is a lot of people in the environment, even if it goes inevitably competing in itself. It's ambition. The environment is important even if it goes alone. Why would he be greedy for doing it alone at home?"
> *"[PC3] Tek gitse bile orda ortamda bir çok kişi olduğu için, kendi içinde ister istemez yarışıyor yani. Hırsa biniyor yani. Tek başına gitse de ortam önemli. Evde tek başına yaptığı için niye hırs edecek yani?"*

> "[PC3] Two-person program, not for individual use, two avatars may appear..."
> *"[PC3] Bir kişilik değil de iki kişilik program, iki postür çıkabilir..."*

"[PC2] An extra program ... Two instructors, two athletes can be ... You know, a little more fun to entertain the environment ... Contest ..."
"[PC2] Extra bir program daha... İki eğitmen, iki sporcu olabilir... Hani biraz daha ortamı eğlendirmek amaçlı... Yarışma..."

Improve background design

Three users and an expert suggest improving the background design, because they find it dark and crowded. They would prefer a natural environment shown in the background.

" [S18] But it could have been a more fun background. It was a little overcast plan. Could have been more joyful. The colors were very dark. And it looked pretty crowded."
"[S18] Ama daha eğlenceli bir arka plan olabilirdi. Birazcık böyle basık bir plandı. Daha hareketli olabilirdi. Renkler çok koyuydu. Bir de baya kalabalık görünüyordu."

"[S21] It could have been a natural environment."
"[S21] Doğal bir ortam olabilirdi."

"[E1] … may be video as if you were in nature."
"[E1] ...video olabilir doğadaymışsın gibi."

Improve user control

Two users suggested improving the user control, especially for selecting the exercise program and its duration, and also pausing and continuing the program when needed.

"[S17] Too much interruption is happening by the way, I wish I could pause it though. So, for example, when I make this movement, it would be appropriate to have a little stop. If only we can stop it anytime we want, and then go on. Because when we leave, it gives zero."
"[S17] Çok bölünme oluyor ya arada, keşke durdurma olsa. Yani mesela bu hareketi yaptığımda biraz durdurma olsa gayet uygun. İstediğimiz zaman durdurup sonra devam edebilsek. Çünkü sonra ayrılıyoruz sıfır veriyor."

"[S01] Yes, if I could stop it, that two-minute break could have been longer, if it was exhausting. We could have a choice of movements, for example there would be 50 instead of 20 movements, today I want to do the following movements we can adjust accordingly. Because after a while people get tired of doing the same movements and it becomes monotonous."

> *"[S01] Evet durdurabiliyor olsaydım, o iki dakikalık araları daha uzun olabilirdi, yorucuysa eğer. Hareketleri seçme şansımız olabilirdi, orda mesela 20 değil de 50 tane hareket olur, ben bugün şu şu hareketleri yapmak istiyorum diye süreyi de ona göre ayarlayabiliriz. Çünkü bir zaman sonra insan aynı hareketleri yapmaktan sıkılıyor ve ezbere oluyor."*

Motion instructions can be delivered with video

Two users and a coach commented that the motion instructions could be delivered with video as well. S18 thinks it would clear some of the misconceptions users had of watching the instructors avatar. PC6 thinks video would be better that showing the movements with avatar.

> "[S18] …sometimes the instructor seemed to be jumping, ascending, technical error. With a video, that misunderstanding could be remedied."
> *"[S18] ... bazen eğitmen zıplıyormuş, yükseliyormuş gibi görünüyordu, teknik hata vardı. Video ile o yanlış anlaşılma giderilebilirdi."*

> "[S01] Their videos can be shot and given with a cd, you may also do it more comfortable if you watch them, something like that."
> *"[S01] Onların videoları çekilip, ekte cd de onlar verilirken, bunları izlerseniz daha rahat yapabilirsiniz gibi bir şey olabilir."*

> "[PC6] Video is better than animation, video can be more effective."
> *"[PC6] Video daha iyi olur o animasyon yerine, video daha etkili olabilir."*

Allow seeing my video online

One user mentioned that since the Kinect is able to record video, a sample of the user's performance could be uploaded to the database, instead of only storing their performance scores.

> "[S12] If it has internet, then I should be able to see a copy of what I did. If you save it online."
> *"[S12] Hocam internet varsa, ben kendimin yaptığımın kopyasını görebilmeliyim. İnternete atıyorsanız."*

Improve feedback

While the VSP gives feedback to the user as in movement score and flashing the incorrect limbs, S09 suggested auditory feedback could be added. Similarly PC1 points out that user might miss the flashing feedback, thus the VSP should also provide auditory feedback.

> "[S09] Auditory feedback seems more reasonable."
> *"[S09] Ses daha mantıklı gibi geldi."*

> "[PC1] Sound effect, for example, the trainer, in the back ... Right wrong ... Looks red, but maybe he can miss it at the moment while doing sports ... He can say that you're doing it right, you're doing it wrong, raise your arm or something."
> *"[PC1] Ses efekti de olabilir mesela eğitmenin, arkada... Doğru yanlış... Kırmızı gözüküyor ama, belki o an kaçırabilir sporu yaparken... Söyleyebilir yani doğru yapıyorsun yanlış yapıyorsun kolunu kaldır falan."*

Provide user manual

One coach, PC3, thinks that a user manual should be provided to the users, at the beginning.

> "[PC3] There may also be a user manual, that is, when you give the program, when you give these tools or something, how the user manual will start, which key will be pressed, if he teaches them from the beginning, then the housewife will not have any problems."
> *"[PC3] Kullanma kılavuzu da olabilir, yani programı verdiğinizde bu aletleri falan verdiğimizde kullanma kılavuzu nasıl başlayacak, hangi tuşa basacak, onları baştan öğretirse zaten o zaman ev hanımı falan sıkıntı yaşamaz."*

Gamification

Two coaches and an expert suggested that the VSP could incorporate some gamification elements to ensure continuation of the usage and increasing enjoyment.

> "[PC3] Teacher, the people in the house are already bored quickly, so that's why they are in that situation. It can be made a bit of fun."
> *"[PC3] Hocam evdeki insanlar zaten çabuk sıkılan insanlar, onun için hani bu durumdalar. Bu biraz eğlenceli hale getirilebilir."*

> "[PC3] For example, it can be used as a game at the beginning or end of the program. The same moves can be combined with a game at

the level of the program it applies ... More fun. Not before the program is completed, the program will be completed ...”

“[PC3] Mesela programın başında ya da sonunda bir oyun şeklinde kullanabilir. Aynı yaptığı hareketlerin, uyguladığı programın seviyesindeki bir oyunla birleştirilebilir... Daha eğlenceli olur. Program tamamlanmadan önce olmasın, program da tamamlanmış olur...”

“[PC2] An extra program ... Two instructors, two athletes can be ... Behold a little more environment to entertain ... Competition ...”

“[PC2] Extra bir program daha... İki eğitmen, iki sporcu olabilir... Hani biraz daha ortamı eğlendirmek amaçlı... Yarışma...”

“[E1] It can also give you a warning, because the clock has started and so on. Now people like it, for example, you walked so far today, for example, you acted so much.”
“[Res] As you reached the target.”
“[E1] Yes it can be added in a way that needs to enjoy the pleasure of reaching the goal, or doing daily sports.”

“[E1] Hem uyarı verebilir bu, işte saatin başladı vesaire diye. Şimdi insanlar hoşlanıyor mesela, bugün şu kadar yürüdün diyor mesela, bu kadar hareket ettin.”
“[Res] Hedefe ulaştın gibi.”
“[E1] Evet hedefe ulaşmanın, ya da günlük spor yapmanın hazzını duyması gerekiyor bir şekilde, o eklenebilir.”

Real image instead of Avatar

A coach, PC3, thinks it would be better to herself on the screen as a video rather than embodied through an avatar. In addition, E1 thinks the same way for more experienced users.

“[PC3] For example, I’m doing here, but in the program posture (avatar) is moving slower. Then I’m saying that I’m doing the wrong thing, as my friend said .. If it reflects exactly the same there would be something more if I see myself ... I don’t have a chance to see myself on the screen instead of the posture? … An avatar is not the same as a human. For example, if I put myself and users see themselves, then a better result can be achieved.”

“[PC3] Mesela ben burada yapıyorum, ama programda postür (avatar) daha yavaş hareket ediyor. O zaman ben hani şey diyorum acaba yanlış mı yapıyorum.. Aynı arkadaşımın dediği gibi.. Birebir aynısını yansıtsa oraya ben kendimi görsem orda daha şey olurdu... postürün yerine kendimi ekranda görme şansım yok mu? ... insanla bir postürün ki aynı olmuyor. Mesela ben kendimi koysam,

kullanıcılar da kendini görse, o zaman daha güzel sonuç elde edilebilir."

"[E1] The mirror is used in some activities in the gym. People want him to see themselves. That's why it would be better for him to see himself one-on-one for dance or folk dances. But it would be an option. That's when he is online it's closed, it's on when he is on his own. Nowadays he is in a selfie environment constantly, so he might want to see his movements and maybe even record it there and send it. … It would be better to see one-on-one movements in terms of improvement, the other is a computer game. So I think that in the first moves this is ok, but he would like to see himself later."

"[E1] Spor salonunda bazı etkinliklerde ayna da kullanılıyor. İnsanlar birebir kendisini görmesini istiyorlar. Onun için danstı işte ya da halk oyunları gibi şeylerde bire bir kendisini görmesi daha iyi olacaktır. Ama öyle bir seçenekte olacaktır zaten. İşte online olduğu zaman kapatılıp, kendi başına olduğu zaman... İnsanların kendisini görmesi daha hoşuna gidiyor nihayetinde. Günümüzde sürekli selfie çekilen bir ortamda... yani hareketlerini görmek hatta belki orda kaydedip onu göndermek isteyebilir.... Birebir hareketleri görmek, iyileştirme yönünden de daha iyi olacaktır yani... öteki sonuçta bir bilgisayar oyunu. Yani ilk hareketlerde tamam daha sonra kendisini görmek ister diye düşünüyorum."

Allow sharing

E1 suggested that the VSP should allow the users share their performance results with their friends or coaches.

"[E1] Of course he may want to share. Here today I made these movements, how did you do it. Also, he may want to send to his teacher in that way. I mean, that should be an option for him anyway."

"[E1] Tabii paylaşmak isteyebilir. İşte bu gün bu hareketleri yaptım, siz nasıl yaptınız diye. Hem hocasına göndermek isteyebilir o şekilde. Yani onun için öyle bir seçenek olması lazım zaten yani."

4.6.3 Technical Suggestions

Users, coaches and experts stated their opinions on the improvements to be made on the technical level as well. Their suggestions were categorized under four themes as: Improve Kinect's motion detection capacity; Implement usage of equipment; Integrate smart watches or smartphones; Artificial intelligence.

Improve Kinect's motion detection capacity

Two users and one coach suggested improving Kinect's motion detection capacity.

> "[S05] The connection could break when someone passed in front of us. We could get zero. This problem can be fixed."
> *"[S05] Birisi önünden geçtiği zaman bağlantı kopabiliyordu. Sıfır alabiliyorduk. Bu problem giderilebilir."*

> "[S01] Detection first. Kinect's detection could be clearer."
> *"[S01] Algılaması ilk önce. Algılaması daha net olabilirdi."*

> "[PC3] But there is a problem with the avatar executing our motion, it can not fully perceive the movement. For example, we do not jump but it jumps. So, that can be corrected."
> *"[PC3] Ama postürün onu algılamasında sıkıntı var işte oradaki şeyde yaptığınız hareketi tam algılamıyor. Mesela biz zıplamıyoruz ama zıplıyor. Yani o düzeltilebilir."*

Implement usage of equipment

Both experts suggested implementing the usage of equipment in the VSP, in order to increase efficiency. In addition, the experts mention specific tools such as tennis racket, barbell, and ball, could be used while the user studies how the professionals utilize these tools.

> "[E1] As I said to improve, it can also be developed to include equipment. For instance, how to hold the racket. What you need to pay attention to when making forehand. It can be improved on this."
> *"[E1] Geliştirmek için de dediğim gibi yani aletli şekilde de geliştirilebilir. İşte raket nasıl tutulur? Forehand yaparken neye dikkat etmek gerekiyor gibi. Bu konuda geliştirilebilir."*

> "[E2] … Or in technical studies, for example, a shot putter or weightlifter that technique was exactly straight you know something, or 100 to 80 90 accuracy level ... Here is the first lifting moment of the point where the weightlifter holds the bar ... Or how a shot-putter gives the ball the inclination. .. Their rankings can be improved in terms of the best use of the technique, as well as world record-breaking weightlifters, or world record-throwers."
> *"[E2] ... Ya da teknik çalışmalarda, mesela bir gülle atıcısının ya da haltercinin o tekniği tam düz hani sizde bir şey oluşuyordu ya 100 de 80 90 doğruluk düzeyi... İşte haltercinin barı tuttuğu noktanın ilk kaldırma anının... Ya da bir güllecinin dönüşte verdiği eğim... Onların derecelerinin işte en iyi yapan ya da dünya rekortmeni halterciler, ya da dünya rekortmeni gülleciler bu işi nasıl yapıyor*

ise, tekniğin en düzgün şekilde kullanılması açısından geliştirilebilir."

Integrate smart watches or smartphones

E1 suggests integrating smart watches or smartphones to the VSP, so that the user's motions can be tracked throughout the day.

> "[E1] It can also warn you that this is where the watch started and so on. Now people like it, for example, it says that you walked so far today, you moved so much."
>
> *"[E1] Hem uyarı verebilir bu, işte saatin başladı vesaire diye. Şimdi insanlar hoşlanıyor mesela, bugün şu kadar yürüdün diyor mesela, bu kadar hareket ettin."*

> "[E1] Advancing by developing. Or it becomes boring. He wants to see progress as a human being. If we are losing weight, there is already that type of thing, body weight and so on. Or, for example, this could be improved with something. Smart watches and so on. You walked up and down and ran so much effort."
>
> *"[E1] Geliştirerek ilerlemek. Yoksa sıkıcı hale gelir. İnsan olarak ilerlemeyi görmek istiyor zaten. Kilo veriyorsak, zaten bunun o tip şeyi de vardır herhalde, vücut ağırlığı vesaire, buna etkisi, işte başladığında kilom şuydu şimdi şu, bunlar gerçi manuel girilecek ama ya da mesela bunun şeyle geliştirilebilir. Akıllı saatlerle vesaire. Şu kadar yürüdün şu kadar koştun, şu kadar efor sarf ettin. Yani bunu saat tutarak değil de, manuel değil, otomatik olarak belki geliştirilebilir."*

Artificial intelligence

Coach PC5 suggests utilizing artificial intelligence for motion detection to get better results.

> "[PC5] I also think that my teacher may be different if it is artificial intelligence. Movements can be detected better and more clearly with today's technology, some brands are already using, and getting more efficient results."
>
> *"[PC5] Bir de hocam yapay zeka olsa belki daha farklı olabilir diye düşünüyorum. Hareketleri daha fazla algılar karşısındaki cisimleri daha net algılayabilir günümüz teknolojisi, zaten bazı markalar kullanıyor daha verimli sonuçlar elde ediliyor."*

4.7 Summary

Results of the study were presented in detail above. To sum up, most of the users perceived the VSP to be easy to use, and useful in terms of the effects on their physical, psychological, and productivity parameters. Preservice coaches and experts also stated opinions that the VSP would be effective in those categories. In light of the difficulties users had faced while using the VSP, they made some suggestions for further improvement, which are categorized as exercise program, design, and technical suggestions.

CHAPTER 5

DISCUSSION AND CONCLUSION

In this section, the findings of the study are discussed based on the previous studies within parallel to the research questions. Finally, suggestions for future research and implications for practice are presented.

5.1 The perceptions of users, and opinions of coaches and experts on the ease of use of the VSP (Research Question 1)

One of the factors that has a large effect on attitude and actual system use is the ease of use (Davis, 1989). According to Davis (1989) "ease of use influences usage indirectly through its effect on usefulness" (p. 330). Hence, *perceived ease of use* "refers to the degree to which the prospective user expects the target system to be free of effort" (Davis et al., 1989). Thus, users' perceived ease of use, and other participants' opinions on this manner were analyzed deeply in the preceding chapter. Features that affect the perceived ease of use of the VSP were categorized into two sections as the features that positively and negatively affect the ease of use. Analysis of the participants' responses showed that there were more categories emerged within the negatively affecting features theme than the positively affecting features theme; 29 and 17 categories respectively. Nonetheless, the difference of the total number of quotations between the themes was large as well; there were 95 quotations on negative features, and 49 quotations on positive features.

The features that negatively affect the ease of use categorized under three themes: technical issues, content issues, and design issues. *Technical issues* (f=48) were cited

as much as the positive features (*f=49*) by the participants, though this might mean that the implementation process had some drawbacks, rather than the actual features of the VSP. For instance, internet connection problem, database connection problem and score not saved problem were all related to the internet connectivity issues that the user had during the implementation process, which arises from the infrastructure of the region where users live. The VSP requires internet connection in order to run initially, because the system checks the user's login information from the database and updates the exercise programs list as well. Thus if users did not have a stable internet connection, or if there is a restriction in their local network to connect to the VSP database, users were not able to start the program. Moreover, if the user starts the VSP, however the internet connection is lost during the performance, user's score cannot be sent or saved to the database. Thus, these issues were tangentially related to the system design, however the system could be improved so as to not require internet connection throughout the usage, and store the performance data locally on users' PC, and update the VSP database whenever there is a stable connection possible.

Some technical issues appear to be originated from the users themselves, such as: Difficulties in preparing the usage are (*f=3*), Difficult to install (*f=2*), Insufficient computer specifications (*f=2*), and Problems with clothing (*f=2*). These issues are not directly related to the features of the VSP, as well. In fact, these issues were overseen before the implementation, and the users were informed about the requirements to set-up and run the VSP effectively. For instance, users reported having problems using the system with the clothing they wear, as in when they wore black clothes, wide-sleeved shirts, or trousers with wide trotters. This issue could be based on Kinect's limitation, because black clothes do not reflect the infrared light properly, which had to be detected by Kinect to calculate the depth of the environment. In other words, Kinect could not see the user, when they wore black or dark colored clothes. This brings up the most cited technical issue by users (*f=9*) and coaches (*f=4*), that negatively affect the perceived ease of use: motion detection problem with Kinect. Users point out that, when the Kinect did not detect them, or detect something else instead of them, the VSP continued the session and gave low scores. They also mention that, in such cases the Avatar of the user made strange movements, not representing the user motions.

Therefore, this issue most probably originates from the environment of the user, caused by the light in the environment, objects near to the user, someone passing by or standing behind the user. To sum up, the technical issues summarized above were mostly user induced which should be considered while giving orientation to the users at the beginning of the implementation.

Some of the *content issues* (*f*=30) probably originated from the implementation choices of the study, and the preferences of the participants. Indeed, participants were informed about the duration (45 minutes, twice a week) of the daily exercises, and the entire research period of six weeks, before the implementation process. However, during and after the usage period, their statements on the exercise regimen showed that instead of repeating the same regimen for six weeks, they would prefer different motions or different durations for the exercises based on their preferences. Thus, their perception of the ease of use of the VSP was affected by the content issues such as limited variety of motions, limited user control over the selection, duration and repetition of the motions. These themes could be connected to the *design issues* that negatively affect the perceived ease of use such as "User control is not sufficient" (*f*=2) and "Personalization is not sufficient" (*f*=1). In fact, personalization is a strong point of the VSP, according to the developers (Yukselturk et al., 2017). Since, the VSP allows a coach to create any exercise regimen based on the users' needs. However, for the implementation of this research, all participants were assigned the same exercise regimen, that was decided and created by a coach for meeting the basic needs of a sedentary person. Therefore the *content issues* and some of the *design issues* addressed in this study by the participants are solvable with ease by creating new exercise programs on the VSP. Nonetheless, the design of the VSP should also be improved in order to give user the control to personalize their own exercise regimen, separately from a coaches' input. For instance, user could choose the exercises they desire from a list of previously recorded exercises, so that they would personalize their exercise regimen.

The most cited design issue by the users was having difficulty understanding and learning the motions (*f*=6). In addition, one coach thinks the motions' presentation by

the instructor avatar is sometimes unintelligible. Although, users stated that they had this problem at the beginning of the implementation process, which later disappeared. This could be explained as the users not being familiar with the VSP at the beginning. In addition, it could be explained by the position of the instructor avatar on the screen, that is also another design issue; "instructor is not visible" (*f*=1). Since the instructor was behind the user's avatar and partially not visible. Alternatively, the camera angles, through which the motions are presented to the user, could have caused some of the motions to be perceived as unintelligible. Currently, there is only one camera in the virtual environment that is facing the user and instructor avatars. Thus, adding more cameras to the virtual environment and showing the motions from different angles could increase the understandability of the motions.

Some participants pointed out design issues such as, instructions font size is small (*f*=1), no time to read the motion instructions (*f*=1), feedback is not sufficient (*f*=1). These issues seem to originate from the presentation of the instructions and feedback, as they were text and visual based. Users stated not being able to see the information on the screen from two meters away, which is a challenge when a user only has a laptop and a Kinect, without the big screen TV output. Thus, these issues could be solved by adding auditory instructions and auditory feedback as well.

The issues that negatively affected the perceived ease of use was discussed above, though some of the participants were on the opposite side with some of these issues. For instance; "Presentation of the motions is sufficient" (*f*=4) and "learning the motions is easy" (*f*=2) themes emerged as opposed to the "instructor's motion is not understood" (*f*=6) theme. In fact, one of the experts, E1 stated that, as long as the exercises are determined according to the user's needs, and the instructor avatar expresses them correctly, users would be able to learn the movements easily.

> "[E1] I mean, it's easy to learn. I don't have any problems in my mind. As long as it is done according to the level of the other party (user) and the instructor in the back expresses it nicely, I think it can be learned easily."

Considering the expert's opinion, and five other users' perceptions on easily learning the motions, as opposed to six users stating that instructor's motions are not

understood, this issue could be related to the differences in the background experiences of the users on doing exercises. Since, the users who have done similar exercises in their life previously would be inclined to learn the motions on the VSP more easily than someone who is only just learning the exercises, though there was not enough data to conclude this issue.

Other themes emerged from the perceptions of users and opinions of coaches and experts on the features that positively affects the ease of use were; interaction with the VSP is clear and understandable ($f=9$), and easy to use ($f=8$). These are the only two themes that emerged commonly from the three groups of participants, as presented in Table 4.1. Besides users ($f=4$) and experts mentioned the space and time independent usage of the VSP offers a convenience, especially for who do not have the time and opportunity to go to the gym.

"Recording new motions is easy" was cited by one coach only, on the other hand, "feedback is not sufficient," "creating an exercise program is confusing," and "the instructor's motion is not understood" were cited by the coaches as well. Thus, their opinions on the ease of use from a design point are divided as well.

Perceived ease of use of the VSP could be considered mostly positive from the design point, however not great in terms of technical issues that occur because of the difficulties users had achieving the ideal conditions required for the system to run efficiently. As for the content issues, participants mostly cited variety and duration of the exercises as not being personalized; and being boring, or tiring. The technical and content issues seem to affect the effort users had to exert while using the VSP. Therefore, those issues should be addressed for improvements, in order to increase the perceived ease of use.

5.2 The perceptions of users, and opinions of coaches and experts on the usefulness of the VSP (Research Question 2)

Ease of use, from the perceptions of users and opinions of coaches and experts, was discussed above considering how it would affect the acceptance of the VSP. Even

though the lack of user friendliness of a system is a crucial obstacle to user acceptance, the introduction of user interfaces that increase usability might not provide the key to success. Nevertheless, while it is important to make the system easy to use, its usefulness is more critical and should not be ignored. A difficult interface could be tolerated by users to access very important features, however a program that does not perform a useful task can not be compensated by simple usage (Davis et al., 1989). Thus Davis et al. (1989) defines the perceived usefulness as follows:

> "Perceived usefulness (U) is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" (p. 986).

Users' perceived usefulness and the opinions of coaches and experts on the usefulness of the 3D Virtual Sports Platform were investigated within three main themes, that emerged as the perceived physical effects of the VSP, the perceived affective effects of the VSP, and the perceived effects of the VSP on productivity. Since this system was developed in order to provide the user constructive feedback on their exercise, and bring efficiency to learning the movements, its usefulness could be categorized as physical, affective and productivity effects. Participants cited effects on productivity (f=61) the most, followed by physical (f=54), and affective (f=32) effects.

Users' perception of the effects of VSP on productivity was mostly positive (f=37), and somewhat negative (f=12). Preservice coaches (f=6) and experts (f=6), similarly, stated their opinions on the positive effects on productivity. Feedback ensures motion accuracy is the most cited positive effect of VSP perceived by users (f=12) on their productivity, as well as two coaches and both of the experts. The VSP provided two types of feedback on the user's movements; highlighting the wrongly moved limbs and giving a success score on the motion accuracy. Users found the highlighting feedback useful in order to realize what they are doing wrong and correct it. Similarly, score feedback triggered some users want to achieve higher scores, thus do the motions better. In addition, the VSP was found superior to following an exercise program on TV, since users can not see themselves or their mistakes on TV. On the other hand (f=6) users perceived that the inconsistent feedback of the VSP affected the productivity negatively. For instance, even though they did not move incorrectly, the

VSP sometimes perceived it as a mistake. Nonetheless, sometimes even though they make the motion incorrectly, the VSP gave high scores, especially for the last movement of the exercise regimen, jumping jacks. They note that they got high scores even if they did not jump, and just lifted their arms up. This issue could be based on several reasons, such as Kinect's detection problem mentioned in the preceding title, or the difficulty level of exercise movement that was set while creating the exercise regimen. However, feedback feature would be considered to have positive effect on the usefulness of the VSP. Similarly, users found the VSP to be more systematic in comparison to doing exercise at home by themselves. Because the order and time limit of movements, made users more inclined to complete the routine, although when they were by themselves they would quit after getting tired, or getting distracted by others. Thus, systematically continuing the regimen without giving user the option to pause, would have a positive effect on usefulness, although in the preceding title it was considered a negative design issue. Therefore, there might be a counterintuitive effect of giving user more control; increasing ease of use, while decreasing usefulness.

Some of the other features of the VSP that effects the productivity are saves time compared to gym, and space and time independent usage. Therefore it is important for users to do their exercises whenever and wherever they like, which increases the efficiency. Similarly, other quotes focused on the VSP provides efficiency of time and money by monitoring the progress, improving time management skills, and being financially viable. In addition, feeling energized as a byproduct of physical exercise helped some users to be more productive in other areas of their lives as well. On the other hand, some of the users perceived as the VSP was not efficient because the exercise regimen is not effective, and they wasted time while sharing Kinect with other users. However, these effects are expected to disappear for a personal usage scenario, since their exercise regimen would be tailored to their needs, and they would use their own Kinect. Nevertheless, two users still thought that the VSP was not financially viable because they should buy the Kinect. Thus, cost of the system would be another feature that affects the perceived usefulness.

Users mostly cited positive physical effects (f=22) that they perceive using the VSP had on them, similarly opinions of coaches (f=6) and experts (f=6) on the physical effects of the VSP was mostly positive. Nonetheless, some of the users cited their perceived negative physical effects (f=9), while coaches and experts did not state any opinions on the negative physical effects of the VSP. Furthermore, some users perceived that the VSP did not have any physical effect (f=8), which is shared by three coaches as well.

It is generally hard to see any observable physical effects for the first few months of physical exercise, according to the experts. Especially by doing just warm up exercise as the ones on the VSP. Still, users perceived the VSP was useful to increase their flexibility, endurance, motion comfort, motion accuracy, activity and to reaching desired weight. Similarly, three coaches and both experts cited "Contributes to physical development". In comparison there was a few negative physical effects as: tiring, weight gain, and increased appetite. These are generally seen in the first few moths of starting doing sports according to E2.

> "[E2] When you start to do sports, the body reacts negatively. People walk away from the gyms for this reason. For example, while their fat should be reduced, contrarily it increases. There is an increase in liquid ratio and so on, weight gain is happening. People quit sports because they care about their physical appearance. But here they do it alone, so there will be no such concern for doing it."
> *"[E2] Zaten hani insan spor yapmaya başladığı zaman vücut olumsuz tepki veriyor. Spor salonlarından onun için insanlar uzaklaşıyor. Mesela yağlarında artış oluyor azalması gerekirken, iste sıvı oranında vesaire oluyor, kilo artışı oluyor. İnsanlar fiziksel görünümüne önem verdiği için sporu bırakıyorlar. ama burada kendi kendine yaptığı için öyle bir endişe de olmayacak."*

Moreover, some users perceived that the VSP was not useful to have any physical affect at all. This could be based on their personal background of doing sports, though they mentioned different exercise regimen might have an effect on them. Similarly, three coaches think that the current exercise regimen would not affect the physical attributes of the user, though if it changes it is possible. Therefore, the content in the system plays a role on the perceived usefulness as well.

Another effect of doing exercise is seen on the affective responses of people, which is generally positive for moderate level exercises (Reed, Berg, Latin, & La Voie, 1998). Physical activity research has generally been based on one or more socio-cognitive models (Ajzen, 1991; Bandura, 1986; Rogers, 1983). Increases in positive effect and tranquility related to exercise and reductions in feelings of exhaustion can help to effectively turn exercise desires into behavior (Kwan & Bryan, 2010). A study reported that, sedentary participants with more positive affective reactions to a medium-intensity exercise continue exercising for longer minutes, even after a year (Williams et al., 2008). Thus, in this research, users' perceptions of the effects of the VSP on their affective states are considered to be important for evaluating the usefulness. Users mostly cited positive affective effects (f=13) that they perceive using the VSP had on them, similarly opinions of experts (f=3) on the affective effects of the VSP was mostly positive. On the contrary, coaches' (f=6) opinions indicated that the VSP has mostly negative affective effects. Similarly some users (f=8) and one expert cited some negative affective effects of the VSP.

Positive affective effects were; feeling vigorous, socializing, entertaining, brought responsibility, gained the habit of doing sports, stress release, comfort of doing sports alone. Negative affective effects were boring, feeling compulsory, decreasing sociality, and frustrating.

Socializing was cited by users as an effect on the perceived usefulness of VSP, both as a negative and a positive theme. The implementation process and the design features probably triggered this theme. Users mentioned doing the workout in the lab environment was *socializing*, and then they cited that they could not have the same effect at home environment, while using the VSP alone. In fact, one of the users at home cited that the VSP is decreasing sociality, because she had to do it alone. In addition, some of the coaches mention that users will not gain anything socially, might become introverted, and lose motivation. This could also be related to the *subjective norm*, a construct of the Theory of Reasoned Action (Fishbein & Ajzen, 1975), however not included in the TAM (Davis et al., 1989). Subjective norm refers to "the person's perception that most people who are important to him think he should or

should not perform the behavior in question" (Fishbein & Ajzen 1975, p. 302). Since users mentioned that they would prefer using the VSP with a friend, this might arise from a need to fulfill their sense of approval for doing exercises. Indeed, some participants suggested adding a multiuser feature to enable two people use the VSP simultaneously. Moreover, some participants suggested adding a share feature that allows sending their performance scores and videos with their friends or coach. Thus, socializing features might affect the perceived usefulness. Apart from a design point, one of the coaches commented that after the exercises users might relax psychologically and have a confidence boost, which could increase their likelihood of attending social activities. Similarly, *boring* vs. *entertaining* themes are also related to the usage type; users in the lab environment found it entertaining, however users at home was bored.

Comfort of doing sports alone was perceived to be useful, which could be based on the space and time independent usage of the VSP, mentioned as a factor of ease of use. As opposed to doing sports at the gym, users at home using the VSP could move more freely, dressing as they liked. Besides, one of the experts points out that, people initially gain weight when they begin exercising which can cause them to feel self-conscious about their looks and stop going to the gym. However, he adds, since users can use the VSP at home environment they would not have such concerns. This indicates that the VSP has a comforting effect while doing sports alone.

Feeling compulsory was mentioned in two user focus groups by two users. Both of them stated that they did not find the VSP useful because they felt some obligation to do the exercises for the sake of the research, thus did not continue willingly, thus feeling compulsory was coded as negative affective effect. Voluntariness was found to have a moderating effect on social influence or subjective norm (Venkatesh et al., 2003). However in this study, participants were voluntarily involved in the research, and they knew that they could leave anytime they want. Thus, other factors such as the perceived ease of use could have lead them continue to participate.

5.3 The attitudes of participants towards using the VSP (Research Question 3)

Attitude toward using a technology is defined as an individual's overall affective reaction to using a system. Users' attitudes toward using the VSP were mostly positive ($f=16$), followed by negative attitude ($f=2$). Moreover some users ($f=4$) cited both positive and negative statements, which indicates an ambivalent attitude towards using. Both experts stated positive attitudes. Whereas coaches were spread as one positive, one negative and one ambivalent attitude.

Most of the participants cited positive attitude towards using the VSP. Users cited that the VSP is useful and beneficial for doing exercises, thus they stated their willingness to use it. In fact, the discussion from the second research question indicates that users mostly perceive the VSP to be useful, which is mediated into their positive attitudes. As the technology is considered to be more useful, the more positive the attitude and intention to use it develops (Davis et al. 1989; Taylor & Todd, 1995). Both of the experts showed positive attitude as well. However, only one of the eight coaches indicated positive attitude, PC3, who also stated various positive comments on the usefulness of the VSP. She mentioned that when she becomes a coach she could offer her clients to use the VSP at home, as a supplementary tool, and it would be useful for her to monitor their progress. While PC3 considered her clients, PC6 considered his own feelings towards using the VSP, stating that he would not use it, because he likes going to the gym more. Thus, their opinions on the usefulness of the VSP have an effect on their attitude. PC1 states that she would wonder and try the VSP, however this does not indicate she would use it, therefore she has ambivalent attitude. Other five coaches did not state their attitudes openly, which could be explained by the limited time they had for interaction with the VSP, during the demonstration.

Some participants stated both positive and negative statements, which indicate an ambivalent attitude towards using the VSP. For instance, S12 accepts that the VSP is useful and he would use it to warm up before playing football match, yet still he does not think the VSP is equivalent to doing sports. Similarly, S21 finds the VSP useful, nonetheless does not want to use it. Two users said that they do not want to use the VSP, indicating a negative attitude. S01 based her negative attitude to not finding the

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system useful. Similarly, S20 states that she does not perceive the VSP would increase her performance to do sports. Thus, the attitude toward using the VSP appears to be affected by perceived usefulness of the VSP.

5.4 The intentions of participants to use the VSP in the future (Research Question 4)

Participants' intentions to use the VSP were separated into three themes based on their responses as: would use if improved; would use in the future; would not use in the future. Participants mostly stated that they would use the VSP, if it was improved (f=10), though some would use it in the future (f=5) as it is. Three participants stated they would not use the VSP in the future for exercise.

The findings from the present study indicates that the users' positive or negative evaluations of using the VSP influence their intentions to use it. Users negative attitudes (f=2) appears to have an effect on their intentions not to use the VSP in the future (f=2). Usually, attitude towards a particular behavior plays an important role in determining the intention of a person to do it (Ajzen, 1991). Nonetheless, Davis (1989) states that:

> "If affect is not fully activated when deciding whether to use a particular system, one's attitude would not be expected to completely capture the impact of performance considerations on one's intention" (Davis et al., 1989, p. 986).

Considering this issue, the reason for the difference in the number of users stating that they would use the VSP in the future (f=3), and stating positive attitude (f=16), could be explained by affect was not involved in their intention to use it. It is possible that their intentions were mostly determined by their perceived usefulness of the VSP. Moreover, most of the users stated that they would use the VSP if it was improved (f=9), which indicates that, they accept the core features of the VSP to be useful. However, they require some improvements on the ease of use, and usefulness issues mentioned in the results. For instance, some of the improvements they require was updating the exercise program, and adjusting the length of the daily exercise duration, which are very easily updatable, since they are already integrated parts of the VSP.

5.5 The opinions of participants on the implications of using the VSP in educational settings (Research Question 5)

Although this research was not implemented in an educational setting, all of its parts are related to education, just as the aim of the VSP, which is to help users learn to exercise correctly. Users, coaches, and experts recognized this, and stated their opinions on the implications of using VSP in educational settings. Firstly, users think the platform is readily usable in Physical Education classes as a teaching material, and for warm up. E1 also agrees that it is usable in classroom settings, and he adds that it could be used to record the movements of professional players in different branches and let the students test their moves to match with professionals. However, some of the users think, classroom environment is very crowded for the usage of VSP or similar tools using Kinect, thus is could only be a material for gaining attention, or doing fun activities. Nonetheless, there are many examples from the literature that utilized Kinect based platforms in a classroom environment with fruitful results. For instance one study (Chang, Chien, Chiang, Lin, & Lai, 2013) modeled eight movements to reflect the taxonomy of Gardner's multiple intelligences theory metaphorically, and used it in a gesture-based multimedia presentation, in a classroom setting with sixteen college students. A systematic literature review conducted by Merino-Campos & Del Castillo Fernández (2016) concludes that "the controlled studies show that active video games increase motor, intellectual and physical capacities in relation with PA and education."

Some users mentioned that this kind of a system could be developed for teaching anatomy, such as organs and body parts. In fact, one study presents a "personalized AR magic mirror system" for anatomy education (Ma et al., 2016). The system Ma et al. (2016) introduced, is qualified accurate and useful enough for anatomy learning and the majority of medical students acknowledged the technology's learning potential.

Others thought that children in special education needs to use VSP, and they would benefit from it. In fact, similar tools using Kinect motion capture technology were utilized to teach social skills, to develop fine and coarse motor skills, to gain self-expression skills, and to teach music and artistic activities in the education and rehabilitation process of individuals with special needs (Öğülmüş & Melekoğlu,

2015). According to Öğülmüş & Melekoğlu (2015) it is seen that the studies on this subject are limited and evidence-based scientific studies are needed.

Experts were more inclined to picture VSP as a tool for professional training of athletes and sports players. They think that the system is robust enough to be improved in order to include some highly precise technical figures that could be used in the training of professional players. A thesis dissertation (Hanson, 2016) examined how the use of Kinect camera improve the ability of practitioners to design and track wellness programs. Hanson (2016) found that the device was best suited for identifying finer details and non-intuitive variables such as precise joint angle imbalances, and synchrony that the exercise practitioner is unable to detect quickly. However, in sensing non-joint-related gestures such as muscle recruitment, performer fatigue, gaze and overall performer comfort the exercise practitioner outperformed the Kinect camera (Hanson, 2016). Such results show the potential of technologies such as the Kinect camera to improve health and wellness professionals' services.

5.6 The suggestions of participants for improvement of the VSP (Research Question 6)

Users, coaches, and experts shared their suggestions for improvement as presented in the results section. It is seen that most of the suggestions were about the *content* of the VSP, especially the Exercise Regimen. The general problem with the exercise regimen was about it being the same throughout the research. Users were not happy with doing the same motions for a month and a half, which is understandable. E1 also explains that the exercise program should gradually increase in duration and difficulty level, as the user gets used to the current program. Otherwise, it would be boring and unfruitful. Indeed the VSP allows the personalized use since a trainer could record any motion and create any program suitable for the user. However, for the sake of the research, this exercise program was recorded by a trainer at the beginning, and assigned to all users the same way. If every user would get their own personalized exercise program, that would be a factor that interferes with the general usability and usefulness of the platform. That is the reason that participant selection process was done according to the processes mentioned in the method chapter, and spesifically selected from

sedentary people. All participants were similar in terms of age and physical activity levels thus having similar needs for exercise regimen, which is determined by a professional coach.

Design suggestions were the second most mentioned type of suggestion by users, however the most by total participants. Most of these suggestions came from the users (f=31) based on their perceived usefulness and ease of use of the VSP. Therefore, these suggestions refer to users' difficulties with using the VSP, and its efficiency for exercising, which provides crucial information to improve the system for increasing its acceptance. For example, adding auditory instructions and auditory feedback besides the current text and visual ones. Because some of the motions were not clear for users in the beginning, and even after a while using the platform. Thus, the motions should be explained with audio while they are presented; and after user performed the motion, feedback on their performance should be provided with audio as well. On the same topic, users and coaches stated that video instructions that shows the human trainer would be preferable in some situations, rather than seeing the instructions through the instructor avatar. One step further, a coach and an expert suggested getting rid of the avatars of both user and instructor all together, and showing the real video image of them on the screen. Nonetheless, the current position of the instructor on the screen should be changed to a closer position, perhaps next to the user's avatar, rather than its behind, to improve the visibility. Moreover, participants require more user control, and personalization to change the background of the virtual environment, to change the music, to have more options of avatars rather than just male and female, and to change the settings of the exercise regimen as in difficulty, duration, target region, and preferred exercises. Most of these suggestions are reasonable and supposedly increase the perceived ease of use of the VSP.

Furthermore there were more structural design suggestions such as Allow seeing the scores of others, Allow simultaneous multiuser, Allow seeing my video online, Allow sharing, Gamification and Levels. These suggestions for the VSP, indeed, propose a gamified educational system similar to the exergames or active video games. While most of the educational research that used gamification show promising results, more

empirical research is needed to establish how gamification can affect both extrinsic and intrinsic motivation for learners (Cayton-hodges et al., 2018). Nevertheless Sherry (2004) states that:

> "Ultimately, understanding of the mechanisms underlying media enjoyment and preference will facilitate better design of educational and prosocial media. The engagement associated with the flow state facilitates greater engagement with, and longer use of, the material."
> (p. 345)

Therefore, if these suggestions would be considered for the improvement, the user would be always playing on the very edge of their skill level, getting real time feedback to their responses, which advocate a state of "flow" (Csikszentmihalyi, 1990), where the user is completely absorbed in the system. When engagement and motivation of the users increase, their attitudes and intentions to use the system might be positively affected as well.

Technical suggestions were emerged as: Improve Kinect's motion detection capacity; Implement usage of equipment; Integrate smart watches or smartphones; and Artificial intelligence. In fact, "motion detection problems" was one of the most cited issues that negatively affect the perceived ease of use. However, the capabilities of Kinect is an engineering issue which is beyond designers' influence. Although Kinect version one which was sold with Xbox 360 was used for this study, the second version of Kinect for Xbox One is sold by Microsoft as well. Kinect 2.0 has been tested for performance analysis in a study (Napoli, Glass, Ward, Tucker, & Obeid, 2017) and found to be valuable device in areas such as medicine, sports, rehabilitation and fitness, providing a viable alternative to professional 3D capture systems for certain applications. On the other hand, a comparison between two versions reveals that:

> "Interestingly, the Kinect V2 did not always outperform the Kinect V1 in terms of depth map accuracy despite its more recent release, higher resolution and time of flight technique. … There is no strong evidence that the Kinect V2 outperformed the Kinect V1 with respect to accuracy of the skeleton tracking, however it is feasible that the more consistent sampling rate and accuracy of the depth camera of the V2, and alterations over time to the SDK, may have improved performance" (Clark, Mentiplay, Hough, & Pua, 2019, p. 195).

Therefore, the VSP could be upgraded to integrate Kinect V2 based on the possible improvements to be seen on the performance of the system in terms of motion detection capabilities.

Another technical suggestion "integrate smart watches or smartphones" came from an expert, indicating that keeping track of users' steps, hearth beat, weight and similar physical activity levels would increase the acceptance of the VSP. In fact, the expert also suggested that these values could also be tracked by user input, rather than devices. However a study found that, user input does not reflect the reality:

> "Physical activity level in office workers assessed by a subjective measure was greatly different from assessed by an objective tool. Consequently, research on physical activity level, especially in those with sedentary lifestyle, should consider using an objective measure to ensure that it closely reflects a person's physical activity level" (Sitthipornvorakul, Janwantanakul, & Van Der Beek, 2014)

Hence, an improvement of integrating smartphones or smartwatches could help the users and their coaches track their physical activity levels through the VSP and increase the effectiveness of the exercise by providing more suitable exercise regimens and feedback.

5.7   Implications for Practice

With the use of the Kinect based 3D Virtual Sports Platform, people are expected to have increased interest and participation levels of physical exercise. In accordance with TAM (Davis et al., 1989), users' intentions to use the VSP were explained by the factors perceived usefulness, perceived ease of use, and attitude toward using the VSP. Which means that, designers should be aware of the factors that affect the ease of use of the VSP, and practitioners must take into account the factors that are derived from the implementation process which affect the perceived usefulness of the VSP.

Users of the VSP are expected to be able to follow exercise programs under instructor control with minimal effort. In addition, all movements performed by the users of this system during physical activities are available to them online. In this way, users' personal or group performances of physical activities can be examined by their

instructor. Instructors are capable to add new motions and create specific exercise regimens for their trainees. Since the platform is online, feedback could be provided to the users immediately and can be reported to their coach at the end of the performance. Considering these specifications of the VSP, it can be used in academic settings in the field of sports sciences.

In order to influence the intention positively, users should be introduced to the VSP with an orientation session, and helped during the set up and installation of the VSP if needed or provided with a manual. Also users should be provided help if they are unable to connect to internet or database throughout their usage, which is also suggested by the UTAUT model as Facilitating Conditions (Venkatesh, Thong, & Xu, 2012).

5.8 Suggestions for Future Studies

The study focused exclusively on the initial user decision to use the VSP. It was meant to explain and understand the TAM based acceptance of the VSP. While the results may provide insight into the VSP's positive adoption, they may have minimal significance for understanding aspects about the VSP's actual use in realistic settings. In other words, users' acceptance of the VSP may not ensure that the VSP will be used effectively in the users' personal lives. A future study may therefore help to explain and clarify the continued use of VSP based on TAM. It is of great importance to provide alternative methods to increase the opportunities for people to do sports and to help them gain the habit of doing exercise. The advantages of current and advanced technologies provide new chances to overcome the shortcomings and produce new methods. Providing opportunities, for those who cannot find, to do sports by the current and advanced technologies such as the Internet, PC and Kinect needs to be investigated further. As in this study, Kinect could help users to do exercises correctly, under the control of the instructor without being physically in the same place. Following studies, could examine the effect of the sports activities to be performed on the system with different demographic groups or in other settings, using other methods such as experimental research.

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APPENDICES

A. INTERVIEW QUESTIONS FOR USERS

Original Turkish version of the interview questions for users

Kullanıcılar için görüşme sorularının orijinal Türkçe versiyonu

SSP=Sanal Spor Platformu

1. Algılanan Kullanım Kolaylığı *(Perceived ease of use)*
   1.1. SSP kullanmayı öğrenme süreci sizin için nasıldı?
       1.1.1. Kolay bulduğunuz yanları nelerdi?
       1.1.2. Zor bulduğunuz yanları nelerdi?
   1.2. SSP'yi kullanırken bir problemle karşılaştınız mı?
       1.2.1. Sistemle etkileşim, açık ve anlaşılır mıydı?
       1.2.2. Sistemi geliştirmek isteseydiniz neyi farklı yapardınız?
2. Algılanan Fayda (Perceived usefulness)
   2.1. SSP'yi egzersiz için kullanmanızın, fiziksel ve psikolojik gelişiminize etkileri nelerdir?
       2.1.1. Esneklik, güç, dayanıklılık gibi özelliklerinize etkisi oldu mu?
       2.1.2. SSP ile egzersiz yapmanın, motor becerinizi ne yönlerden etkilediğini düşünüyorsunuz?
       2.1.3. Dinç, enerjik hissetmenize etkisi oldu mu?
   2.2. SSP'yi egzersiz için kullanmanızın verimlilik yönünden etkileri nelerdir?
       2.2.1. Spor salonuna gitmeden, istediğiniz zaman evde spor yapabilmek size neler kazandırdı?
       2.2.2. Programın yanlış hareketlerinize geri bildirim verme özelliği egzersiz yapmanıza nasıl etki etti?
       2.2.3. Düzenli spor yapmanızın, hayatınızın diğer alanlarına ne gibi etkileri oldu?
   2.3. SSP'yi egzersiz için kullanmak beklentilerinizi karşılar mı?
       2.3.1. Sistemdeki egzersiz hareketleri sizin için yeterli miydi? >Neden?
       2.3.2. Uyguladığınız spor programının süresi ve çeşitliliği sizin için yeterli miydi? >Neden?
3. Kullanmaya Yönelik Tutum *(Attitude towards using)*

3.1. SPP'yi egzersiz için kullanmaya yönelik tutumunuz ne yöndedir?

3.2. SSP'yi egzersiz için kullanmanın size uygunluğu hakkında tutumunuz ne yöndedir?

3.3. SSP'yi egzersiz için kullanmanın size yararları hakkında tutumunuz ne yöndedir?

4. Kullanmaya Yönelik Davranışsal Niyet *(Behavioural intention to use)*

   4.1. Gelecekte SSP'yi kullanmak hakkında niyetiniz nedir?

      4.1.1. Gerekli donanımlara sahip olduğunuzu düşünürseniz (Bilgisayar, Kinect), SSP yi spor yapmak için kullanmaya devam eder miydiniz? >Neden?

   4.2. SSP'yi düzenli olarak egzersiz yapmak için kullanmak hakkında niyetiniz nedir?

      4.2.1.

5. Eğitimde Kinect ile SSP kullanımı hakkında ne düşünüyorsunuz?

English translation of the interview questions for users

VSP = Virtual Sports Platform

1. Perceived ease of use

   1.1. How was the process of learning to use VSP for you?

      1.1.1. What were the easy aspects?

      1.1.2. What did you find difficult?

   1.2. Did you encounter a problem while using the VSP?

      1.2.1. Was the interaction with the system clear and understandable?

      1.2.2. What would you do differently if you wanted to improve the system?

2. Perceived usefulness

   2.1. What are the effects of using VSP for exercise on your physical and psychological development?

      2.1.1. Has it affected your features such as flexibility, strength, durability?

      2.1.2. In what ways do you think exercising with VSP affects your motor skills?

      2.1.3. Has it any effect on you feeling vigorous or energetic?

   2.2. What are the implications of using VSP for exercise on productivity?

      2.2.1. What did you gain from doing sports at home at any time without going to the gym?

      2.2.2. How did the program's ability to provide feedback on your wrong movements affect your exercise?

      2.2.3. What impact did regular exercise have on other areas of your life?

   2.3. Does using VSP for exercise meet your expectations?

2.3.1. Were the exercise movements in the system sufficient for you? > Why?

2.3.2. Were the duration and diversity of the sport program you performed sufficient for you? > Why?

3. Attitude towards using

    3.1. What is your attitude towards using VSP for exercise?

    3.2. What is your attitude towards the suitability of using SSP for exercise?

    3.3. What is your attitude towards the benefits of using SSP for exercise?

4. Behavioral intention to use

    4.1. What is your intention to use SSP in the future?

        4.1.1. If you think you have the necessary equipment (Computer, Kinect), would you continue to use SSP for exercising? > Why?

    4.2. What is your intention to use the SSP for regular exercise?

5. What do you think about using Kinect and SSP in education?

B. INTERVIEW QUESTIONS FOR PRESERVICE COACHES AND SPORTS SCIENCES EXPERTS

Turkish version of the interview questions for coaches and sports sciences experts

Antrenör ve spor bilimleri uzmanları için görüşme sorularının Türkçe versiyonu

1. ALGILANAN KULLANIM KOLAYLIĞI
    1.1. SSP kullanmayı öğrenme süreci sizin için nasıldı?
        1.1.1. Sisteme hareket kaydetme süreci hakkında ne düşünüyorsunuz?
        1.1.2. Program oluşturma süreci hakkında ne düşünüyorsunuz?
        1.1.3. Programı test etme süreci hakkında ne düşünüyorsunuz?
    1.2. SSP yi kullanırken bir problemle karşılaştınız mı?
        1.2.1. Sistemle etkileşim, açık ve anlaşılır mıydı?
        1.2.2. Sistemi geliştirmek isteseydiniz neyi farklı yapardınız?
2. ALGILANAN FAYDA
    2.1. SSP yi egzersiz için kullanan birinin fiziksel ve psikolojik gelişimine ne gibi etkileri olabilir?
        2.1.1. Esneklik, güç, dayanıklılık gibi özelliklerine etkisi olur mu? Nasıl?
        2.1.2. Motor becerilerine ne yönlerden etkileri olabilir?
        2.1.3. Dinç, enerjik hissetmelerine nasıl etki edebilir?
    2.2. SSP yi egzersiz için kullanan birine verimlilik yönünden etkileri nelerdir?
        2.2.1. Spor salonuna gitmeden, ya da dışarı çıkmadan, istediği zaman evde egzersiz yapabilmek verimlilik yönünden etkili midir? Neler kazandırır?
        2.2.2. Programın yanlış yapılan hareketlerde geri bildirim verme özelliği; egzersiz yapmasına nasıl etki edebilir?
            2.2.2.1. Hatalarını düzelterek hareketleri doğru yapabilmesine imkan verir mi?
            2.2.2.2. Hareketin doğruluk yüzdesini görmek nasıl etki edebilir?
            2.2.2.3. Kullanım süresince gelişimini çevrimiçi takip edebilmek nasıl etkiler?
        2.2.3. Bu programla düzenli spor yapan birinin hayatının diğer alanlarına ne gibi etkileri olabilir?
            2.2.3.1. Günlük işlerde daha dinamik ve hızlı olmaya katkı sağlayabilir mi?
            2.2.3.2. Kendine güven konusunda etkileri ne olabilir?
            2.2.3.3. Olaylara olumlu bakabilme becerisi kazanır mı?
            2.2.3.4. Sosyal etkinliklere katılımına etkisi olabilir mi? Nasıl?
    2.3. SSP yi egzersiz için kullanmak beklentilerinizi karşılar mı?

  2.3.1. Sistemdeki egzersiz hareketleri size göre yeterli mi?

  2.3.2. Hareketlerin ve Programların çeşitliliği size göre yeterli mi?

   2.3.2.1. Kinect'in hareket algılama limitleri düşünüldüğünde, sisteme eklenebilecek hareketler ile etkili programlar oluşturulabilir mi? Nasıl?

  2.3.3. Uygulanan spor programının süresi size göre yeterli mi?

3. KULLANMAYA YÖNELİK TUTUM

 3.1. SPP yi egzersiz için kullanmak ister misiniz?

  3.1.1. SPP yi egzersiz için kullanmasını kimlere önerebilirsiniz? (demografik özellikleri)

 3.2. SSP yi egzersiz için kullanmak sizin için uygun mu?

  3.2.1. SSP nasıl olsaydı sizin için uygun olurdu?

 3.3. SSP yi egzersiz için kullanmak sizin için yararlı olur muydu?

  3.3.1. SSP nasıl olsaydı sizin için yararlı olurdu?

4. KULLANMAYA YÖNELİK DAVRANIŞSAL NİYET

 4.1. Gelecekte SSP yi kullanmak hakkında niyetiniz nedir?

  4.1.1. Gerekli donanımlara sahip olduğunuzu düşünürseniz (Bilgisayar, Kinect), SSP yi spor yapmak için kullanmaya devam eder miydiniz?

 4.2. SSP yi düzenli olarak egzersiz yapmak için kullanmak hakkında niyetiniz nedir?

5. EĞİTİMDE SSP KULLANIMI

 5.1. Beden Eğitimi derslerinde SSP nasıl kullanılabilir?

 5.2. SSP'yi Beden eğitiminde kullanmanın avantajları neler olabilir?

 5.3. SSP'yi Beden eğitiminde kullanmanın dezavantajları neler olabilir?

 5.4. SSP'yi Beden eğitiminde kullanmanın sınırlılıkları neler olabilir?

 5.5. SSP beden eğitimi derslerinde kullanılmak üzere nasıl geliştirilebilir?

English translation of the interview questions for coaches and sports sciences experts

VSP = Virtual Sports Platform

1. Perceived ease of use

 1.1. How was the process of learning to use VSP for you?

  1.1.1. What do you think about the process of recording motion into the system?

  1.1.2. What do you think about the program creation process?

  1.1.3. What do you think about the process of testing the program?

 1.2. Did you encounter a problem while using VSP?

 1.2.1. Was the interaction with the system clear and understandable?

1.2.2. What would you do differently if you wanted to improve the system?
2. Perceived usefulness
   2.1. What can be the physical and psychologic development of someone who uses VSP for exercise?
      2.1.1. Does it affect its properties such as flexibility, strength, durability? How?
      2.1.2. How can it affect motor skills?
      2.1.3. How can it affect their vigorous, energetic feeling?
   2.2. What are the implications of someone using VSP for exercise on productivity?
      2.2.1. Is it effective, in terms of efficiency, to exercise at home at any time without going to the gym or going out? What does it help gain?
      2.2.2. How can the ability of the program, to provide feedback on wrong movements, affect exercise?
         2.2.2.1. Does it allow users to make the movements properly by correcting their mistakes?
         2.2.2.2. What are the effects of seeing the accuracy percentage of the movement?
         2.2.2.3. What are the effects of being able to monitor their improvement online during their usage?
      2.2.3. What impact does doing regular exercise with this program may have on other areas of their life?
         2.2.3.1. Can it contribute to being more dynamic and faster in daily work?
         2.2.3.2. What could be the implications for self-confidence?
         2.2.3.3. Does it help gain the ability to look at the events positively?
         2.2.3.4. Can it affect the participation in social activities? How?
   2.3. Does using VSP for exercise meet your expectations?
      2.3.1. Are the exercises in the system sufficient for you?
      2.3.2. Is the diversity of movements and programs sufficient for you?
         2.3.2.1. Given the Kinect's motion detection limits, can effective programs be created with the movements that can be added to the system? How?
      2.3.3. Is the duration of the sport program sufficient for you?
3. Attitude Towards Use
   3.1. Would you like to use VSP for exercise?
      3.1.1. To whom can you recommend using VSP for exercise? (demographic characteristics)
   3.2. Is it appropriate for you to use VSP for exercise?
      3.2.1. How would VSP be appropriate to you?
   3.3. Would it be beneficial for you to use SSP for exercise?
      3.3.1. How would VSP be useful to you?

4. Behavioral Intention To Use
    4.1. What is your intention to use SSP in the future?
        4.1.1. If you think you have the necessary equipment (Computer, Kinect), would you continue to use VSP for sports?
    4.2. What is your intention to use VSP for regular exercise?
5. VSP in Education
    5.1. How can VSP be used in Physical Education classes?
    5.2. What are the advantages of using VSP in physical education?
    5.3. What are the disadvantages of using the VSP in physical education?
    5.4. What are the limitations of using VSP in physical education?
    5.5. How can VSP be developed for use in physical education classes?

C. EXERCISE REGIMEN

Exercise Regimen used in this study is presented below, accompanied with some illustrations of the exercises.

1. Stretching the neck to the left and right
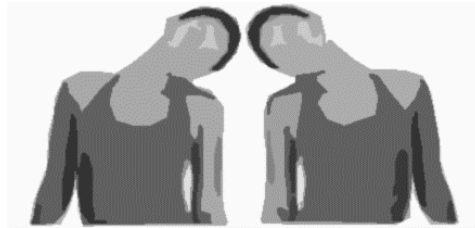
2. Stretching the neck forward and backward
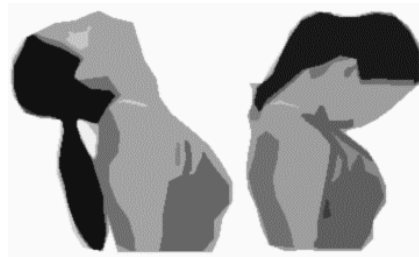
3. Open the arms from the sides and reach up
4. Swinging the arms forward
5. Swinging the arms backwards
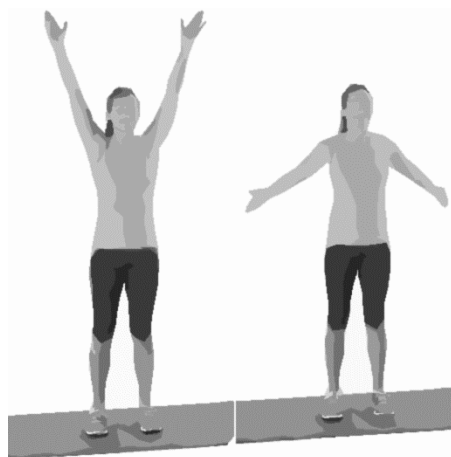
6. Stretching the back to the right
7. Stretching the back to the left
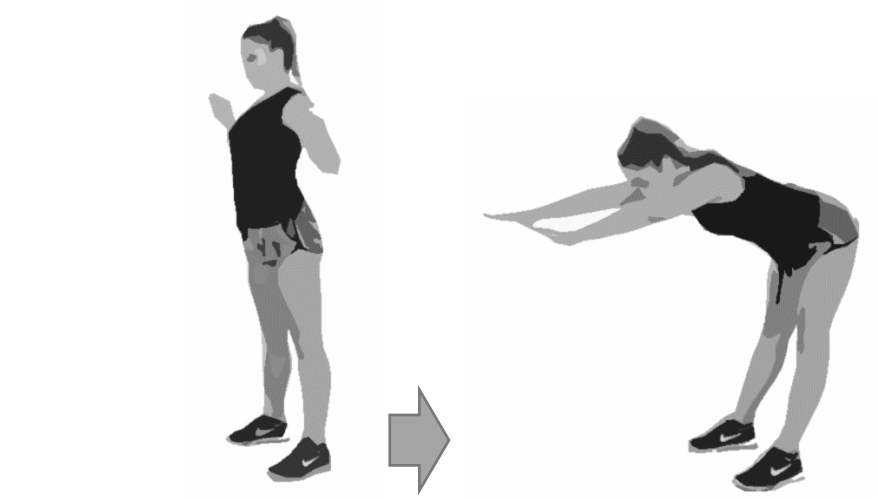
8. Stretching the waist to the right side (side stretch)
9. Stretching the waist to the left side (side stretch)

10. Touch to the left toes with the right hand
11. Touch to the right toes with the left hand
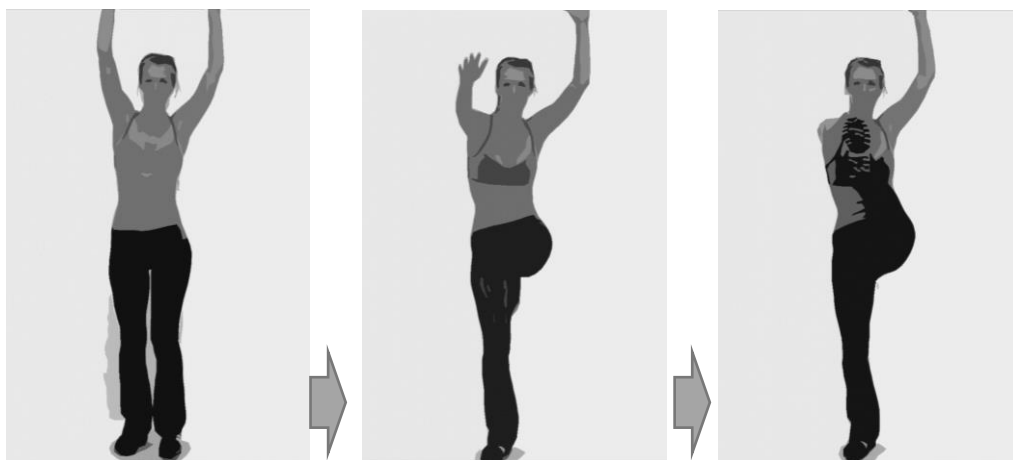
12. Rotate the torso to right and left (torso rotations)
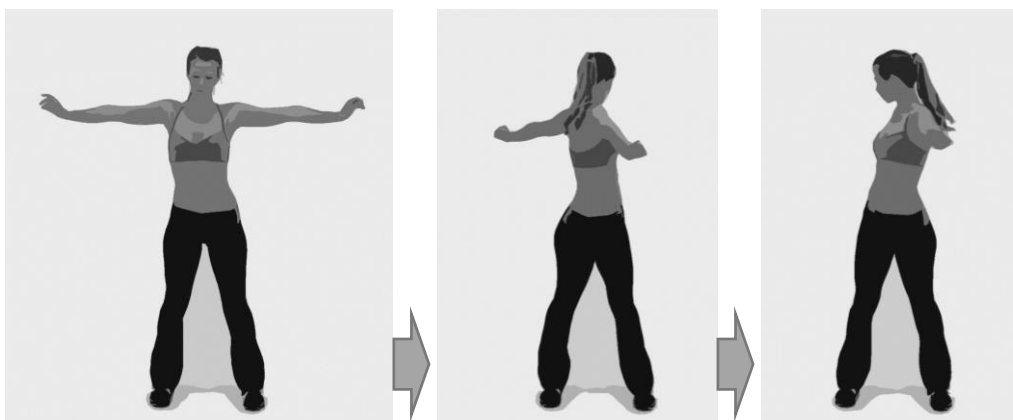
13. Reaching up while stepping to the right
14. Reaching up while stepping to the left
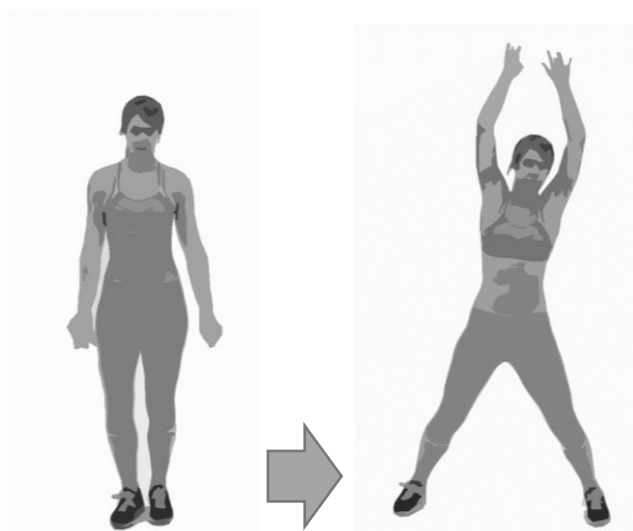
15. Standing parallel to the ground on the right leg
16. Standing parallel to the ground on the left leg

17. Right leg stretching (adductor strecth)
18. Left leg stretching (adductor strecth)
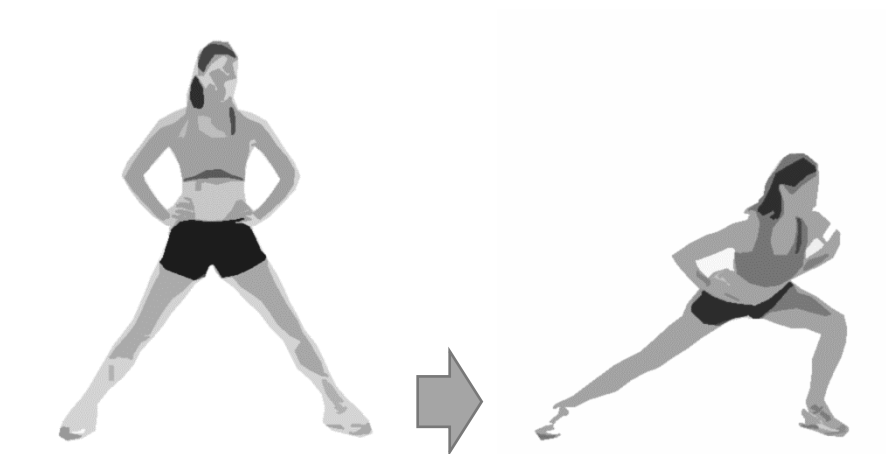
19. Jumping Jacks
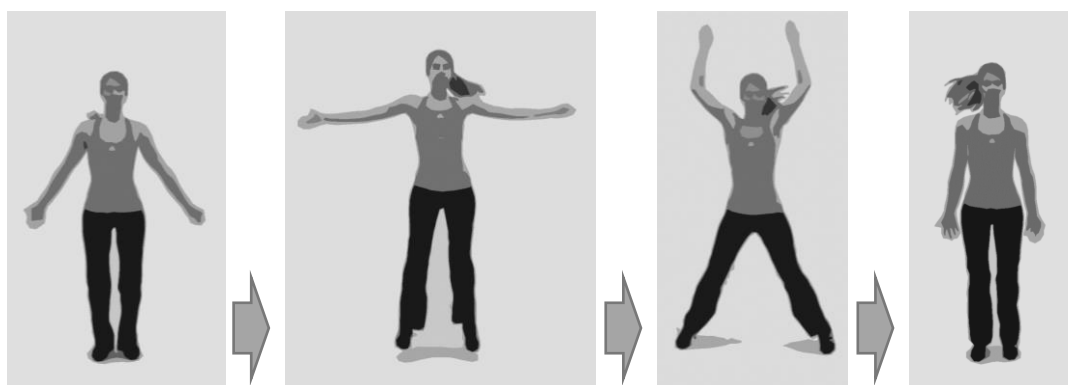
D. QUOTATIONS OF PARTICIPANTS

In this appendix, the entire quotations of the users, coaches and experts that are coded under the themes are provided whether mentioned in the original text or not, in the order of the themes presented in the Results Chapter.

1. The perceptions of users, and opinions of coaches and experts on the ease of use of the VSP

1.1. Features that positively affect the perceived ease of use

Interaction is clear and understandable

"[S04] Yes it was easy after getting used to … it was clear."

"[S04] Evet alıştıktan sonra kolaydı… Açıktı."

"[S09] Yes, there was no problem."

"[S09] Aynen hocam bir sorun yoktu."

"[S08] It was clear."

"[S08] Netti."

"[S22] It was easy."

"[S22] Kolaydı."

"[S19] Yes"

"[S19] Evet"

"[S18] I think it was easy. It was quite clear"

"[S18] Kolaydı bence. Gayet açıktı"

"[PC5] I liked the Program, interface and such are quite simple, useful. I do not think some users would have a hard time."

"[PC5] Programı ben beğendim ara yüzü falan bayağı sade kullanışlı. Zorlanacağını hiç düşünmüyorum bazı kullanıcıların."

"[E1] Surely it can be improved, but as far as I can see, there doesn't seem to be any shortage. So it seems simple for the user to record it, test it, and show it online."

"[E1] Muhakkak daha geliştirilebilir, ama şu anki gördüğüm kadarıyla herhangi bir sıkıntısı yok gibi. Yani bunu kaydetmesi test etmesi online göstermesi kullanıcı açısından basit gibi duruyor."

"[E2] Of course, that is something that almost every person can understand with today's technology."

"[E2] Tabii ki yani bugünkü teknoloji ile hemen hemen her insanın anlayabileceği bir şey."

Space and time independent usage

"[S18] It can be used indoors seasonally. We can do anything in summer but in winter we are indoors."

"[S18] Kapalı ortamda mevsimsel olarak kullanılabilir. Yazın her şeyi yapabiliyoruz ama kışın kapalı ortamdayız yani."

"[S12] … For example , the program can be developed for women after birth. For example, if there is a baby at home, can't get out, but also sagging is happening after birth. They need to lose weight, and get firmer. Sure it is enough for that."

"[S12] … Mesela doğum sonrası bayanlar için geliştirilebilir program. Mesela evde bebek var çıkamıyorsa ama aynı zamanda sarkmalar oluyor tabi doğum sonrasında. Kilo vermek oluyor. Sıkılaşmak da oluyor tabi. Onun için yeterli bence."

"[S14] At least, there are people who don't have time and means to go (to the gym), it might be advantageous for them. They want to go to the gym but doesn't have time or, if woman's husband may not allow. It could be an alternative for them."

"[S14] En azından gitmeye vakti ve imkanı olmayan insanlar oluyor, onlar için avantajlı olabilir. spor salonuna gitmek istiyor ama zamanı olmuyor ya da hanımlara eşleri izin vermiyor. Onlar için bir alternatif olabilir."

"[S14] I think this program generally addresses women more. Men are already out of the house. But if we think for women, we will get married, we will be involved in offspring, so sometimes our husband may not allow, we will be busy because of work, cleaning the house or something…"

"[S15] For example, we will cook…"

"[S14] I can't feel comfortable at the gym personally, but do as you like at home."

"[S14] Ya bence bu program genellikle bayanlara daha çok hitap ediyor. Erkekler zaten hani evden dışarda oluyorlar. Ama bayanlar için düşünürsek evleneceğiz, çoluk çocuğa karışacağız yani eşimiz bazen izin vermiyor olabilir, işten dolayı yoğun olacağız, ev temizliği yapacağız falan…"

"[S15] Mesela yemek yapacağız…"

"[S14] Ben şahsen spor salonunda rahat edemiyorum, ama evde istediğin gibi yap."

"[S15] Instead of going out, whether it is summer or winter, we can do sports at home."

"[S15] Evden dışarı çıkmaktansa yazı var kışı var çünkü evde de sporumuzu yapabiliriz."

"[E2] Will not go to a place, will not depend on a place, working time will not be dependent."

"[E2]Bir yere gitmeyecek bir yere bağımlı olmayacak çalışma saati bağımlı olmayacak."

"[E1] So, this program can have two things, such as housewives who can not leave the house, I mean you can not constantly think about or around the metropolitan areas, so there are towns, villages, with no access to the gym. Or think of a physical education teacher, works in the village where the facilities are narrow, that is, can be used in such places."

"[E1]Yani bu programın iki şeyi olabilir, evden çıkamayan ev hanımları gibi, yani sürekli çıkamayanlar ya da işte etrafında yani büyükşehirleri düşünmeyelim sonuçta kasabalar var, köyler var, spor salonu ulaşımı yok. Ya da işte bir beden eğitimi öğretmenini düşünün köyde imkanların dar olduğu yerlerde, yani o tip yerlerde kullanılabilir."

Variety of motions is sufficient

"[S06] I think it was comfortable because we did it on certain days. We didn't do it every day."

"[S06] Belirli günlerde yapmış olduğumuz için rahattı bence. Her gün yapmadık, iki günde bir yaptığımız için sorun yoktu."

"[S04] It does not work just on one region, for example, It works on our arms, legs and everywhere, we are not aware, perhaps, but."

"[S04] sadece mesela bir yerimize çalışmıyor, kolumuza bacağımıza falan her yerimize çalışıyor, farkında değiliz belki ama."

"[S05] The variety of movement was so great that I was never bored."

"[S05] Hareket çeşitliliği çok fazlaydı ben hiç sıkılmıyordum yani."

"[S03] I think it's sufficient."

"[S03] Bence yeterli."

Easy to use

"[S04] It was easy to use in my opinion."

"[S04] Bence kullanımı kolaydı."

"[S04] It was easy. It was good. Accompanied by you. You were showing us. I'd say we got used to it easily."

"[S04] Kolaydı. İyiydi hocam. Sizin eşliğinizde. Siz gösteriyordunuz zaten bize. Gayet rahat alıştık diyebilirim."

"[S18] At first we had difficulty in making it detect motions. Our percentages were low. But later we got a bit used to it, so it got better."

"[S18] İlk zamanlar hareketleri algılatmakta zorluk çekiyorduk. Yüzdelerimiz düşük düşük geliyordu. Ama sonradan birazcık daha biz de alıştık, yani daha iyi oldu."

"[S16] After all, we study computer. We didn't have any trouble setting it up. It's very easy to set up. We didn't have a problem with the internet either."

"[S16] Sonuçta bilgisayar okuyoruz. Kurmada falan bir sıkıntı yaşamadık. Kurulumu çok kolay. İnternette de bir sorun yaşamadık."

"[PC5] I think it's very nice, I mean you choose the program and such, I mean you can do everything in a very simple way. You can introduce a new program, add new motions. Pretty easy and good in my opinion. I find it successful."

"[PC5] Bence gayet güzel yani orada programı falan seçiyorsun, yani çok basit bir şekilde her şeyi yapabiliyorsun. Yeni program tanıtabiliyorsun. Yeni hareket ekleyebiliyorsun… Oldukça kolay ve güzel bence. Başarılı buluyorum."

"[PC6] It is not a difficult program for the younger segment but it is difficult for advancing age groups."

"[PC6] Zor bir program değil genç kesim için ama ilerleyen yaş grupları için zor."

"[PC3] There is no problem in the program to record the movement of the application or something nice."

"[PC3] Programın hareket kaydetmesinde sıkıntı yok hani uygulaması falan güzel."

"[E1] No, I don't have a difficulty. I can do it very easily."

"[E1] Yok zorlanmam. Çok kolay bir şekilde yaparım."

"[E1] Learning… there is no difficulty, on the upshot. I mean, it's easy to learn. I don't have any problems in my mind. As long as it is done according to the level of the other party (user) and the instructor in the back expresses it nicely, I think it can be learned easily."

"[E1] Öğrenmek… zorluğu yok sonuçta. Yani öğrenmek kolay. Herhangi bir sorun yok aklımda. Yeter ki karşı tarafın seviyesine göre yapıldığı müddetçe ve arkadaki eğitmen de güzel bir şekilde ifade ettiği şekilde bu kolayca öğrenilir diye düşünüyorum."

"[E2] It was easy to use both for people who have done sports in their past life and for the first time using that program."

"[E2] Hem geçmiş yaşantısında spor yapmış insanlar hem de o programı ilk kez kullanan insanlar için de kullanımı kolaydı."

Presentation of the motions is sufficient

"[S08] Presentation of the motions was nice."

"[S08] Hareketlerin gösterilmesi güzeldi."

"[S06] Exactly."

"[S06] Aynen."

"[S01] I mean, it was enough for me, because you were with us, showing us."

"[S01] Yani benim için yeterliydi ama yanımızda siz olduğunuz için gösterdiğiniz için."

"[E1] Learning… there is no difficulty, on the upshot. I mean, it's easy to learn. I don't have any problems in my mind. As long as it is done according to the level of

the other party (user) and the instructor in the back expresses it nicely, I think it can be learned easily."

"[E1] Öğrenmek… zorluğu yok sonuçta. Yani öğrenmek kolay. Herhangi bir sorun yok aklımda. Yeter ki karşı tarafın seviyesine göre yapıldığı müddetçe ve arkadaki eğitmen de güzel bir şekilde ifade ettiği şekilde bu kolayca öğrenilir diye düşünüyorum."

Learning the motions is easy

"[S11] After the first set was finished, we made it very comfortably in the second set."

"[Res] Did you learn the motions immediately?"

"[S11] Yes, we did."

"[S11] İlk set bittikten sonra ikinci sette çok rahat bir şekilde yaptık."

"[Res] Hareketleri hemen öğrendiniz mi?"

"[S11] Evet öğrendik."

"[S15] It was easy since it required repetition."

"[S15] Tekrarlama vadettiği için de kolaylık oldu."

Motion detection of the Kinect is sufficient

"[S20] When I saw S22, he was in a sports outfit, it was fine."

"[S20] Ben S22 gördüğümde spor kıyafeti vardı, gayet te iyiydi."

"[S22] It was good because I was an athlete, there was no problem. I never had any trouble."

"[S22] Ben sporcu olduğum için iyiydi, sıkıntı yoktu. Bende hiç sıkıntı olmadı."

"[S05] (If the program freezes) When I stood at a T-shape, it detected me back."

"[S05] T şeklinde durunca geri algılıyordu."

"[E2] We can. In other words, almost all sports and almost everything done before and after, we are already standing. We are on the ground just while we are resting. Maybe, you know, a few things like artistic gymnastics, such as floor mats can be difficult, but ... In other sports, during warmup session, competition session, I think this level of detection can be sufficient for all of that."

"[E2] Yapabiliriz. Yani hemen hemen zaten birçok sporun ve öncesi esnası ve sonrasında yapılan hemen hemen her şey zaten ayakta sadece biz dinlenirken yerde oluruz yani yerde yapılan spor sayısı çok az. Belki hani artistik jimnastik gibi birkaç işte yer minderi gibi şartlarda zor olabilir ama... Diğerlerinin işte ısınma aşaması müsabaka aşaması, hepsini görebileceğini düşünüyorum bu algılama boyutunun."

Orientation

"[S04] In understanding movements. Because it was not very understandable in the beginning, for example, we were doing other movements. Then you corrected them."

"[S04] Hareketleri çözmede hocam. Çünkü çok anlaşılır değildi başta mesela başka hareketler yapıyorduk. Sonra siz onları düzelttiniz."

"[S01] I mean, it was enough for me, but because you were with us, showing it. But it may not be enough for someone who does it for the first time at home."

"[S01] Yani benim için yeterliydi ama yanımızda siz olduğunuz için gösterdiğiniz için. Ama evde ilk kez yapan biri için yeterli olmayabilir."

Exercise duration is sufficient

"[S12] I think it's boring because the movements are the same. 1 hour was fine. Let's do the first set as you said. But the other sets are definitely regional."

"[S12] Bence hareketler aynı olduğu için sıkıcı oluyor. 1 saat iyiydi. İlk seti sizin dediğiniz gibi yapalım. Ama diğer setler bölgesel kesinlikle."

"[E2] Now, the training is completely individual. So we test the person first and see what we are aiming at. You know, should they lose weight or gain weight? Do they have too much fat or too little? I mean what is our direction? But after adjusting all this and after considering their age, we just try to play for the duration. What is the duration… while the physical and physiological parameters of a person is good trying to maintain their condition, 4 days a week for 45 minutes is enough for them. If we try to burn fat maybe 6 days a week, morning and evening. Maybe 70 minutes, 80 minutes. At least we will have to find 100 minutes a day. So, these are personal. But 45 minutes may be enough for someone in a fit position."

"[E2] Şimdi antrenman tamamen bireyseldir. Yani kişiyi önce test ederiz onun üzerinde neyi amaçladığımız da bakarız. Hani kilo mu verdireceğiz kilo mu aldıracağız. Yağımı eksik yağımı fazla yani nereye gideceğiz. Ama bütün bunları ayarladıktan sonra ve işin içine yaş da girdikten sonra süresine oynamaya çalışırız sadece. Nedir işte süre… fiziksel ve fizyolojik parametreleri düzgün bir kişi formunu korumaya çalışıyorsa haftada 4 gün 45 dakika onun için yeterli iken, yağ yakmaya çalışırsak belki haftada 6 gün sabahlar akşamlı. Belki 70 dakika 80 dakika. En azından gün içinde 100 dakikayı bulmamız gerekecek. Yani bunlar bireysel. Ama Fit pozisyonda birisi için 45 dakika yeterli olabilir."

Keeps the user active

"[S05] It was beautiful. I mean, it keeps you active all the time."

"[S05] Güzeldi. Yani sürekli aktif tutuyor insanı."

"[PC3] But think of someone who works at a desk, for example, my father sits until the evening, his movements are limited, he says he's just sitting at the desk, I'm already twisted. If he comes home and learns a few things, it will have effect."

"[PC3] Ama masa başında çalışan birini düşün, mesela benim babam akşama kadar sürekli oturuyor, hareketleri kısıtlı, sadece oturduğunu söylüyor masa başında, zaten iki büklüm oluyor. Eve gelip bu hareketleri yapsa bir kaç bir şey öğrense (aktif olmaya) etkisi olur."

Exciting

"[S04] I was excited, actually, you know, what are we doing, we were trying to follow them, adjust the speed… you know, did I do it before or after… (instructor) was doing as an example first... I was curious at first, I was wondering. But later, there wasn't much…"

"[S04] Heyecanlıydı aslında, nasıl oluyor hani, ne yapıyoruz, onları falan takip etmeye çalışıyorduk hızını falan ayarlamaya… hani öncemi yaptım sonra mı yaptım… ilk önce örnek olarak yapıyordu ya... heyecan vericiydi ilk başta, merak ediyordum. Ama daha sonra çok şey olmadı…"

Gives error messages

"[Res] Was the system giving feedback when you received an error?"

"[S03] Yes."

"[Res] Hata aldığınızda sistem geri bildirim veriyor muydu?"

"[S03] Evet."

Number of exercise days is sufficient

"[S06] I think it was comfortable because we did it on certain days. We didn't do it every day, it didn't matter because we did it every other day."

"[S06] Belirli günlerde yapmış olduğumuz için rahattı bence. Her gün yapmadık, iki günde bir yaptığımız için sorun yoktu."

Rest break in the program is sufficient

"[S05] I remember being rested in front of him. There was no problem."

"[S05] Ben karşısında dinlendiğimi hatırlıyorum. Sorun olmuyordu."

Performing the motions is easy

"[PC7] Simple motions, not difficult."

"[PC7] Basit hareketler, zor değil"

"[PC7] These movements are not very advantageous for a working person, a person already working makes these movements very comfortably."

"[PC7] Çalışan birisi için bu hareketler çok avantajlı değil, zaten çalışan bir insan bu hareketleri çok rahat yapar..."

"[PC7] There's nothing much to do, he'll just raise his arm ... If he can't do it, there's no luxury to use that tool ..."

"[PC7] Yapacağı bir şey yok ki sadece kolunu kaldıracak... Onu yapamayacak durumda olsa zaten o aletin başına geçme lüksü olamaz..."

Recording new motions is easy

"[PC3] There is no problem in the program while recording the movement, and testing was nice."

"[PC3] Programın hareket kaydetmesinde sıkıntı yok hani uygulaması falan güzel."

Personalization

"[E1] Learning… there is no difficulty in the end. So it's easy to learn. I don't have any problems in my mind. As long as it is done according to the level of the other party and the instructor in the back expresses it nicely, I think it can be learned easily."

"[Res] So my teacher, was it correct to do the same movements for a month and a half, or is it correct to advance?"

"[E1] Progressing by advancing (the level of motions). Or it becomes boring."

"[E1] Öğrenmek… zorluğu yok sonuçta. Yani öğrenmek kolay. Herhangi bir sorun yok aklımda. Yeter ki karşı tarafın seviyesine göre yapıldığı müddetçe ve arkadaki eğitmen de güzel bir şekilde ifade ettiği şekilde bu kolayca öğrenilir diye düşünüyorum."

"[Res] Peki hocam aynı hareketleri bir buçuk ay yapmak mı doğru yoksa geliştirmek mi?"

"[E1] Geliştirerek ilerlemek. Yoksa sıkıcı hale gelir."

1.2. Features that negatively affect the perceived ease of use

1.2.1. Technical issues that negatively affect the perceived ease of use

Motion detection problem with Kinect

"[S01] Where I used it, there was trouble with light or something. There was a problem with detection in the light."

"[S01] Işıktan yaptığım yerde ışıktan falan sıkıntı oldu. Işıkta algılama sıkıntısı oldu."

"[S01] It is very difficult to perceive some movements. Sometimes when you make a ridiculous act 90 gave 100 gave. Sometimes when you do exactly in the 30s was also in the 0s."

"[S01] Bazı hareketleri algılaması çok sıkıntı yaratıyor. Bazen çok saçma hareket yapınca da 90 verdi 100 verdi. Bazen tam yapınca da 30 larda 0 larda verdiği de oldu."

"[S01] The light… the usage place, and I don't know how it can be handled? But I'd try to correct it too."

"[S01] Işık… yani yapılan yer, ve de onu bilmiyorum nasıl halledilebilir ya da halledilebilir mi? Ama onu da halletmeye çalışırdım."

"[S08] There was a bit of a lack of detection."

"[S08] Algılamada da biraz eksikliği vardı."

"[S14] the camera was freezing."

"[S14] kamera donuyordu."

"[S14] The camera did not detect our movements."

"[S14] Kamera hareketlerimizi algılamıyordu."

"[S16] It doesn't detect when we get away, for example, I lift my arms, my arms are like this ... it gives a low score."

"[S16] Uzaklaştığımız zaman algılamıyor, algıladığı kısımda da mesela kollarımı kaldırıyorum kollarım şöyle oluyor.. düşük puan veriyor."

"[S17] We were making it at home. Kinect could detect the bed or something or the blanket."

"[S17] Biz evde yapıyorduk. Yatağı falan algılıyordu. Battaniyeyi algılıyordu."

"[S17] But he only detects what's behind me, not me!. I'm doing I'm doing I'm looking at once, It detected something else…"

"[S17] Ama sadece mesela arkamdakini de algılıyor, beni değil!. Ben yapıyorum yapıyorum yapıyorum bir bakmışım onu algılamış bir anda…"

"[S18] At first, we had difficulty making it detect movements. Our percentages were low and low. But we got used to it a little bit later, so it got better."

"[S18] İlk zamanlar hareketleri algılatmakta zorluk çekiyorduk. Yüzdelerimiz düşük düşük geliyordu. Ama sonradan birazcık daha biz de alıştık, yani daha iyi oldu."

"[S18] It didn't sense some colors on the clothes. She didn't, for example, when she wore black trousers."

"[S18] Kıyafetlerde bazı renkleri algılamıyordu. Mesela siyah pantolon giyince algılamıyordu. Bol paçalı pantolon giyince…"

"[S18] It couldn't fully sense the movements. For example, when we stretched out our hands, he twists and turns, but we didn't do that."

"[S18] Tam anlamıyla hareketleri algılayamıyordu. Mesela biz elimizi uzattığımızda o ara elleri falan döndürüyor ama biz öyle bir şey yapmıyorduk."

"[S19] I had a wide-sleeved outfit, it made a problem too."

"[S19] Benim de kolları geniş bir kıyafetim vardı onda sorun olmuştu."

"[S19] Its inability to detect certain movements made us think that we were doing things wrong… For example, turns, lifts. He was detecting differently, showing different figures (on the screen)."

"[S19] Bazı hareketleri algılayamaması bizim sanki hareketleri yanlış yaptığımızı düşündürüyordu… Mesela dönüşler, el kol kaldırmalar falan. Farklı algılıyordu, farklı figürler gösteriyordu."

"[S20] We were spreading our arms, but it couldn't detect, couldn't start the program."

"[S20] Kollarımızı açıyorduk ama algılayamıyordu, gelmiyordu."

"[S21] There is also a difference between the tall and short people. It detects the longer one more (better)."

"[S21] Bir de boyu uzun olanla kısa olan arasında fark oluyor. Uzun olanı daha çok (iyi) algılıyordu."

"[S21] And because we have memorized the movements, we knew how the Kinect detects, so we did it accordingly."

"[S21] Bir de hareketleri ezberlediğimiz için, kinectin nasıl algıladığını bildiğimiz için ona göre yapıyorduk."

"[PC1] For example, he gives his attention to it, he thinks that he is doing wrong because the movement is perceived differently... His sport get disrupted."

"[PC1] Mesela oraya dikkatini veriyor, tam yapacağı zaman oradaki hareket farklı algılandığı için yanlış yapıyorum diye düşünüyor ve gidiyor yani... Yaptığı spor şey oluyor..."

"[PC3] For example, I'm doing here, but in the program posture (avatar) is moving slower. Then I'm saying that I'm doing the wrong thing, as my friend said .. If it reflects exactly the same there would be something more if I see myself ... I don't have a chance to see myself on the screen instead of the posture?"

"[PC3] Mesela ben burada yapıyorum, ama programda postür (avatar) daha yavaş hareket ediyor. O zaman ben hani şey diyorum acaba yanlış mı yapıyorum.. Aynı arkadaşımın dediği gibi.. Birebir aynısını yansıtsa oraya ben kendimi görsem orda daha şey olurdu... postürün yerine kendimi ekranda görme şansım yok mu?"

"[PC3] The program does not have trouble recording the movement of the application or something nice. But there is a problem in the perception of the posture there is something that you do not fully perceive the movement. For example, we do not jump but jump. So he can be corrected."

"[PC3] Programın hareket kaydetmesinde sıkıntı yok hani uygulaması falan güzel. Ama postürün onu algılamasında sıkıntı var işte oradaki şeyde yaptığınız hareketi tam algılamıyor. Mesela biz zıplamıyoruz ama zıplıyor. Yani o düzeltilebilir. O zaman kullanıcıya da sıkıntı yaşayabilir"

"[PC7] Two-dimensional shooting of the camera…In some cases, the movement made by the movement shown may not be the same."

"[PC7] Kameranın iki boyutlu çekmesi…Gösterilen hareketle yapılan hareket bir olmayabiliyor bazı durumlarda.. İki boyutlu gördüğü için sonucu bile etkileyebiliyor..."

"[PC8] You do this, he shows the movement otherwise. You are doing the right thing that the movement perceives the wrong ... Friend just did right, showed 10 percent."

"[PC8] Siz böyle yapıyorsunuz hareketi o başka türlü gösteriyor. Siz doğru yapıyorsunuz mesele hareketi o yanlış algılıyor... Arkadaş demin doğru yaptı, yüzde 10 gösterdi."

Internet Connection Problem

"[S01] There is a lot of trouble in the internet in the dormitory, we even do projects at school."

"[S01] Yurtta internet de çok sıkıntı oluyor, projeleri bile okulda yapıyoruz."

"[S01] There is also a shortage of internet. So internet is often a hardship everywhere."

"[S01] Bir de internete bağlı sıkıntısı oluyor. Yani internet çoğu zaman sıkıntı her yerde."

"[S20] My teacher, we were setting it up, for example. Then we connected to the internet. We couldn't connect to the internet, to the database. It is probably caused by the internet of the school. That's all ... I remember there was no other problem."

"[S20] Hocam onu kuruyorduk mesela. Sonra internete bağlıyorduk. Bir türlü internete bağlanamadık, veri tabanına. Muhtemelen okulun internetinden kaynaklanmıştı. O kadar... Başka bir sıkıntısı yoktu hatırladığım."

"[S06] For example, when the internet connection went to the database was not registered. Our sport was in vain. Our score was not registered in the system."

"[S06] Mesela internet bağlantısı gittiği anda veri tabanına kaydolmuyordu. Yaptığımız spor boşuna gidiyordu. Puanımız sisteme kaydolmuyordu."

"[S12] We had trouble with the Internet . A problem from us, not from the program."

"[S12] İnternette sıkıntı yaşadık. Bizden kaynaklı bir problem, programdan değil."

"[S08] I've had (the same problem), too."

"[S08] Ben de yaşadım hocam."

"[S16] I've had (the same problem) once. Because of my internet connection, I did but it did not save, and it appeared to be 13% on the system. I had to do it again."

"[S16] Ben bir kere karşılaştım. O da internetim çekmemesinden dolayı, yaptım yaptım kaydetmedi %13 olarak göründü sistemde. Bir kere daha yapmak zorunda kaldım."

Database Connection Problem

"[S20] … We couldn't connect to the internet, the database. It probably originated from the internet of the school."

"[S20] .... Bir türlü internete bağlanamadık, veri tabanına. Muhtemelen okulun internetinden kaynaklanmıştı."

"[S03] We could not connect to the database."

"[S03] Veri tabanına bağlanamadık."

"[S14] Is it possible to do it without Internet infrastructure?"

"[S12] Then how will you see your records?"

"[S10] It can not save without being able to connect to the database."

"[S11] It could save to the computer."

"[S14] Exactly. Internet was a problem for all of us."

"[S11] Absolutely."

"[S14] Bir de internet altyapısı olmadan olsa olmaz mı?"

"[S12] O zaman nasıl göreceksin yaptıklarını?"

"[S10] Veri tabanına bağlanamadan kaydedemez."

"[S11] Bilgisayara kaydetsin."

"[S14] Aynen. İnternet hepimizde problem oldu yani."

"[S11] Kesinlikle."

Score not saved

"[S01] And something like that happened. Ok we did it all we did we did then we didn't save to the site when there was a nuisance or a nuisance like internet connection or I couldn't see my average score which came out of the system automatically."

"[S01] Bir de şöyle bir şey oldu. Tamam hepsini yaptık yaptık yaptık sonra bir sıkıntı ya da internet bağlantısı gibi bir sıkıntı olduğu zaman siteye kaydetmedi ya da sistemden otomatik olarak çıktı benim ortalama puanımı göremedim."

"[S16] I've had (the same problem) once. Because of my internet connection, I did but it did not save, and it appeared to be 13% on the system. I had to do it again."

"[S16] Ben bir kere karşılaştım. O da internetim çekmemesinden dolayı, yaptım yaptım kaydetmedi %13 olarak göründü sistemde. Bir kere daha yapmak zorunda kaldım."

"[S15] It happened to me too."

"[S15] Bana da oldu o."

"[S11] We had trouble saving."

"[S11] Kaydederken sıkıntı yaşadık."

"[S06] For example, when the internet connection went to the database was not registered. Our sport was in vain. Our score was not registered in the system."

"[S06] Mesela internet bağlantısı gittiği anda veri tabanına kaydolmuyordu. Yaptığımız spor boşuna gidiyordu. Puanımız sisteme kaydolmuyordu."

Application freezes

"[S14] the camera was freezing."

"[S14] kamera donuyordu."

"[S21] For example, when someone goes in front of the computer, it freezes. Freezing happens in the movements while doing it at home alone. I would open my arms thoroughly so that it could come. I was doing the movements again, but did not give points .."

"[S21] Mesela bilgisayarın önünden biri geçince donuyor. Evde tek başıma yaparken de hareketlerde donma oluyordu. O gelsin diye kollarımı iyice açıyordum. Donması geçince yine hareketleri yapıyordum ama puan vermiyordu.."

"[S12] Yes, there was a problem with freezing."

"[S12] Evet donmayla alakalı bir problem olmuştu."

"[S11] I found a bug. I have done once, and when I start the second time it only does one set, and does not precede to other sets. Always staying thirteen fifteen percent. Error solved when we close and start over."

"[S11] Ben açığını buldum hocam. Bir kere yaptıktan sonra ikinciye yeniden başla dediğimizde hep bir set yapıyor sonra ikinci setlere gelmiyor. Hep yüzde on üç on beşte kalıyor. Durdurup başlattığımızda hata çözülüyor."

"[S09] We had to complete three rounds. After the first round, the program was closed on its own. It gave one third of the total score."

"[S09] Üç tur tamamlamamız gerekiyordu. İlk tur bittikten sonra program kendi kendine kapanıyordu. Toplam puanın üçte birini veriyordu."

Difficulties in preparing the usage area

"[S06] We were in trouble because we did it in the dormitory environment. The girls were passing by."

"[S06] Biz yurt ortamında yaptığımız için sıkıntı oluyordu. Kızlar önümüzden geçiyordu"

"[S08] At first there was trouble adjusting the distance, since I had a lot of difficulty."

"[S08] İlk başta mesafeyi ayarlamada sıkıntı vardı, ondan yana çok zorluk çektim."

"[S01] When someone passed in front of him or back, he deemed my action invalid."

"[S01] Önünden ya da arkadan biri geçtiği zaman benim hareketimi geçersiz saydı."

"[S01] And if someone else lives in the house, he might have to go through in front of you. After all, since I didn't have a room here (dorm), because we had to live together with everyone, it would be a big problem…"

"[S01] Bir de evde başkası yaşıyorsa oradan geçmesi gerekebilir. Sonuçta bir odam olmadığı için burada, mecburen herkesle birlikte yaşadığımız için o çok büyük bir sıkıntı, burada (evde) yapılması büyük bir sıkıntı olurdu…"

Problem with Kinect Sharing

"[S01] It was also a hardship for me to take and bring back the kinect."

"[S01] Bir de kinecti götürüp getirmesi sıkıntıydı."

"[S12] In fact, the lack of the gym, my teacher. Two or three people can do the same thing at the same time. If we do the same movements at the same time or if the movements are different, we do not need the gym, but we do one person ... waiting for an hour friend."

"[S12] Aslında spor salonundan eksiği şu hocam. Aynı anda iki üç kişi yapabilsek yine aynı şey olur. Aynı anda aynı hareketleri yapsak ya da hareketler farklı olsa spor salonuna biz gerek duymayız ama tek kişi yapıyoruz ... bir saat bekliyor arkadaş."

"[S12] Because it already takes a long time or an hour or so. One of us is doing one of us, we have to wait for one of us."

"[S12] Çünkü zaten uzun sürüyor ya yani bir saat falan. Birimiz yapıyoruz birimizi beklemek zorunda kalıyoruz. Diğerimiz yapıyoruz diğerimizi bekliyoruz."

"[S16] My teacher also had something like this. If everyone had a kinect .. for example, I want to do sports now, I do not have kinect. When Kinect comes to me, I have a job. So we have trouble. We didn't want it when it was kinect. Then we did it two or three times in one day."

"[S16] Hocam bir de şöyle bir şey oldu. Herkeste bir tane kinect olmuş olsaydı.. mesela ben şuan spor yapmak istiyorum bende kinect yok. Kinect bana geldiği zaman benim bir işim oluyor bana uymuyor. Yani sıkıntımız bu. İstediğimiz zaman kinect olmadı, kinect olduğu zaman biz istemedik. Ondan sonra bir gün içinde iki üç kere yaptık sıkıldık."

Limitations of Kinect

"[S08] At home, for example, there are movements we can do on a flat surface, they can be added. We can find everything in the gym but not at home."

"[S08] Evde mesela düz bir zeminde yapabileceğimiz hareketler var, onlar eklenebilir. Spor salonunda her şeyi bulabiliyoruz ama evde yok."

"[S08] I would increase the movements. I mean, there are only movements for the arm . There is a leg, bend over, I think some movements are missing. This is probably something that comes from kinect ."

"[S08] Hocam hareketleri arttırırdım. Yani sadece kola yönelik hareketler var. Bacak ta var ama eğilip kalkma şu bu, hani bazı hareketler eksik bence. Bu da belki kinect'ten kaynaklanan bir şeydir."

"[S05] The connection could break when someone passed in front of us. We could get zero. This problem can be fixed."

"[S05] Birisi önünden geçtiği zaman bağlantı kopabiliyordu. Sıfır alabiliyorduk. Bu problem giderilebilir."

Difficult to install

"[S21] We didn't know which to open because there were a few files. I was always calling S18 to ask which one to open."

"[S21] Birkaç dosya olduğu için hangisini açacağımızı bilemiyorduk. Hep S18'yı arayıp soruyordum hangisini açacağız diye."

"[S20] Installation was difficult, kinect was difficult to detect (by computer). We had lost a lot of time at one point, but then everything was fine."

"[S20] Kurulumu zordu, kinecti algılatması zordu. Bayağı zaman kaybı yaşamıştık bir ara, ama sonra düzelmişti herşey."

Insufficient Computer Specifications

"[S01] My computer's specifications was not enough, so I had to find another computer."

"[S01] Benim Bilgisayarım mesela kaldırmadı. O yüzden başka bilgisayar bulmam gerekti."

"[S22] My computer's specifications was not enough."

"[S22] Benim bilgisayarım kaldırmıyordu."

Problems with clothing

"[S18] It didn't detect some colors on the clothes. For example, when I wore black trousers, it did not detect it. When I put on trousers with wide trotters."

"[S18] Kıyafetlerde bazı renkleri algılamıyordu. Mesela siyah pantolon giyince algılamıyordu. Bol paçalı pantolon giyince…

"[S19] I had a wide-sleeved outfit, it made a problem too."

"[S19] Benim de kolları geniş bir kıyafetim vardı onda sorun olmuştu."

1.2.2. Content issues that negatively affect the perceived ease of use

Variety of motions is not sufficient

"[S13] If there were other movements."

"[S13] Başka hareketler de olsaydı."

"[S15] could be different in the first set, different in the second, different in the third."

"[S15] 1. Sette farklı, ikinci sette faklı, üçüncü sette farklı olabilirdi."

"[S12] I think it's boring because the movements are the same. 1 hour was fine. Let's do the first set as you said. But the other sets are definitely regional"

"[S12] Bence hareketler aynı olduğu için sıkıcı oluyor. 1 saat iyiydi. İlk seti sizin dediğiniz gibi yapalım. Ama diğer setler bölgesel kesinlikle"

"[S14] His movements are very boring."

"[S14] Hareketleri, çok sıkıcı."

"[S01] For example, in movements… If it is improved, more movements can be added. Those movements were simple. Neck movement, arm movement, which was tiring but simple. We did the same thing three times…"

"[S01] Hareketlerde mesela… O algılaması geliştirilirse daha yeni hareketler eklenebilir. O hareketler basitti. Boyun hareketi, kol hareketi, yani yorucuydu ama basitti. Üç kere aynı şeyleri yapıyorduk…"

"[E1] Advancing by improving (the exercises). Or it becomes boring."

"[E1] (Hareketleri) Geliştirerek ilerlemek. Yoksa sıkıcı hale gelir."

Daily exercise duration is long

"[S14] I would have shortened the time. I would have shortened it in the second and third set, but not in the first set."

"[S14] Süresini kısaltırdım. İlk sette kısaltmasam da ikinci ve üçüncü sette kısaltırdım."

"[S03] Yes, the time was too long."

"[S03] Evet süre çok fazlaydı."

"[S09] The movements should be less. For those who do regular sports, only warm-up movements are required."

"[S09] Hareketlerin daha az olması lazım. Düzenli spor yapanlar için sadece ısınma hareketleri olması lazım."

"[S02] And (the duration) was too long,"

"[S02] Bir de çok uzundu,"

"[S13] And also the repetitions may be fewer. We were doing eight times I guess."

"[S13] Bir de tekrar sayısı az olabilirdi. 8 defa yapıyorduk herhâlde."

No rest break

"[S06] When you move away from the front of Kinect, the program was freezing..."

"[Res] How would you like it to be?"

"[S06] I could sit, for example."

"[S06] Aralarda şey yapınca, Kinect'in önünden ayrılırsan program gidiyordu."

"[Res] Nasıl olmasını isterdin?"

"[S06] Oturabilirdim mesela."

"[S01] It could let me pause. In the end, if this is done at home, not to go to the gym, there should be a pause... we can't always stand in front of it and move."

"[Res] So you say the time is 1 hour long, you say I should be able to split and continue when I want to?"

"[S01] Yes, absolutely."

"[S01] Ara verme durumu olabilirdi. Sonuçta bu evde yapılacak, spor salonuna gidilmemesi için yapılıyorsa eğer, ara verme durumu olması… sürekli onun başına geçip te hareket yapamayız illa ki.."

"[Res] Yani süre 1 saat uzun diyorsun, bunu ben istediğim zaman bölüp devam edebilmeliyim diyorsun?"

"[S01] Evet, kesinlikle."

"[S01] And there was no waiting. They were very annoying. There was no such thing as taking a break, I had to do it continuously."

"[S01] Bir de bekletme durumu falan olmadı. Bunlar çok sıkıntı oldu. Bir ara vermek gibi bir durum olmadı devamlı yapmam gerekti."

"[Res] When you leave the program already stops the program. If you want to go for 15 minutes , the count continues when you come."

"[S07] When we left in front of my teacher, he still continued to do so. Then he was giving the missing points."

"[Res] He may have perceived another cis as a human instead of you."

"[Res] Önünden ayrıldığınız zaman zaten program süreyi durduruyor. İsterseniz 15 dakika gidin, geldiğinizde saymaya devam ediyor."

"[S07] Hocam önünden ayrıldığımız zaman yine de süreye devam ediyordu. Sonra eksik puan veriyordu."

"[Res] O zaman senin yerine başka bir cismi insan olarak algılamış olabilir."

"[S08] When I take a break, count the 3 minutes, but I shouldn't have to stand in front of kinect."

"[S08] Ara verince 3 dakikalık süreyi saysın ama önünde durmam gerekmesin."

Boring

"[S12] Doing the same motions is boring."

"[S12] aynı hareketleri yapmak sıkıyor."

"[S13] When you are with someone, you don't understand how time passes. But when you're on your own, it feels like that one hour is getting too long, it doesn't end."

"[S13] Yanında başkaları olunca zamanın nasıl geçtiğini alamıyorsun. Ama tek başına olunca o bir saat çok uzuyormuş gibi geliyor, bitmiyor."

"[S14] The motions are very boring."

"[S14] Hareketleri, çok sıkıcı."

"[PC3] Boring. So my teacher, from the beginning ... So we are doing the movements, we will learn from the beginning, I've been bored in the two minutes that I used here, for example ... I do it, but there is trouble in its detection, there is trouble in movement, there is trouble in seeing the avatar. A person gets bored, I mean."

"[PC3] Sıkıcı. Yani hocam en baştan... Yani hareketleri yapıyoruz, en baştan öğreneceğiz, ben şurada iki dakika yaptım sıkıldım mesela... Yapıyorum ama yani algılamasında sıkıntı var, oradaki harekette sıkıntı var, benim postürü görmemde sıkıntı var. Sıkılıyor insan yani."

"[E1] Advancing by improving (the exercises). Or it becomes boring."

"[E1] (Hareketleri) Geliştirerek ilerlemek. Yoksa sıkıcı hale gelir."

Tiring

"[S15] If it wasn't always the same moves. Because, we were getting tired at the third set."

"[S15] Hep aynı hareketler olmasaydı. 3. Sette yoruluyorduk çünkü"

"[S15] It was tiring for our arm. We were waiting so long like this (arms up in the air)."

"[S15] Kolumuzu yoruyordu. Çok bekliyorduk böyle (kolları havada)."

"[S01] It was both tiring and I couldn't see any benefit. It didn't create any benefit for me. I don't know if it was caused by me or because of it? But I got tired of doing it. After a lot of time… I mean it was difficult for me to even complete, but later since I got used to it, I was able to complete them all."

"[S01] Hem yordu, hem de ben bir fayda göremedim açıkçası. Bende herhangi bir fayda yaratmadı. Bilmiyorum benden kaynaklı mı ondan kaynaklı mı? Ama yaparken yoruldum. Baya bir süre sonra… Yani ilk zamanlarda tamamlamak bile sıkıntıydı, ama sonra alıştığım için hepsini tamamlayabildim."

"[S16] The first week I felt a bit sore (I was rusty), later it did not hurt."

"[S16] Hocam ilk hafta biraz hamladım ben ondan sonra bir zarar olmadı."

"[PC3] The first time, it starts with 8 repetitions? That's trouble teacher. At first, people can not complete eight movements. They already come with zero movement."

"[PC3] İlkinde 8 tekrarla mı başlıyor hocam? O sıkıntı hocam. İlk başta sekiz hareket tamamlayamaz insan. Zaten sıfır hareketle geliyor."

"[PC3] At first, you work with small tools, you gradually increase. You look at the situation of the person, according to them. They don't move at all, you have to start the motions slowly so that their confidence will not break. If it does, they won't continue, they will say I can't do it."

"[PC3] İlk başta küçük aletlerle çalışırsın yavaş yavaş arttırırsın. Hocam kişinin durumuna bakarsın ona göre. Hareketi hiç yok yavaştan başlatacaksın ki güveni kırılmasın. Köreltirsen hiç devamlılığı olmaz onun, ben zaten yapamıyorum der, devam etmez."

Number of exercise days is not sufficient

"[S04] I think the number (of days) should be more. We were doing two days a week, it should increase."

"[Res] Should be up to 3 days?"

"[S04] Yes."

"[S04] Sonradan sayısı fazlalaşmalı bence hocam. İki gün yapıyorduk haftada o bence artmalı."

"[Res] 3 güne mi çıkmalı?

"[S04] Evet."

"[S19] What I'm saying is actually, I think it wasn't very productive. Because it's not continuous. I think it's a short time. Not enough time for sports. It could be on certain days of the week and at certain hours. It could be longer than a month and a half. The program consisted of three set, but I think it was very tiring."

"[S19] Benim söylediğim şey aslında bu, yani çok verimli değildi bence. Çünkü sürekli değil. Kısa bir süre bence. Spor için yeterli bir süre değil. Haftanın belli günlerinde ve belli saat aralığında olabilirdi. Bir buçuk aydan daha uzun olabilirdi. Mesela o üç periyottan oluşuyordu ama çok yoruyordu bence."

Motion duration is long

"[S11] After my teacher memorized the movements, the time was too long. We were waiting for 8 seconds for a little action."

"[S11] Hocam bir de hareketleri ezberledikten sonra süre çok uzun geliyordu. 8 saniye bekliyorduk küçük bir hareket için."

"[PC1] If I take this, I'd say that doesn't work, I can't be patient. It will be more active."

"[PC1] Ben bunu alsam, bu bir işe yaramıyormuş diye şey yaparım yani, sabredemem ben. Daha aktif olacak."

Motion duration is short

"[S04] Duration was a hardship. I didn't understand the time at first, what we would do during that time. I couldn't keep up, I was getting zero or something."

"[S04] süre sıkıntıydı. Ben başta süreyi anlayamamıştım, o süre boyunca yapacağımızı. Yetiştiremiyordum, sıfır falan alıyordum."

Rapidness is not sufficient

"[PC2] Trainer in and out, waiting time, arm up and waiting for him to show the points will come. In fact, we do not expect him to do sports, so we do it in a row. There should be a little more speed ..."

"[Res] Actually there should be no waiting between movements."

"[PC2] Yes. It needs to be a little more series, here's the coach in and out ... They need to develop and show me a little bit."

"[PC2] Eğitmenin girip çıkması, onu bekleme süresi, kolunu kaldırıp bekliyor işte onu gösterecek puan gelecek diye. Aslında spor yaparken onu beklemiyoruz yani arka arkaya yapıyoruz. Biraz daha hız olmalı..."

"[Res] Hareketleri arasında bekleme olmaması lazım aslında diyorsun."

"[PC2] Evet. Biraz daha seri olması lazım, işte oradaki antrenörün girip çıkması... Beni algılayıp da göstermesi onlar biraz gelişmeli."

1.2.3. Design issues that negatively affect the perceived ease of use

The instructor's motion is not understood

"[S18] The instructor's movements were not understood."

"[S18] Eğitmenin hareketleri anlaşılmıyordu."

"[S18] At first we couldn't figure out how to do the movements. Later we learned."

"[S18] İlk zamanlar çözememiştik hareketleri nasıl yapacağımızı. Sonradan öğrendik."

"[S01] I mean, it was enough for me, but because you were with us, showing it. But it may not be enough for someone who does it for the first time at home."

"[S01] Yani benim için yeterliydi ama yanımızda siz olduğunuz için gösterdiğiniz için. Ama evde ilk kez yapan biri için yeterli olmayabilir."

"[S01] It was not enough."

"[S01] Yeterli değildi."

"[S04] Yes, it was easy after getting used to. At first we couldn't understand the movements . Even after using it a bit, sometimes you corrected it."

"[S04] Evet alıştıktan sonra kolaydı. İlk başlarda hareketleri anlayamıyorduk. Biraz kullandıktan sonra bile bazen siz düzeltiyordunuz."

"[S04] My teacher in solving the movements. Because it was not very understandable in the beginning, for example, we were doing other movements."

"[S02] I agree."

"[S03] I agree."

"[S04] Hareketleri çözmede hocam. Çünkü çok anlaşılır değildi başta mesela başka hareketler yapıyorduk."

"[S21] It feels like he's jumping, sir, he can be fixed."

"[S21] Zıplıyormuş gibi oluyor ya hocam, o düzeltilebilir."

"[PC2] …I'm also stuck on the clarity of the movements and the intelligibility. There may be problems, since every age group would use it."

"[PC2] …Ben bir de şeye takıldım hareketlerin netliğine anlaşılabilirliğine. Orada da yine her yaş grubu kullanacağı için sıkıntı olabilir."

Error messages are not helpful

"[S02] The system did not say anything."

"[S02] Sistem hiç bir şey söylemiyordu."

"[S18] We were able to solve it, but why? You were with us. But those who did it at home, for example, S21were looking for someone to ask for, on how to solve it. We talked every time she took kinect. It didn't connect, how are we going to do this… There should be information to help."

"[S18] Biz çözebiliyorduk, ama neden? Siz vardınız yanımızda. Ama evde yapanlar mesela S21 soracak biri arıyordu, bunu nasıl çözeceğiz. Her kinecti aldığında biz konuşuyorduk. Bağlantı olmadı, bunu nasıl yapacağız… Yani bir bilgilendirme olmalı orda, ya da yardım…"

User control is not sufficient

"[S17] Too much interruption is happening by the way, I wish I could pause it though. So, for example, when I make this movement, it would be appropriate to have a little stop. If only we can stop it anytime we want, and then go on. Because when we leave, it gives zero."

"[S17] Çok bölünme oluyor ya arada, keşke durdurma olsa. Yani mesela bu hareketi yaptığımda biraz durdurma olsa gayet uygun. İstediğimiz zaman durdurup sonra devam edebilsek. Çünkü sonra ayrılıyoruz sıfır veriyor."

"[S10] Yes, my teacher. I took the phone in my pocket, in case someone calls, I couldn't get it, my hands were like this. (He opens his hands, in a T shape)"

"[S10] evet hocam. Telefonu cebime aldım biri ararsa açayım diye, ellerim böyle kaldı alamadım. (ellerini iki yana açar, T şeklinde)"

Instructions font size is small

"[S20] Sound can be added. Text can sometimes be too small, unreadable."

"[S20] Ses eklenebilir. Yazı bazen çok küçük kalabiliyor, okunmuyor."

Instructor is not visible

"[S12] He was not visible in the back."

"[S12] Arkada gözükmüyordu."

No time to read the motion instructions

"[S18] We couldn't take the time to read because of time constraints."

"[S18] Zaman kısıtlaması olduğu için yazı okumaya vakit ayıramamıştık."

Personalization is not sufficient

"[S01] Yes. It could have been an option as well, such as I want to skip to the next level."

"[S01] Evet. Bir de seçimli olabilirdi hani ben sonraki seviyeye atlamak istiyorum gibi."

Feedback is not sufficient

"[PC1] For example, the trainer, in the back, could have sound effect. Right wrong. Looks red, but maybe he can miss it at the moment while doing sports. He can say that you're doing it right, you're doing it wrong, raise your arm or something."

"[PC1] Ses efekti de olabilir mesela eğitmenin, arkada... Doğru yanlış... Kırmızı gözüküyor ama, belki o an kaçırabilir sporu yaparken... Söyleyebilir yani doğru yapıyorsun yanlış yapıyorsun kolunu kaldır falan."

Confusion in creating an exercise program

"[PC5] I think it is wrong, if my teacher is in a percentage or something, why is it between 10 thousand and 20 thousand? It can be a bit confusing."

"[PC5] Yanlış bence hocam yüzdelik dilimde falan olsa hani neden 10 bin ile 20 bin arası? O kafa karıştırıcı olabilir biraz."

"[PC2] The program needs to determine ... because you know it will be used by all ages. The trainer needs to determine."

"[PC2] Programın belirlemesi gerekiyor... Çünkü bunu hani her yaş kullanacağı için. Eğitmenin belirlemesi gerekiyor."

2.   The perceptions of users, and opinions of coaches and experts on the usefulness of the VSP (Research Question 2)

2.1.   The perceived physical effects of the VSP

2.1.1. Positive Physical Effects

Increased flexibility

"[S22] I felt that I was more flexible. I couldn't touch my feet, but now I can."

"[S22] Ben daha esnek olduğumu hissettim. Mesela ayaklarıma değemiyordum ama artık değebiliyorum."

"[S15] I was able to make it easier and more flexible, especially because we repeated the arm movements frequently."

"[S15] Özellikle kol hareketlerini sık tekrarladığımız için daha kolay ve daha esnek yapabiliyordum."

"[S21] I just felt it worked on the legs."

"[S21] Ben sadece bacaklarda işe yaradığını hissettim."

"[S12] We were more flexible."

"[S12] Daha esnektik."

"[S06] There were jumping movements, they made you feel flexible."

"[S06] Zıplama hareketleri vardı, onlar esnek hissettirdi."

"[Res] Well if you compare the beginning and the end."

"[Res] Peki ilk başlardaki ve sonlardakini kıyaslarsan."

"[S08] At first I moved. But the more he does, the better. The arms began to spread."

"[S08] İlk başta hamladım mesela. Ama yaptıkça düzeliyor. Kollar açılmaya başladı."

"[S05] There was actually a stretch in the legs."

"[S05] Bacaklarda bir esneme oldu aslında."

"[PC3] This is good for human beings. Like yourself, like me, you can't think of it like that. It will move. This program is used for the continuity of movement. If it does it all the time it will have an effect on the weakness of the movement."

"[PC3] Bu insan için bu güzel. Kendin gibi, benim gibi, senin gibi düşünemezsin onu. Hareket edecek yani. Hareketin devamlılığı için kullanılıyor bu program. Eğer sürekli yaparsa hareketin zayıflığına da etkisi olur. Yani esner."

"[E2] This flexibility is about the program we add ... Flexibility, strength and endurance have an impact on all of them."

"[E2] Bu esneklik, içine eklediğimiz programla ilgili... Esneklik de güç de dayanıklılık da, hepsine etkisi olur."

Increased motion accuracy

"[S04] We couldn't do those moves at first, but it's better now."

"[S04] O hareketleri de yapamıyorduk biz başta, ama şimdi daha iyi."

"[S15] In the program, for example, our scores were lower in the early 50s, 60s. He's been going from 80 to 90 lately."

"[S15] Programda da gözüküyor mesela puanlarımız başlarda daha düşüktü 50'lerde 60'lardaydı. Son zamanlarda 80'e 90'a çıktı."

"[PC3] Yes, my teacher, because he sees himself, sees his mistake there, sees how he can fix it. But they only show it perfectly on TV. They don't make mistakes, she can't see herself. If he's wrong, he thinks it's true. But since he sees his own posture here, he sees his mistake."

"[PC3] Olur hocam, çünkü kendini görüyor, oradaki yanlışını görüyor, nasıl düzeltebileceğini görüyor. Ama televizyonda tek mükemmel şekilde

gösteriyorlar. Hata göstermiyorlar, o kendini göremiyor. Yaptığı yanlışsa da doğru zannediyor. Ama burada kendi postürünü gördüğü için, yanlışını da görür."

Increased endurance

"[S18] Increased walking distance…"

"[S18] Yürüme mesafesini artırdı…"

"[S05] I agree. I haven't been doing sports for a long time. I felt my leg muscles move. That's a good thing, actually showing that it works. After a while, I could easily do it."

"[S05] Ben de katılıyorum. Spor yapmıyordum uzun zamandır. Bacak kaslarımın hamladığını hissettim. Bu iyi bir şey aslında çalıştığını gösteriyor. Bir süre sonra rahatlıkla yapabiliyordum."

"[S01] It forced me to complete the first time, but then I realized I was not tired. So something happened. But I didn't have things like weight gain or speed difference."

"[S01] Şöyle ilk zaman tamamlaması baya zorladı beni, ama sonradan yorulmadığımı fark ettim. Demek ki bir şeyler oldu. Ama hani kilo artışı ya da hız farkı gibi şeyler bende olmadı."

"[S01] My stamina increased, but it wasn't too hard to do otherwise, so I was comfortable."

"[S01] İşte dayanma gücüm arttı ama onun dışında yaparken çok zorlanmamıştım, yani rahat yapabiliyordum."

"[S01] At first, my arms hurt. After a week or so it went away."

"[S01] İlk başlarda kollarım ağrıyordu. Bir hafta sonra falan geçti."

"[S01] I just got tired. I didn't feel tired after that."

"[S01] Sadece yoruldum. Daha sonra yorgunluk hissi falan yaşamadım"

"[Res] So by the end of the program you felt less tired."

"[S16] First week I was a little sore, but no problem later on."

"[S16] Hocam ilk hafta biraz hamladım ben ondan sonra bir zarar olmadı."

"[E2] If people do sports for a long time from the moment they do for a long time, our strength increases once they increase their quality of life... It is about the program ... we add flexibility, power as well as endurance , it would impact all of them."

"[E2] Kişilerde, uzun süre yaptığı andan itibaren spor uzun süre yaparsa bizim bir kere dayanıklılığımız artıyor dayanıklılığının artması da yaşam kalitesinin artması demek... ...içine eklediğimiz programla ilgili... Esneklik de güç de dayanıklılık da, hepsine etkisi olur."

Increased motion comfort

"[S08] Yes. It only made it more comfortable for us to do it all the time."

"[S08] Evet. Sadece sürekli tekrar yaptığımız için daha rahat yapmamızı sağladı."

"[S14] I had problems with the neck and arms. It seemed to improve when I did the sport."

"[S14] Boyun ve kollarda sıkıntılarım vardı. Sporu yaptığım zaman daha düzeldi gibi."

"[S19] Provides ease of movement."

"[S19] Hareket kolaylığı sağlıyor."

"[PC3] Not a hundred percent but for a person who does not move at all has an effect (on motion)."

"[PC3] Yüzde yüz olmaz ama hiç hareket etmeyen bir insan olarak da etkisi olur."

Weight gain

"And I'm thin, I need to gain weight. For example, I was eating more lunch when I did it without eating on an empty stomach. It's made me gain weight."

"Bir de ben zayıfım hani, benim kilo almam lazım. Aç karnına yemek yemeden yaptığımda örneğin öğle yemeğini daha fazla yiyordum. Kilo almamı da sağladı zaten."

"[S20] I was the opposite, I gained weight."

"[S20] Bende tam tersi oldu, ben kilo aldım."

Weight loss

"[S11] Teacher, I lost weight."

"[S11] Hocam ben kilo verdim."

"[S11] It made me lose six kilos."

"[S11] Bana altı kilo verdirdi."

"[S21] It had an effect (on my weight), because I was sweating. There hasn't been much change, but maybe I haven't noticed."

"[S21] Oldu çünkü terliyordum. Çok bir değişim olmadı ama belki olmuştur ben fark etmemişimdir."

"[E2] … One will work, and work, and work with this, then one will find that they reach 70 kilos, their ideal form weight…"

"[E2] .... Bunu çalışacak çalışacak çalışacak sonra bir bakacak o 70 kiloyu bulacak yani ideal form kilosunu bulacak."

Contributes to psychomotor skills

"[S19] It contributed more to my psychomotor skills. It didn't have much effect on me psychologically."

"[S19] Daha çok psikomotor becerilerime katkısı oldu. Psikolojik olarak bende çok etki yaratmadı."

Increased activity

"[S12] But whenever I think of it I was doing those movements. Just because I did it in sports, you just do those movements for no reason."

"[S12] Ama böyle aklıma geldikçe o hareketleri yapıyordum. Sporda yapmıştım diye, durduk yerde o hareketleri yapıyorsun."

Contributes to physical development

"[PC3] Maybe, if it can be done regularly."

"[PC3] Olabilir düzenli yaparsa."

"[PC2] If there is a continuity."

"[PC2] Sürekliliği olursa olur."

"[PC1] It's like continuity in your strength. So you have a certain force, you have a certain physical property, you keep it going."

"[PC1] Sizin yaptığınız kuvvette devamlılık gibi. Yani belli bir kuvvettesin belli bir fiziksel özelliğin var, onu devam ettiriyorsun onun devamı yani."

"[PC2] I'm sitting at home until the evening on television, for example, I opened the program, I lifted my arm for a month, it had an impact on my arm muscles."

"[PC2] Ben evde oturuyorum akşama kadar televizyon başındayım, mesela açtım programı, bir ay boyunca kolumu kaldırdım indirdim, bu benim kol kaslarıma etkisi oldu. Nefes alıp verdiğim için de etkisi olur..."

"[E2] Yes, it certainly happens, opening stretching movements warming movements can be done on this program. Because our athletes see warming as fatigue, whereas warming is meant to increase intramuscular coordination. Because you need to be ready for the competition. Otherwise, you know how to do the disability, and you can do whatever you want. This flexibility is about the program we add ... Flexibility, strength and endurance have an impact on all of them."

"[E2] Olur, kesinlikle olur, açma germe hareketleri ısınma hareketleri yapılabilir bu program üzerinde. Çünkü bizim sporcular ısınmayı yorgunluk olarak görüyor, hâlbuki ısınma kas içi koordinasyonu arttırabilmek içindir. Çünkü müsabakaya antrenmana hazır olman gerekir. Yoksa hem sakatlığına bilirsin hem istediğin hareketleri yapmaya bilirsin. Bu esneklik, içine eklediğimiz programla ilgili... Esneklik de güç de dayanıklılık da, hepsine etkisi olur."

"[E1] Physical education is said to have contributed to physical and mental development. It is already fixed from the academic literature. I think it will make a progress if it fits physically in the program anyway. Especially the employees will make a progress about those who cannot go out."

"[E1] Beden eğitiminin zaten fiziksel ve ruhsal gelişime katkı sağladığı söyleniyor. Bu akademik literatürlerden zaten sabitlenmiş durumda. Fiziksel anlamda zaten programa uyar ise bir gelişim sağlayacaktır diye düşünüyorum. Özellikle de çalışanlar ya dışarıya çıkamayanlar konusunda bir gelişim sağlayacaktır."

2.1.2. Negative Physical Effects

Increased appetite

"[S21] Yes. But after doing the movements, I was saying, I should eat."

"[S21] Evet. Ama hareketleri yaptıktan sonra "yemeliyim" diyordum, nasılsa spor yaptım diye."

Weight gain

"[S02] I gained six kilos."

"[S02] Ben altı kilo aldım."

"[S19] I felt like I was gaining weight."

"[S19] Ben kilo aldığımı hissettim."

"[S04] I gained weight. After I quit, I gained weight. At that time (while driving) I gave, but then I got back"

"[S04] kilo aldım. Bıraktıktan sonra kilo aldım. O sürede (kullanırken) vermiştim, ama sonra geri aldım"

Tiring

"[S08] It was exhausting, my teacher. Because there was not much time between sets, we couldn't rest, we were tired. We were tired because we were always working arm."

"[S08] Yorucuydu hocam. Setler arasında pek vakit olmadığı için dinlenemiyoruz, yoruluyorduk. Sürekli kol çalıştığımız için yoruluyorduk."

"[S21] I think it was tiring for what we did during school. Because after class, our brains got tired."

"[S21] Biz okul sırasında yaptığımız için yorucu oluyordu bence. Çünkü derslerden sonra beynimiz yoruluyordu."

"[S01] I'm tired like I said, but…"

"[S01] Yoruldum dediğim gibi ama…"

"[S05] It was more comfortable at home, less tiring. When I did it at school it was harder to get in pants and shoes."

"[S05] Evde daha rahattı daha az yorucuydu. Okulda yapınca pantolonla ayakkabıyla falan daha zor oluyordu."

"[S18] It's about our timing. It was hard for us to get out of school and deal with it."

"[S18] Bizim zamanlamamızla alakalı. Okul dönemi dersten çıkıp, bununla uğraşmamız bize zor geliyordu."

2.1.3. No physical effect

"[S08] I don't think the reason for the lack of physical development is my teacher. We already use our arms in daily life."

"[S08] Hocam fiziksel olarak gelişim olmamasının sebebi bence ağırlığın girmemesi. Günlük hayatta zaten kollarımızı kullanıyoruz."

"[S21] I didn't understand whether I did it because I did regular sports or not."

"[S21] Ben de düzenli spor yaptığım için anlayamadım işe yaradı mı yaramadı mı."

"[S09] I don't think I feel a physical development"

"[S09] Fiziksel olarak bir gelişim hissettiğimi düşünmüyorum"

"[S20] My teacher just seemed extra to me because I played volleyball."

"[S20] Hocam ben voleybol oynadığım için bana extra gibi oluyordu sadece."

"[S20] No changes occurred."

"[S20] Hiçbir değişiklik olmadı."

"[S02] No change."

"[S02] Değişiklik olmadı."

"[S01] Motor skills, that is, fine muscle ... about movements, those were not very fine movements, because in normal daily life it was a little bit simpler because there wasn't too much detail, there wasn't too much detail, it didn't perceive too much detail. He was doing very different movements than what we did there . He was either directly spinning or doing very different movements. So I didn't see a very different effect."

"[S01] Motor becerileri yani ince kas... hani hareketlerle ilgili, o çok ince hareketler değildi, normal günlük hayatta da hani biraz daha basit kaldığı için çok fazla bir etki olmadı zaten çok fazla detay yoktu, zaten çok fazla detayı algılamıyordu. Hani bizim yaptığımızdan, orda gördüğümüz çok farklı hareketler yapıyordu. Direk dönüyor ya da çok farklı hareketler yapıyordu. O yüzden çok farklı etkisini görmedim ben."

"[S06] I mean it was actually the moves we had never done before, but they were not that hard to do."

"[S06] Yani daha önce hiç yapmadığımız hareketlerdi aslında. Ama yapamayacak ağırlıkta hareketler değildi."

"[PC2] I don't think it has any performance-enhancing effect or I'm going to gain flexibility. But because of my point of view and my past… it could still be useful ... But it's still the categories for all age groups that need to be separated. Is it the same program for everyone?"

"[PC2] Ben herhangi bir performans arttırıcı etkisi olduğunu ya da esneklik kazanacağımı düşünmüyorum. Ama kendi açımdan ve geçmişimden dolayı… yine de yararı olabilir... Ama bunun yine ayrılması lazım her yaş grubuna kategorileri. Herkese aynı program mı?"

"[PC8] None of these movements, my teacher, does not increase the level of movement of people. Add whatever you add on these existing movements ... Movements in the system are moving very slowly, the pulse rate of that person does not go up. You're doing it right, it's showing otherwise, you're doing it right, it's perceiving the movement wrong ... The friend just did it right, he showed 10 percent."

"[PC8] Bu hareketlerin hiç biri hocam, insanın hareket düzeyini arttırmaz. Bu mevcut hareketlerin üzerine ne eklerseniz ekleyin... Sistemde hareketler çok yavaş ilerliyor, o insanın nabız seviyesi yukarı çıkmaz. Nabız seviyesini geçin, hareketler eklem açılarındaki sistemdeki eklem açıları bile genişlemez. Siz böyle yapıyorsunuz hareketi o başka türlü gösteriyor. Siz doğru yapıyorsunuz mesele hareketi o yanlış algılıyor... Arkadaş demin doğru yaptı, yüzde 10 gösterdi. İleri seviyeye arttırırsanız sakatlıklar meydana çıkar."

"[PC1] Either the contents of the program change or not, but not with these actions."

"[PC1] Ya programın içeriği değişse zaten olur da, bu hareketlerle olmaz."

"[PC2] Not physical. If done seldomly."

"[PC2] Fiziksel olmaz. Yani aralıklarla yaparsa olmaz hocam."

2.2.   The perceived affective effects of the VSP

2.2.1. Positive Affective Effects

Entertaining

"[S04] , we were reluctant at first, but then it was entertaining. It quickly finished. It didn't feel too long."

"[S04] başta öfleyerek geliyorduk hocam, ama sonradan güzel yani zevkliydi. Hemen bitiyordu. Çok uzun gelmiyordu."

Feeling vigorous

"And I felt more energetic."

"Bir de kendimi daha enerjik hissediyordum daha zinde hissediyordum."

"[S11] Absolutely."

"[S11] Kesinlikle."

"[S18] It was more psychologically influenced. For example, I felt more vigorous. It feels great about the taste of life."

"[S18] Daha ziyade psikolojik olarak etkiliyordu. Mesela daha dinç hissediyordum. Hayattan tat alma konusunda çok iyi geliyor."

"[S04] yes, I felt more vigorous."

"[S04] evet, daha dinç hissediyordum."

Brought responsibility

"[S05] It made you feel responsible. There was an obligation to do it. I had to do it within a certain period of time. I think it brings responsibility."

"[S05] Sorumluluk sahibi hissettiriyordu. Yapma zorunluluğu vardı. Belli bir süre içinde yapmam gerekiyordu. Sorumluluk kazandırdığını düşünüyorum."

Socializing

"[S18] It is about the place you are doing it. I an S04 was doing together, we had fun. We were talking, playing music, or something…"

"[S18] Yaptığın ortamla da alakalı. Biz S04 ile beraber yaptığımız için eğlenceli geçiyordu. Konuşa konuşa.. Müzik falan açıyorduk."

"[S02] It was like social activity."

"[S02] Sosyal aktivite gibi oldu."

"[Res] You say it was like social activity. If you didn't come here, for example, would you do the same thing at home?"

"[S02] No"

"[S04] No. I couldn't go up to ninety percent, I mean, seventy-sixty."

"[S03] I couldn't reach the third set."

"[S04] Yes."

"[Res] Sosyal aktivite gibi oldu diyorsunuz. Peki buraya gelmeseydin, mesela evde yapıyor olsaydın aynı şey olur muydu?"

"[S02] Hayır"

"[S04] Olmazdı. Yüzde doksanlara falan çıkamazdım yani, yetmiş-atmış falan (alırdım)."

"[S03] Üçüncü sete kadar ulaşamazdım."

"[S04] Evet."

"[Res] Does it affect your participation in social activities?"

"[PC2] As he moves, he can relax psychologically, as his confidence increases."

"[Res] Sosyal etkinliklere katılımına bir etkisi olur mu?"

"[PC2] Hareket ettikçe psikolojik olarak rahatlayacak, kendine olan güveni artacağından, olabilir."

"[Res] Does it affect things like self-confidence, looking at things positively, participating in social activities?

"[E2] Certainly, since it would change all parameters of physical and physiological …"

"[Res] Kendine güven, olaylara olumlu bakma, sosyal etkinliklere katılma gibi şeylere etkisi olur mu?"

"[E2] Kesinlikle olur fiziksel ve fizyolojik bütün parametreleri değişeceği için."

Gained the habit of doing sports

"[S13] For example, if I have a tightness on my neck or arm, I say if I did sports this wouldn't happen… it turns into a habit since we do it all the time…"

"[S13] Mesela şey oluyor bazen boynum veya kolum tutuluyor, şey diyorum spor yapsaydım bunlar olmazdı falan diyorum… sürekli yaptığım için alışkanlığa dönüşüyor…"

Stress release

"But mentally, it helps to release stress, and I didn't think of anything else. While trying to do the same thing as the instructor."

"Ama ruhsal olarak stres atıyordu hani başka şeyler düşünmüyordum. Karşıdakiyle aynı şeyleri yapmaya çalıştığım için."

"[E2] He will also automatically feel good because he is already releasing hormones because he is doing sports."

"[E2] Spor yaptığı için de zaten vücut hormonları salgıladığı için zaten kendine otomatikman iyi hissedecek."

It was more comfortable to do sports alone

"And when I go to the gym, I can't always be comfortable, even if it's all ladies. But because I was at home, it was a more relaxed atmosphere. I could dress what I wanted."

"Bir de spor salonuna gittiğimde hep bayan da olsa rahat edemem hareketlerimde. Ama evde olduğum için daha rahat bir ortam oldu. İstediğimi giyinebiliyordum."

"[E2] Besides, it's good as we do sports… When you start to do sports, the body reacts negatively. People walk away from the gyms for him. For example, while the increase in fat should be reduced, there is a liquid ratio and so on, weight gain is happening. People quit sports because they care about their physical appearance. but there will be no such concern for doing it here on its own."

"[E2] Bunun yanında spor yaptıkça iyi… Zaten hani insan spor yapmaya başladığı zaman vücut olumsuz tepki veriyor. Spor salonlarından onun için insanlar uzaklaşıyor. Mesela yağlarında artış oluyor azalması gerekirken, iste sıvı oranında vesaire oluyor, kilo artışı oluyor. İnsanlar fiziksel görünümüne önem verdiği için sporu bırakıyorlar. ama burada kendi kendine yaptığı için öyle bir endişe de olmayacak."

2.2.2. Negative Affective Effects

Frustrating

"[S21] Teacher, I was very angry at first because of technical problems."

"[S21] Hocam, ilk zamanlarda teknik sorunlar nedeniyle çok sinirleniyordum."

Boring

"[S21] I was bored because I did it alone at home. I was hoping it finished so would sit down."

"[S21] Ben de evde tek başıma yaptığım için sıkılıyordum. Bitse de otursam diyordum."

"[S01] At first, I'm doing sports, something will change, you know I'm going to gain weight, because I thought it was my goal, so I started. I continued with that intent. When I finally didn't see anything, I was a little bored."

"[S01] İlk başta hani spor yapıyorum bir şeyler değişecek, hani kilo alacağım, benim hedefim o olduğu için öyle düşünmüştüm, öyle başlamıştım. Baya da o niyetle devam ettim. Sonunda bir şey göremeyince canım sıkıldı tabi biraz."

"[S01] I didn't see a difference between doing it and not doing it myself. You're just giving me a point, you know, trying to adjust if I did it right. It was bored because it didn't exactly come clear. Rather than go back to the computer and repeat the robot-like movements, it is more attractive for me to do outside or on my own."

"[S01] Onun karşısına geçip yapmamla, kendim yapmama arasında bir fark göremedim. Sadece bir puan veriyorsun, hani doğru yapıp yapmadığımı ayarlamaya çalışıyordu. O tam da net gelmediği için sıkıntıydı. Evde hani dışarı çıkıp yürüyüş yaptığımda hem hava almış oluyorum hem bana daha iyi geliyor. Sürekli bilgisayar başına geçip robot gibi hareketleri tekrarlamaktansa, o benim için daha cazip geliyor dışarda ya da kendi başıma yapmak."

"[PC3] PC1 said, it's a little bit different, like jumping up and hitting your hands together, instead of something from above ... So it can be done in a play style. Because it's psychology is not suitable for sports. So it sounds boring. The sedentary people buy jogging equipment to the houses, but despite that, the continuation does not continue."

"[PC3] PC1 dedi ya, biraz daha değişik, yukarı zıplayıp ellerini birbirine vuruyor mesela, onun yerine yukardan bir şeyler... Yani oyun tarzında yapılabilir. Çünkü zaten psikolojisi spor yapmaya uygun değil. O yüzden de sıkıcı geliyor. İki ayı bırakın bir ay kullanamaz insan onu. Hırs yapsa da bir süre sonra bırakır. Zaten sedanter insanlar evlere koşu aletleri alıyorlar ama ona rağmen devamı da gelmiyor."

Decreasing sociality

"[S12] I think he would use the gym to pick up girls."

"[S12] Bence kız tavlamak için kullanırdı."

"[S13] You do not feel how the time passes when with others. But when you're on your own, it feels like an hour is getting too long."

"[S13] Yanında başkaları olunca zamanın nasıl geçtiğini alamıyorsun. Ama tek başına olunca o bir saat çok uzuyormuş gibi geliyor, bitmiyor."

"[PC7] This might make him an introverted person."

"[PC7] İçine kapanık bir insan olacak."

"[PC1] He would not gain anything socially, for example."

"[PC1] Sosyal anlamda kazanamaz mesela."

"[PC3] He may not want to do it alone at home, but when a neighbor comes and says let's do it, it's an activity. They don't go out and do aerobics at home, so it can be fun."

"[PC3] Evde tek başına onu yapmak istemeyebilir ama bir komşusu gelip hadi gel şunu yapalım dediği zaman hem bir aktivite olur. Hem dışarı çıkmamış

oluyorlar hem de evde aerobik yapmış oluyorlar, o zaman eğlenceli hale gelebilir"

"[PC3] Does not want to come to the gym ... He thinks I can do it at home, and does not meet with people..."

"[PC3] Spor salonuna gelmek istemiyor... Evde yapabilirim deyip çıkmıyor insan içine... Bir de böyle düşünebiliriz..."

"[PC2] Anti-Socializing ... He won't get an answer. There's no one to motivate if he wants to talk."

"[PC2] Asosyalleştiriyor... Sorusuna cevap alamayacak. Konuşmak istese, motive edecek kimse yok."

"[E1] In fact, we want them to develop in the field by touching something. This program is mainly used for training at home. Ultimately improves whether it improves. But it's not like training on the field."

"[E1] Biz bunları aslında, alanda, çocukların da bir şeylere dokunarak gelişiminin sağlanmasını istiyoruz. Bu program daha çok evde antrenman yapmak için kullanılır. Sonuçta geliştirir mi geliştirir. Ama birebir sahada antrenman yapmak gibi olmaz yani."

"[E1] Of course, people are going for that. People who go to the gym are not just going to do sports, socializing, meeting new people, bored people. This doesn't contribute to them. This is a program that works in places where there is no gym, or a homework, that is, movements without coaches, which should be done face-to-face."

"[E1] Tabi zaten insanlar onun için de gidiyor. Spor salonuna giden insanlar sadece spor yapma amacıyla gitmiyor zaten, sosyalleşmek, yeni insanlarla tanışmak, sıkılan insanlar. Onlara birebir katkısı olmaz. Benim asıl işe yarayacak olan evden çıkamayacak olan, spor salonu olmayan ya da bir ödev yapması gereken yani hareketleri antrenörsüz de birebir yüz yüze olmadığı ortamlarda yapılması gereken yerlerde işe yarayan bir program bu."

Feeling compulsory

"[S21] It didn't work for me. I felt like I was making it obligatory."

"[S21] Benim için bir işe yaramadı. Kendimi zorunlu yapıyormuş gibi hissettiğim için."

"[S11] Absolutely. My teacher bothered me that it was a necessity."

"[S15] Then why did you volunteer?"

"[S11] We volunteered but we made it mandatory, the eight times."

"[Res] It was hard for you to do two days a week."

"[S11] Exactly. So if I do it of my own free will, I do it every day."

"[S11] Kesinlikle. Hocam bir de zorunluluk olması beni rahatsız etti."

"[S15] O zaman niye gönüllü olarak katıldın?"

"[S11] Gönüllü girdik te onu zorunlu yaptık ama sekiz taneyi."

"[Res] Haftada iki gün yapmak sana zor geldi…"

"[S11] Aynen. Yani kendi isteğimle yaparsam her gün yaparım."

2.3.   The perceived effects of the VSP on productivity

2.3.1. Positive Effects on Productivity

Felt energized

"[S18] As a person feels more physically vigorous, I want to do something aktivit I am, for example, a painter, I do not do much when they call to get out. I think one feels vigorous or finds the power to come out of himself."

"[S18] İnsan fiziksel olarak kendini daha dinç hissettiği için aktiviteye daya şey… ben mesela üşengecimdir, dışarı çıkarım diye aradıklarında çok ta şey yapmam (gitmek istemem). İnsan kendini dinç hissediyor ya o dışarı çıkabilecek gücü kendinde bulabiliyor bence."

"[S02] We didn't felt lazy for doing things (while exercising). Now I'm still lazy."

"[Res] Yeah? So it gave you energy?"

"[S02] Yes, I was feeling energetic."

[S02] (Spor yaparken) Bazı şeyleri yapmaya üşenmiyorduk. Şu an hala üşeniyorum."

"[Res] Öyle mi? Yani enerji kazandırdı mı?"

"[S02] Evet enerjik hissediyordum."

"[S01] At first I was tired, but then I felt more vigorous."

"[S01] Hareket ettiğim için başlarda yoruldum ama sonra daha dinç hissettim."

Feedback ensures motion accuracy

"[S14] You pay more attention when you make the moves ."

"[S14] Hareketleri yaparken daha dikkat ediyorsun."

"[S22] Yes it will be necessarily 100"

"[S22] Evet o illa 100 olacak"

"[S08] The duration of the movement was sufficient. It was effective in completing a movement by following the teacher. At that time we also had the chance to correct it because it also gave feedback in red."

"[S08] Hareketin süresi de yeterliydi. Hocayı takip ederek bir hareketi tamamlamada etkiliydi. O sırada kırmızıyla geri bildirim de verdiği için düzeltme şansımız da vardı o süre içerisinde."

"For example, when I make 20%, I don't want to do it ... shut it down and start over."

"mesela %20 yaptığımda ben onu yapmak istemiyordum.. kapatıp baştan başlasam mı falan oluyordum."

"[S10] For example, at the beginning, we were getting 30% or more towards the end. Towards the end, I began to pay more attention."

"[S10] Mesela ilk başlarda %30 falan alıyorduk ya sonlara doğru daha yükseldi. Sonlara doğru daha dikkat etmeye başladım."

"[S03] Positive."

"[S03] Olumlu."

"[S22] It worked well. It was very effective for us to warn us when we made the wrong move."

"[Res] Okay. How did the program's ability to give feedback to your wrong actions affect your exercise?"

"[S04] Good."

"[S04] Güzel."

"[S02] Positive"

"[S02] Olumlu"

"[S18] I think it's a pretty high rate of ambition, when the percentage is low."

"[S18] İnsan hırslanıyor yüzde düşük oldukça baya bir hırslanıyor bence"

"[S06] So it was nice to give feedback. If I got 30% on my first move, I was able to raise it to 70% in the third because it showed me my mistakes."

"[S06] Yani geri bildirim verme olayı güzeldi. İlk yaptığım harekette %30 aldıysam, yanlışımı gösterdiği için üçüncüde %70 e yükseltebildim."

"[S20] Yes, he wants to see a hundred percent."

"[S20] Evet yüzde yüzü görmek istiyor."

"[S05] I think the feedback was good. So when we did it wrong, we could see, for example, it was red."

"[S05] Bence geribildirim iyiydi ya. Yani yanlış yapınca görebiliyorduk, mesela kırmızı oluyordu."

"[PC6] I think he does, he sees how much he can do, after all, he realizes what he does more."

"[PC6] Bence eder yani, ne kadar yapabildiğini görür sonuçta, Ne yaptığını daha çok fark eder."

"[Res] Does it matter to see the percentage of accuracy of movement?"

"[PC3] It corrects itself."

"[Res] Hareketin doğruluk yüzdesini görmek etki eder mi?

"[PC3] Eder, düzeltir kendini."

"[PC3] Yes, my teacher, because he sees himself, sees his mistake there, sees how he can fix it. But they show it only perfectly on TV. They do not show error, he sees himself not. He thinks he is wrong, but he sees his posture, but he sees his own posture."

"[PC3] Olur hocam, çünkü kendini görüyor, oradaki yanlışını görüyor, nasıl düzeltebileceğini görüyor. Ama televizyonda tek mükemmel şekilde gösteriyorlar. Hata göstermiyorlar, o kendini göremiyor. Yaptığı yanlışsa da

doğru zannediyor. Ama burada kendi postürünü gördüğü için, yanlışını da görür."

"[E1] As far as I can see, it is enough. Enough that trainer correctly enters. My first observation is that there is no problem."

"[E1] Şu an gördüğüm kadarıyla yeterli. Yeter ki o değeri eğitmen doğru bir şekilde girsin. İlk gözlemim bir sıkıntı olmadığı yönünde."

"[E2] Here it is something I'm trying to show in that percentage slice, for example, if we install the shot put technique to try to make it full, it will look at eighty percent right I'm doing 90% right, my shot technique, this is the right shot technique."

"[E2] Burada işte o yüzdelik dilimde göstermeye çalıştığım bir şey oydu mesela gülle atma tekniği yüklesek sporcu onu tam yapmaya çalışsa bakacak işte yüzde seksen doğru yapıyorum %90 doğru yapıyorum benim atış tekniğin doğru atış tekniği bu diye."

Systematic

"[S15] The equipment in the gym is also in our house, but I don't do it, but I can do this because, for example, I have to do it because there is order here."

"[S15] Spor salonundaki aletler bizim evde de var ama ben yapmıyorum. Ama mesela burada bir düzen olduğu için yapma zorunluluğunda hissettiğim için yapabiliyorum."

"[S12] There are also arm movements in that program… for example, when I do it at home, I only work for your abdomens, but that program puts us in order. It allows us to do different movements."

"[S12] O programda kol hareketleri de var… mesela ben evde yaptığım zaman sadece karın çalışırım, ama o program bizi düzene sokuyor. Farklı hareketleri yapmamızı sağlıyor"

"[S12] That is systematic. There are shapes there. According to him, you are trying to do it in a certain time."

"[S12] Bu sistematik yani. Orda şekiller var. Ona göre belli bir sürede yapmaya çalışıyorsun."

"[S01] It forces us to. So we have to do the game. We had to do the game I said we had to do, because we were there for 4-50 minutes, he was making us do the movements. If I had done it at home, I wouldn't have talked to my friend after a couple of moves and then I wouldn't be able to continue the sport. Or I could say I'm tired. I didn't have that chance here, so I tried to finish it because I didn't have a chance to stop it."

"[S01] Bizi mecbur bırakıyor. Yani oyunu yapmaya mecburuz. Mecburuz dediğim oyunu yapmamız gerekiyor, orda bulunduğumuz için 4-50 dakika boyunca o hareketleri yapmamızı sağlıyordu. Evde normalde yapmış olsaydım, bir iki

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hareketten sonra arkadaşım arasa onunla konuşup, sonra spora devam etmeyebilirdim. Ya da yoruldum deyip bırakabilirdim. Burada o şansım olmadı, durdurma şansım da olmadığı için bitirmeye çalıştım."

"[S14] This puts it in an order."

"[S14] Bu bir düzene soktu ya."

Improved time management skill

"[S01] At least because you have a certain program, you need to organize the rest of your life a little more."

"[S01] En azından belli bir programın olduğu için hayatının geri kalanını biraz daha düzenlemen gerekiyor."

"[S05] I wasn't doing sports at the time. It had an impact on planning my time."

"[S05] Ben o vakitler spor yapmıyordum. Zamanımı planlamada etkisi oldu."

"[S19] Good as time management."

"[S19] Zaman yönetimi olarak güzel."

Saves time compared to gym

"[S18] If we think of it as a home environment, not a school environment, we can do it in every space. So it's useful. But our environment was not appropriate."

"[S18] Okul ortamı değil de mesela ev ortamı olarak düşünürsek her boşluğumuzda yapabiliriz. Yani kullanışlı bir şey. Ama bizim ortamımız uygun değildi."

"[S18] Time."

"[S18] Zaman."

"[S19] in terms of time."

S19 zaman açısından."

"[S20] In terms of time."

"[S20] Zaman açısından."

"[S04] We can't keep up with the schedule of the gym, for example, but here we can do it at any time."

"[S04] Bir de zaman, mesela spor salonunun saatine uyamayız, ama burada istediğimiz saatte arada falan yapabiliriz."

"[S14] It's been time-saving. So you're spending your time at home instead of at the gym."

"[S14] Zaman yönünden tasarruf oldu. Yani illa spor salonuna gideceğin süreyi evde harcıyorsun."

"[S08] You're waiting for other users to finish in the gym. There's no waiting for that. You'll have to continue without a break while doing sports. It's effective."

"[S08] Spor salonunda diğer kullanıcıların bitirmesini bekliyorsun. Bunda bekleme olayı yok. Spor yaparken de mola vermeden devam etmek gerekir. Etkili oluyor."

"[E2] What it does, the first advantage is a device that can be used by someone on their own. They will not go to a place, will not depend on a place, working time will not be dependent."

"[E2] Ne yapar, birinci avantajı kendi kendine kullanabileceği bir cihaz. Bir yere gitmeyecek bir yere bağımlı olmayacak çalışma saati bağımlı olmayacak."

Monitoring the progress

"[S08] Motivation. For example, starting with 30% to 50% is reluctant to go up. And when you see the body develop on top of it."

"[S06] Yes."

"[S07] Yes."

"[S09] yes."

"[S08] Motivasyon. Mesela %30 la başlayıp %50 e çıkmak ister istemez mutlu edici. Bir de bunun üstüne vücudun geliştiğini gördüğün zaman."

"[S06] Evet."

"[S07] Evet."

"[S09] evet."

"[PC6] It makes sense."

"[S04] We saw the list there or my teacher, for example, if I got sixty points before, I'll get seventy, I'll do eighty. We would focus on doing the movements better. I was like that."

"[S04] Orda hani listeyi görüyorduk ya hocam, mesela atmış aldıysam, yetmiş alayım, seksen yapayım. Hareketleri daha iyi yapayım diye bir odaklanıyorduk. Bende öyle oluyordu."

"[PC6] Mantıklı."

"[PC3] Even if it doesn't affect it, it's very important that even a normal person knows where he is at what level of success, so he tries to correct his movements a little bit just because he knows his level."

"[PC3] Hiç etkilemese bile, normal bir insan bile başarısını nerde hangi seviyede olduğunu bilmesi çok önemli, yani burayım ben yerimde sayıyorum diye biraz daha düzeltmeye çalışır hareketlerini."

"[Res] Actually, he is now able to log into the system and follow his own progress, but you say it's not enough, a coach should follow him and maybe give him different moves."

"[E1] He has to follow his accuracy or duration and so on. As long as he's working with a coach... There's a bit of something in our community, and it has to be done depending on the place. We're not very independent."

"[Res] Aslında şu an sisteme girip kendi gelişimini takip edebiliyor ama o yeterli değil diyorsunuz bir antrenörün onu takip etmesi ona göre belki farklı hareketler vermesi geliştikçe…"

"[E1] Doğruluğunu veya süresini vesaire takip etmesi gerekiyor… Antrenörle çalıştığı müddetçe, bizim toplumumuzda biraz şey var, illa işte bir yere bağlı olarak yapılması gerekiyor. Kendi başımıza çok hareket edebilen insanlar değiliz. Belki online da onu zorlayıcı bir unsur olur, yani programı takip etmesini sağlayabilirsek faydalı olacağını düşünüyorum."

"[E2] For the Coach and the athlete... Now everyone follows their statistics. The followers wins, others can not. .... After learning to follow oneself, it's like a game, it will force the student to do the best. brings the continuity of work, brings the habit of doing sports for life."

"[E2] Antrenör içinde sporcu içinde... Artık herkes istatistiği, kendi verilerini takip ediyor. Takip eden kazanır takip etmeyen kazanamaz zaten. ... Kendini takip etmeyi öğrendikten sonra, hani bir oyun gibi bu. En iyisini yapmaya daha yukarı çıkmaya zorlayacaktır. Öğrenci yaptığı işin, sporun devamlılığını getirir yaşam boyu spor yapma alışkanlığı getirir."

Financially viable

"[S04] (Going to the gym) would be a financial burden for us, my teacher. Though we need to buy kinect."

"[S04] (Spor salonuna gitmek) maddi açıdan bize yük olurdu hocam. Gerçi kinecti almamız gerekir…"

"[S04] Can be bought as a group. because one person is too costly."

[S04] Grup olarak alırsak olabilir. çünkü tek kişi çok maliyetli olur."

"[S03] But then how many years can you use kinect…"

"[S03] Ama sonra kinecti kaç yıl kullanabilirsin…"

Space and time independent

"[S07] It's actually good in terms of efficiency. You can work anywhere, anytime."

"[S07] Verimlilik yönünden iyi aslında. İstediğin yerden, istediğin çalışabiliyorsun."

"[PC2] Something like that, the program is running, for example ... We're at home doing sports, sedentary. Someone can play at the door. But I can stop the program here ..."

"[PC2] Şöyle bir şey, program kaçıyor mesela... Evdeyiz spor yapıyoruz sedanterim. Kapı da çalabilir birisi de gelebilir. Ama burada programı durdurabildiğim için..."

"[PC3] There is a difference."

"[PC3] İlla ki farkı oluyor."

"[E2] What it does, the first advantage is a device that can use itself. Will not go to a place will not depend on a working time will not be dependent."

"[E2] Ne yapar, birinci avantajı kendi kendine kullanabileceği bir cihaz. Bir yere gitmeyecek bir yere bağımlı olmayacak çalışma saati bağımlı olmayacak."

2.3.2. Negative effects on productivity

Not financially viable

"[S04] Can be taken as a group. because one person is very costly."

"[S04] Grup olarak alırsak olabilir. çünkü tek kişi çok maliyetli olur."

"[Res] Kinect is currently around 500 TL."

"[S20] Going to the gym will cost 500 TL per month .. but there's something like that, wider, more comprehensive, more equipment..."

"[Res] Kinect şu anda 500 TL civarında…

"[S20] Spor salonuna gitmek yine aylık 500 TL'yi bulur.. ama orda şöyle bir şey var, daha geniş daha kapsamlı, daha çok şey var…"

Exercise program is not effective

"[S21] We're already just doing warm-up movements. So we don't waste much energy."

"[S21] Biz zaten sadece ısınma hareketleri yapıyoruz. Yani çok enerji harcamıyoruz"

"[S19] There is something like this. When we go to the gym we need half an hour to do warm-up movements. We're doing a part of the lesson, then we're coming. Part of it is such a disconnect. It shouldn't be like that."

"[S19] Şöyle de bir şey var. Spor salonuna gittiğimizde ısınma hareketleri yaparken yarım saat geçmesi gerekiyor. Ders arasında geliyoruz bir kısmını yapıyoruz, sonra geliyoruz bir kısmını. Böyle kopukluk oluyor. Böyle olmamalı."

"[S19] What I'm saying is actually, I think it wasn't very productive. Because it's not continuous. I think it's a short time. Not enough time for sports. It could be on certain days of the week and at certain hours. It could be longer than a month and a half. three periods, but I think it was very tired."

"[S19] Benim söylediğim şey aslında bu, yani çok verimli değildi bence. Çünkü sürekli değil. Kısa bir süre bence. Spor için yeterli bir süre değil. Haftanın belli günlerinde ve belli saat aralığında olabilirdi. Bir buçuk aydan daha uzun olabilirdi. Mesela o üç periyottan oluşuyordu ama çok yoruyordu bence."

Kinect sharing has wasted time

"[S12] In fact, the lack of it from the gym, my teacher. If only two or three people can do the same thing at the same time. If we do the same movements at the same time or if the movements are different, we do not need the gym, but we do one person ... friend waits for an hour."

"[S12] Aslında spor salonundan eksiği şu hocam. Aynı anda iki üç kişi yapabilsek yine aynı şey olur. Aynı anda aynı hareketleri yapsak ya da hareketler farklı olsa spor salonuna biz gerek duymayız ama tek kişi yapıyoruz … bir saat bekliyor arkadaş."

"[S01] We have compressed it. If I was doing it at home, it wouldn't be that much trouble. I could do it in the evening, I could do it in the night, but I had to find you here, you had to have kinect, the other people weren't supposed to be here,

or you had to queue up and be together. It was a bit of a hardship, a couple of times late for class. To finish it off. Because there is no such thing as stop, we have to finish it when you do not finish it is not added to the system. Better not doing it."

"[S01] Sıkıştırdık. Eğer ben de evde yapıyor olsaydım o kadar sıkıntı olmayacaktı. Akşam gidince de yapabilirim, gece de yapabilirdim, ama burada mecburen sizin olması gerekiyordu, kinectin olması gerekiyordu, diğer kişilerin burada olmaması gerekiyordu ya da sıraya girip o arada olması gerekiyordu. Biraz sıkıntı oldu, derse bir iki kere geç kalma durumu oldu. Onu bitireceğim diye. Çünkü durdur diye bir şey olmadığı için onu bitirmek mecburiyetindeyiz bitirmediğiniz zaman da yarım oluyor o da eklenmiyor zaten hani yapmamış olmak daha iyi."

Feedback could be inconsistent

"[S18] My teacher had a problem with Kinect detection. For example, when I saw others doing it, even when they made a mistake, they wrote 100 percent success. For example, we do the movements correctly, but 60% 50%."

"[S18] Hocam kinectin algılamasında sorun vardı. Mesela diğerlerini yaparken gördüğümde yanlış yaptıkları zaman bile yüzde 100 başarı yazıyordu. Biz mesela hareketleri doğru yapıyoruz, ama %60 %50 falan… Yani algılamada sıkıntısı vardı."

"[S19] I can give an example . For example, the last movement, the jumping movement, I've seen him give high rates even if not jumping. So.."

"[S19] Örnek verebilirim. Mesela en son hareket, zıplama hareketi, onda zıplanılmasa bile yüksek oranları verdiğini gördüm. Yani.."

"[S05] There is a problem. He thought it was right when we did it wrong. For example, he didn't jump in the bouncing movement, but he accepted it right."

"[S05] Şöyle bir problem var. Yanlış yaptığımızda doğru sanıyordu. Mesela zıplama hareketinde zıplamasak da doğru kabul ediyordu. Bazı hareketlerde doğru yapınca yanlış diyebiliyordu."

"[S19] But there is something like that. Even though we didn't act wrong, it was sometimes perceived as wrong."

"[S19] Ama şöyle de bir şey var. Yanlış hareket etmesek te yanlış hareket gibi algılıyordu bazen."

"[S01] Yes, it did, but I did what the model did, but I got a very different look. That was so they were very tight. You know I'm doing wrong or trying to change a lot of different movements was very annoyed, for giving low points. Sometimes, even though I was standing there, or something, it was high. He was a little bored."

"[S01] Evet, oldu ama ben orda mankenin yaptığını yaptığım halde çok farklı bir görüntü aldığım oldu. Onlar çok sıkıtı oldu yani. Hani ben mi yanlış yapıyorum ya da çalışırken çok daha değişik değişik hareketler oldu o çok canımı sıktı, düşük puan verdiği için. Bazen de öyle durduğum halde, ya da bir şey olmadığı halde yüksek verdiği de oldu. O yani biraz sıkıntıydı."

"[S09] It sometimes flashed even if we did correct."

"[S09] Doğru yaptığımızda da yandığı oluyordu."

"[S05] In some movements. For example, in the jumping movement, he only gave a high score when we raised our arms."

"[S05] Bazı hareketlerde. Mesela zıplama hareketinde sadece kolumuzu kaldırdığımızda yüksek puan verdiği oluyordu."

"[S04] Sometimes we didn't do the same, we found the short way or something. He accepted it. For example, we were doing it (he got up, broke his right knee and lifted it up in front of his knee and light tissue on his left hand)"

"[S04] Hocam bazen aynısını yapmıyorduk, kısa yolunu falan bulmuştuk biz. Onu kabul ediyordu mesela. Şöyle yapıyorduk (ayağa kalkar, sağ dizini kırarak önüne doğru havaya kaldırır ve sol eliyle ayakucuna dokunur.) kabul ediyordu."

3. **The attitudes of participants towards using the VSP (Research Question 3)**

Positive Attitude

"[S03] It gives ambition."

"[S03] Hırs yapıyor."

"[S04] Useful"

"[S02] Yes."

"[S03] Yes"

"[S04] Yararlıydı"

"[S02] Evet."

"[S03] Evet"

"[S04] It was appropriate."

"[S02] It was appropriate."

"[S03] It was appropriate."

"[S04] Uygundu"

"[S02] Uygundu"

"[S03] uygundu."

"[S04] We want it. Because my teacher, even if we get weight (while using the VSP) the body looks stable. Now when we get weight, we directly look like we're overweight."

"[S04] İsteriz. Çünkü hocam o zaman kilo alsak bile vücudun toplu alınıyor, vücudun bir düzeni oluyor gerçekten. Şimdi aldığımız zaman direk kilolu gibi duruyoruz."

"[S04] I prefer VSP. Because there is an animation or something, that I like. It gives points, encourages people, tries to do it, with determination."

"[S04] Ssp'yi tercih ederim. Çünkü orda bir animasyon falan var ya insanın hoşuna gidiyor. O puan veriyor, insanı teşvik ediyor, yapmaya çalışıyor, azim falan."

"[S06] Yes, I think it is useful to me. Because, uh, we don't move during the day, except for walking."

"[S06] Evet bana yararı olduğunu düşünüyorum. Çünkü ııı, gün içinde hiç hareket etmediğimiz de oluyor yürümek dışında."

"[S05] I agree with S06."

"[S05] S06ya katılıyorum."

"[S07] I agree."

"[S07] Katılıyorum."

"[S08] I use it even if there was no saving in database. The aim is to do sports."

"[S08] Hocam veri tabanına kayıt olma olayı olmasa da kullanırım. Zaten amaç spor yapmak"

"[S09] I have the same opinion."

"[S09] Ben de aynı düşüncedeyim."

"[S06] I would use it to warm up."

"[S07] Exactly"

"[S08] Yes"

"[S05] Yes"

"[S06] Isınmak için kullanırım."

"[S07] Aynen"

"[S08]Evet"

"[S05] Evet"

"[S11] Available for exercise only."

"[S11] Sadece egzersiz için kullanılabilir."

"[S15] It's a beautiful thing for us ladies."

"[S15] Biz bayanlar için çok güzel bir şey."

"[S15] Useful for warm-up movements"

"[S15] Isınma hareketleri için kullanılabilir"

"[S17] I think it's appropriate as an entry level."

"[S17] Başlangıç seviyesi olarak uygun bence."

"[S16] For example, I want to warm up with this, before going out to Astroturf (for football)."

"[S16] Mesela halı sahaya gitmeden önceden halı sahada ısınmak yerine bununla ısınıp gitmek istiyorum."

"[S18] I think it was useful."

"[S21] Useful."

"[S22] It was useful."

"[S19] It was useful."

"[S18] Bence yararlıydı."

"[S21] Yararlıydı."

"[S22] Yararlıydı."

"[S19] Yararlıydı."

"[S22] I use it, sir."

"[S22] Ben kullanırım hocam."

"[PC3] You are a coach, you will have your own members. You can give to your members. You can give control at home. You know that does it or not? Does it complete the program .. So does not come to the hall, say I'll do it at home. You can keep it under control at home."

"[PC3] Bir antrenörsünüz, kendi üyeleriniz olacak. Üyelerinize verebilirsiniz. Evdeki kontrolü sağlayabilirsiniz. O şekilde hani yapıyor mu yapmıyor mu? Programı tamamlıyor mu.. Yani gelmiyor mesela salona, evde yapacağım diyor. Bunu uygulatabilirsiniz evde, kontrol altında tutabilirsiniz."

"[E1] Or a trainer at home can do that, if it can be improved at work, he will give homework in instrument work, that is, to repeat those movements to work at home."

"[E1] Ya da evde bir antrenör şunu yapabilir, işte geliştirilebilirse aletli çalışmalarda, yani evde çalışması için o hareketleri tekrarlaması için, ödev verecek yani…"

"[E1] We do not approve of this in fact, but here it is obligatory ... So this program can have two things, like housewives who can not leave the house, so you can not think constantly, or around the metropolitan areas, so there are towns, villages, sports hall Or think of a physical education teacher at work in the village where the facilities are narrow, that is, it can be used in places."

"[E1] Çok tasvip etmiyoruz biz bunu aslında, ama işte zorunlu hallerde... Yani bu programın iki şeyi olabilir, evden çıkamayan ev hanımları gibi, yani sürekli çıkamayanlar ya da işte etrafında yani büyükşehirleri düşünmeyelim sonuçta kasabalar var, köyler var, spor salonu ulaşımı yok. Ya da işte bir beden eğitimi öğretmenini düşünün köyde imkanların dar olduğu yerlerde, yani o tip yerlerde kullanılabilir."

"[E2] It would be adequate, it would provide convenience. There's no dependence on anyone. He will only be dependent on the VSP, related with sports. So he won't need to go to a gym. But after he works 5 months 6 months 1 year, when he

comes to a physically and physiologically appropriate position, he will need to do other sports branches."

"[E2] Yeterli olur, kolaylık sağlar. Birine bağımlılığı olmayacak. Tek bağımlılığı da olacak sporla ilgili. Yani bir spor salonuna gitmeye ihtiyaç duymayacak. Ama bunu çalışır 5 ay 6 ay 1 sene, o fiziksel ve fizyolojik olarak uygun pozisyona getirince, diğer spor branşlarını da yapma ihtiyacı duyacak."

Ambivalent attitude

"[S12] It can be used before football match"

"[S12] Halı saha maçından önce kullanılabilir"

"[S12] I think it was enough for warm-up. But it wasn't really sporting."

"[S12] Isınma için yeterliydi bence. Ama gerçekten spor faaliyeti değildi."

"[S21] Useful."

"[S21] Yararlıydı."

"[S21] I do not use."

"[S21] Kullanmam."

"[S10] Can be used if some actions are added instead of others."

"[S10] Bazı hareketler yerine başkaları eklenirse kullanılabilir."

"[S19] Maybe."

"[S19] Belki."

"[PC1] I wonder."

"[PC1] Merak ederdim."

"[PC1] You may be a professional but you just wonder, I wonder if I can get 100% success when I do it on the computer. What does the computer tell me?"

"[PC1] Profesyonel olabilirsin ama sadece merak edersin, acaba bilgisayarda yaptığımda yüzde yüz başarı alabiliyor muyum.. Bilgisayar bana ne diyor."

Negative attitude

"[S01] Had I seen the benefit, I would have loved to continue. If I can not even outside where I have to do that, would I like one I would have thought. But since I didn't see the benefit, I didn't create such enthusiasm."

"[S01] Faydasını görseydim devam etmek isterdim. Eğer burada yapamıyor olsaydım bile dışarda şunu yapmam lazım, yapayım gibi bir düşüncem olurdu. Ama faydasını görmediğim için de öyle bir istek, heyecan yaratmadı bende."

"[S20] No."

"[S20] Hayır."

"[S20] I don't know, the training sounds more accurate to me. What can I gain in a home environment? We are jumping, jumping, running, we have very different movements, my teacher."

"[S20] Bilmiyorum, antrenman daha doğru geliyor bana. Ev ortamında bana ne kazanç sağlayabilir ki? Biz atlıyoruz, zıplıyoruz , koşuyoruz, çok farklı farklı hareketlerimiz var hocam."

"[PC6] Even if we don't know all the movements, when we research and learn, it is more attractive to do it individually, not in front of a camera, but in the gym ..."

 "[PC6] Tüm hareketleri bilmesek bile araştırıp öğrendiğimizde onu bireysel olarak, illa bir kamera karşısında değil de spor salonunda yapmak daha cazip geliyor..."

4.   **The intentions of participants towards using the VSP in the future (Research Question 4)**

Would use in the future

"[S15] We would use it."

"[S15] Kullanırdık."

"[S15] Instead of going out, whether it is summer or winter, we can do sports at home."

 "[S15] Evden dışarı çıkmaktansa yazı var kışı var çünkü evde de sporumuzu yapabiliriz."

 "[S12] We would use it."

"[S12] Kullanırdık"

"[S02] I would use it."

 "[S02] kullanırım."

"[S03] I would use it."

 "[S03] kullanırım."

"[S04] I would use it."

 "[S04] Kullanırım."

"[PC3] So we can have it done at home, but we can't get it done in class"

"[PC3] Yani evde yaptırabiliriz ama derste uygulatamayız yani"

"[PC1] This may be some material in addition to learning. You open the slide, or you learn the movement, you open the same movement in front of the child, he does it. If you'd like, you can make them repeat it outside as well."

"[Res] You say it can be used to attract attention."

"[PC1] Exactly."

"[PC1] Öğrenmede ek olarak bir şey olabilir. Slaytı açıyorsun ya hareketi öğreniyor çocuk, bunda da aynı hareketi açıyorsun çocuk karşısında sadece yapıyor, ek olarak yine yaptırıyorsan dışarıda yaptırırsın zaten."

"[Res] İlgi çekmek için kullanılabilir diyorsun."

"[PC1] Aynen."

"[E2] I would like to use it at every stage of the training, during the warm-up phase and also at the technical stage. Because Turkish athletes, most of the time, they

are weak in terms of technique for starting the sport too late and after that they see themselves very famous, so they do not enter technical studies. I'll show my trainee that, in this dimension he can do it sixty percent accurate, I'll provide feedback."

"[E2] Antrenmanın her aşamasında kullanmak isterim ısınma aşamasında da teknik aşamasında da. Çünkü Türk sporcularını, birçok şeyi, etkeni, çok geç spora başladıkları için teknik konusunda zayıf oluyorlar ve ondan sonra kendilerini çok ünlü gördükleri için teknik çalışmalara girmiyorlar. Yani orada ben sporcumu alırım gösteririm işte o boyutta işte ancak yüzde altmış doğrusunu yapabiliyor diye kendisinde geri dönüşüm sağlarım."

Would use if improved

"[S01] It would be nice if the insufficiencies were removed. I do not think it is attractive as it is."

"[S01] Eksiklerin giderilmesi durumunda çok güzel olur. Bu haliyle cazip değil bence"

"[S05] I don't want it in its current form. But I want to work in its improved form."

"[S05] Şu anki haliyle istemem. Ama geliştirilmiş haliyle çalışmak isterim."

"[S06] I can use if the motions are diversified."

"[S06] Hareketler çeşitlendirilirse kullanabilirim."

"[S07] I think the same way."

"[S07] Ben de aynı düşüncedeyim."

"[S08] I agree."

"[S08] Katılıyorum."

"[S08] I can use if we can add movements by different regions."

"[S08] Farklı bölgelere göre hareketleri ekleyebilirsek kullanırım."

"[S09] I agree with S08. I do sports. I use it in gyms ... or at least use it in the same way to warm up."

"[S09] S08ya katılıyorum. Spor yaptığımdan. Spor salonlarında... ya da en azından aynı şekliyle ısınmak için kullanırım."

"[S14] I can't feel comfortable at the gym personally, but do as you like at home."

"[S14] Ben şahsen spor salonunda rahat edemiyorum, ama evde istediğin gibi yap."

"[S18] Maybe, if the options are increase. Everyone may want to steer to something. For example, S20 to volleyball field ... It may be preferable like that. However, there is currently only one option. Coverage is low."

"[S18] Seçenekler artarsa olabilir. Herkes bir şeye yönlenmek isteyebilir. Mesela S20 voleybol alanına... Öyle bir şey olursa tercih edilebilir. Ama şu an tek bir seçeneğin var. Kapsamı düşük"

"[S22] In my opinion, if it is a big system with a bigger database, why not."

"[S22] Bence de spor olarak dallandırılırsa içerisine veri tabanı bayağı büyük bir sistem gelirse neden olmasın."

"[E1] I use it at home and at work, but there must be elements that motivate me. To warn, the visuality at work may be improved to some extent. So there must be elements to trigger… I would like to use it in every stage of the training, both in the warm up phase and in the technical phase."

"[E1] Kullanırım yani ev de ve iş yerinde kullanırım ama beni motive etmesi gereken unsurlar da olması gerekiyor. Uyaracak, işte görselliği belki bir nebze daha iyileştirilebilir. Yani tetikleyecek unsurların olması gerekiyor… Antrenmanın her aşamasında kullanmak isterim ısınma aşamasında da teknik aşamasında da."

Would not use in the future

"[S10] I wouldn't use it. Games are better."

"[S10] Yalan olmasın kullanmazdım. Çünkü baktım onun içinde bir tane CD var ben onu yükledim oyun çok güzel."

"[S16] I generally wouldn't use it because I don't like to do sports. But I recommend it to people who want to do sports at home."

"[S16] Ben genel olarak spor yapmayı sevmediğim için kullanmazdım. Ama evde spor yapmak isteyenlere tavsiye ederim."

"[S11] Very good to be supportive before sports. Other than that it is not useful."

"[S11] Spor öncesinde destekleyici olması için çok iyi onun dışında bence kullanılmaz."

5.   The opinions of participants on the implications of using VSP in educational settings (Research Question 5)

Can be used in education

"[S18] My idea is that technology should be a last resort. For example, without a microscope, we wouldn't be able to see small cells. It can be used when there is no solution other than technology."

"[S18] Benim fikrim teknoloji son çare olmalı. Mesela mikroskop olmasaydı küçük hücreleri görme şansımız olmazdı. Teknolojiden başka çare olmadığı zaman şey yapılabilir (kullanılabilir)."

"[S19] Yes, it should."

"[S19] Evet kullanılmalı."

"[S20] I also think it should be used. We even used it in an English class."

"[S20] Bence de kullanılmalı. Hatta biz kullanmıştık bir İngilizce dersinde."

"[S22] I think it can also be used in education."

"[S22] Bence de yani eğitimde kullanılabilir."

"[PC3] It can be done at home, but in 40 minutes, how do you get students to do it? My teacher, a physical education instructor needs to make children love sports,

but if she makes the students love computer, students will be turned upside down."

"[PC3] O tamam evde yaptırılabilir ama 40 dakikanın içinde sen ona nasıl yaptıracaksın? Hocam zaten bir beden eğitimi hocası çocuklara sporu sevdirmesi gerekiyor, ama bilgisayarı bunu sevdirirse tepetaklak olurlar."

"[PC4] We could assign the movements that they do in the mornings, to do at home as exercise."

"[PC4] ...Sabah yaptığı hareketleri akşam evde tekrar egzersiz programı olarak verebiliriz"

"[E1] We do not make much use of this type of equipment such as visuality in our lessons right now, as I said we do one-to-one movement, this student as a homework application at home or outside of the application in a summer program will benefit from the application in a summer program, do not necessarily think of our thing in high school In other words, there isn't a gym everywhere but unfortunately it is both indoor and outdoor."

"[E1] Bizim derslerde şuan görsellik yani bu tip ekipmanlardan çok fazla faydalanmıyoruz biz birebir hareket yapıyoruz dediğim gibi bu öğrenciye bir ödev olarak artık hareketi evde uygulaması ya da sınıf dışında uygulaması bir yaz programında uygulaması yönünde fayda sağlayacaktır, illa bizim şey de düşünmeyin liseyi ortaokuldaki öğretmenleri de düşünebilirsiniz. Yani sonuçta her yerde bir spor salonu yok maalesef kapalı hem de açık. Sınıftan çıkamayanlar da var sınıf ortamında uygulayarak ve de ucuz bir maliyetle herhalde."

"[E1] Not in the crowded classrooms. As I said, you can't apply it to the whole class. Only the perception of the movements take place in the brain, so they take that photo. There is no disadvantage too much. It will not be a part of a training just by adhering to it."

"[E1] Kalabalık sınıflarda olmaz. Dediğim gibi yine kullanılır tüm sınıfa uygulatamazsınız. Sadece hareketlerin algılaması beyninde yer etmesi yani o fotoğrafı çekmiş olurlar. Dezavantajı yok çok fazla. Sadece buna bağlı kalarak sonuçta bir eğitim yapılmayacaktır bu bir eğitimin parçası olacağı için."

"[E1] In a classroom environment, students can not use this one by one, but I can say that a few applications can be done. Because, the classroom environment would be crowded. Might be used just to ensure that things take place in their mind. To say that: look, the professional actor has done this practice, let's try it here shortly."

"[E1] Sınıf ortamında sıra ile yapılmaz ama birkaç uygulama yapılabilir öyle diyeyim yani. Yoksa sınıf ortamı kalabalık her biri tek tek yapamazsın. Sadece zihinde o şeyin yer almasını sağlamak için olabilir. Bakın profesyonel oyuncu şu

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şekilde yapmış bunun uygulaması şu hadi burada da uygulayalım denilebilir kısa kısa."

Entertaining

"[S21] Or to make learning more fun in children."

"[S21] Ya da çocuklarda öğrenimi daha eğlenceli hale getirmek için."

"[S22] I think it can also be used in education. It's fun too."

"[S22] Bence de yani eğitimde kullanılabilir. Hem eğlenceli oluyor…"

"[PC1] … You can have kids do it for more fun ..."

"[PC1] … Daha eğlenceli olsun diye hani çocuklara yaptırabilirsin..."

Might increase active participation

"[S19] (I helps to get) active participation of children for permanent learning."

"[S19] kalıcı öğrenme için çocukların etkin katılımı sağlanır."

"[S04] I think it should be used, my teacher. For example, they had applied something like this to us in English ... We are ashamed to get up on the board or something, but here the person wants to play, to speak, even if our pronunciation is bad, we want to talk or something. It was good."

"[S04] Bence kullanılmalı hocam. Mesela Bize İngilizcede uygulamışlardı bundan… Biz kalkamaya utanıyoruz tahtaya falan ama burada bir oynamak istiyor insan çıkmak konuşmak telaffuzumuz kötü olsa bile konuşmak falan istiyor. Güzeldi yani insan istiyor."

Special education

"[S18] In special education. In a group that really needs it."

"[S18] Özel eğitimde. Gerçekten ihtiyacı olan bir grupta."

"[S21] Can be used in special education. To teach movements ..."

"[S21] Özel eğitimde kesinlikle kullanılabilir. Hareketleri öğretmek için…"

Anatomy education

"[S17] … If the system can be formed, if the human body can be created, in order to recognize our body, there is this bone here, like this vessel is there, so it can be used in anatomy."

"[S17] …Eğer sistem oluşturulabilirse, vücudumuzu tanımak amaçlı insan vücudu oluşturulabilirse, burada bu kemik var, şurada şu damar var gibi, anatomide kullanılabilir yani."

Physical education

"[S17] Physical education can be used to warm up in class."

"[S17] Beden eğitimi dersinde ısınmak için kullanılabilir."

"[PC1] It can be used as a separate additional learning technique, for example, like a presentation slide."

"[PC1] O ayrı ek öğrenme biçimi olarak kullanılabilir ama, mesela bir slayt gibi."

"[E1] Available for both (classroom and home). It can be improved as follows. Imagine a professional football player who is expert in that business if we can record his movements in the system, or we can make a basketball player or tennis player, that is, letting a student visually see it before telling the subject. We can get him to play it through the system. We can then apply it in the field. It can be added to the system in this direction... I mean the video shows that here is a tennis player's forehand, then the instructor records it, then the student tests it, a triangulation like this."

"[E1] Her ikisinde de (sınıf ve ev) kullanılabilir. Şu şekilde de geliştirilebilir. O işin uzmanı profesyonel bir futbolcu düşünün onun yaptığı hareketleri sisteme kaydedebilirsek ya da bir basketbolcu ya da tenisçinin, yani öğrenciye bir konuyu anlatmadan önce görsel olarak bunu görmesini sağlayabiliriz. Sistem üzerinden bunu oynamasını sağlayabiliriz. Daha sonra sahada da bunun uygulamasını yapabiliriz. Sisteme bu yönde eklenebilir... Yani videoyu gösterir işte bir tenisçinin forehand şöyle yaptı daha sonra eğitmen onu kaydeder sonra öğrenci uygular üçlü bir şey olmuş olur."

Interesting

"[S20] They pay more attention to lesson. Because they have something like that in front of them. So it's more interesting than pencil and paper."

"[S20] Evet, derse daha çok dikkat ederler. Çünkü böyle bir şey var karşılarında. Yani kalem kağıt olmasındansa bu daha çok ilgilerini çeker."

Gamification

"[S19] ... children's active participation is provided for learning. Student stands up, plays a game, and implicit learning is realized, I think."

"[S19] ... kalıcı öğrenme için çocukların etkin katılımı sağlanır. Çıkar oyun oynar, hem de gizil öğrenme gerçekleşmiş olur bence."

"[PC3] It can be done in the game form. But you can't make students one by one do these movements in the classroom. You are there, you should show them yourself."

"[PC3] Oyun şeklinde yapılabilir. Ama birebir, bu hareketleri sınıf ortamında yaptıramazsın. Kendin varsın, kendin birebir göreceksin."

Professional Training

"[E1] Or a trainer at home can do it, and if it can be improved with equipment, he will give homework, that is to repeat those movements."

"[E1] Ya da evde bir antrenör şunu yapabilir, işte geliştirilebilirse aletli çalışmalarda, yani evde çalışması için o hareketleri tekrarlaması için, ödev verecek yani..."

"[E2] I would like to use it at every stage of the training, during the warm-up phase and also at the technical stage. Because Turkish athletes, many things, the factors, they are weak in terms of technique for starting too late and after that

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they see themselves very famous, so they do not enter technical studies. I'll show you that size at work, but only sixty percent can do the right thing I'll provide recycling."

"[E2] Antrenmanın her aşamasında kullanmak isterim ısınma aşamasında da teknik aşamasında da. Çünkü Türk sporcularını, birçok şeyi, etkeni, çok geç spora başladıkları için teknik konusunda zayıf oluyorlar ve ondan sonra kendilerini çok ünlü gördükleri için teknik çalışmalara girmiyorlar. Yani orada ben sporcumu alırım gösteririm işte o boyutta işte ancak yüzde altmış doğrusunu yapabiliyor diye kendisinde geri dönüşüm sağlarım."

"[E2] It can be used in physical education classes, but if we call it one percent, I think the current dimension of it is 99 out of 100 for private work or individual work or club national team level work."

"[E2] Beden eğitimi derslerinde kullanılabilir ama buna yüzde bir dersek 100'de 99'unu özel çalışmaya da bireysel çalışma ya da kulüp milli takımlar düzeyinde çalışmalarda diye düşünüyorum bunun şu anki boyutunu."

"[E2] National teams or senior professional teams can use it for the development of their athletes in technical training."

"[E2] Milli takımlar ya da üst düzey profesyonel takımlar kendi sporcularının teknik eğitimdeki gelişimleri için kullanabilir."

"[E2] Now there are new studies of the Ministry of National Education, physical education teachers are trying to draw more athletes are trying to train athletes at least a few other areas of course to grow in the subject of course, if multiple views can be provided ... For example, there is a handball team. , 10 athletes, he can show on 10 athletes at the same time percentages ... Teachers, so teachers or coaches can use it."

"[E2] Şimdi milli eğitim bakanlığının yaptığı yeni çalışmalar var beden eğitimi öğretmenlerini içine daha fazla çekmeye çalışıyorlar sporcu yetiştirmeye çalışıyorlar en azından ders dışındaki sporcu yetiştireceği alanlarda tabi birkaç tane de boyuta gelirse, çoklu görüş de sağlanabilirse... Mesela diyelim bir hentbol takımı var, 10 tane sporcuları var, o 10 sporcu üzerinde aynı anda gösterebiliyorsa yüzdelerini... Hocaları yani öğretmenler ya da antrenörler bunu kullanabilir."

Physiotherapy

"[E1] There are people in nursing homes. They can be applied even in physical therapy even in a hospital setting. Physical therapy is applied at home and eventually people are not in the hospital for 24 hours. It can be used even in such things… Yes, it is very useful in the health sector."

"[E1] Bakımevlerinde insanlar var. Hastane ortamında bile fizik tedavide bile uygulanabilir bunlar. Fizik tedavi evde uygular sonuçta 24 saat hastanede

olmuyor insanlar. O tip şeylerde bile kullanılabilir… Evet, sağlık sektöründe de çok kullanışlı olur bu."

Disadvantages in Educational Settings

"[PC3] It can be done at home, but in 40 minutes, how do you get him to do it? My teacher is already a physical education instructor needs to make children love sports, but if the computer makes it love, they will be turned upside down."

"[PC3] O tamam evde yaptırılabilir ama 40 dakikanın içinde sen ona nasıl yaptıracaksın? Hocam zaten bir beden eğitimi hocası çocuklara sporu sevdirmesi gerekiyor, ama bilgisayarı bunu sevdirirse tepetaklak olurlar."

"[E1] Not in crowded classrooms. As I said, you can't apply it to the whole class. Only the perception of the movements take place in the brain, so they take that photo. There is no disadvantage. It will not be a part of a training."

"[E1] Kalabalık sınıflarda olmaz. Dediğim gibi yine kullanılır tüm sınıfa uygulatamazsınız. Sadece hareketlerin algılaması beyninde yer etmesi yani o fotoğrafı çekmiş olurlar. Dezavantajı yok çok fazla. Sadece buna bağlı kalarak sonuçta bir eğitim yapılmayacaktır bu bir eğitimin parçası olacağı için."

"[E1] In a classroom environment, students can not use this one by one, but I can say that a few applications can be done. Because, the classroom environment would be crowded. Might be used just to ensure that things take place in their mind. To say that: look, the professional actor has done this practice, let's try it here shortly."

"[E1] Sınıf ortamında sıra ile yapılmaz ama birkaç uygulama yapılabilir öyle diyeyim yani. Yoksa sınıf ortamı kalabalık her biri tek tek yapamazsın. Sadece zihinde o şeyin yer almasını sağlamak için olabilir. Bakın profesyonel oyuncu şu şekilde yapmış bunun uygulaması şu hadi burada da uygulayalım denilebilir kısa kısa."

"[E2] It can be used in physical education classes, but if we call this one percent, I think that 99 out of 100 is for private work or individual work or work at club national teams level. The current dimension of this is to be used tomorrow. It develops something ... But the use of what I see in the lesson brings a burden to the schools, so it cannot even get a ball to the schools. Since it is a course that aims to do all of life from trekking to football, from basketball to bocce everywhere , it can be used in an area of at least 10 square meters, at least as of today, it can be used very much in physical education classes and also because of its financial dimension. think it is not possible."

"[E2] Beden eğitimi derslerinde kullanılabilir ama buna yüzde bir dersek 100'de 99'unu özel çalışmaya da bireysel çalışma ya da kulüp milli takımlar düzeyinde çalışmalarda diye düşünüyorum bunun şu anki boyutunu. Yarın geliştirilir derste kullanılacak hani başka bir çalışma ile başka birisi başka bir şey

geliştirir... Ama bu gördüğümün derste kullanılması çok bir yük getirir mali bir yük getirir okullara. Yani şu an okullara bir tane top bile alamıyor. Beden eğitimi dersinin asli amacı yaşam boyu spor olduğu için onlara daha fazla hareket etmeyi bunu açık alanda ya da her yerde trekking den futbola kadar, Basketboldan bocce sporuna kadar hepsini yaşam boyu yapmasını amaçlayan bir ders olduğu için. Bunun da en azından 10 metrekarelik bir alanda kullanılabileceği için, en azından bugünkü itibarıyla, beden eğitimi derslerinde çok fazla kullanılabileceğini, bir de mali boyutundan dolayı mümkün olmadığını düşünüyorum."

6. The suggestions of participants for improvement of the VSP (Research Question 6)

6.1. Content Suggestions

Variety of motions can be increased

"[S17] It wasn't enough. It was missing. It could have been more."

"[S17] Yeterli değildi. Eksikti. Daha fazla olabilirdi"

"[S16] It would be nice to have someone who we can call a visual live like that dances there."

"[S16] Bir tane böyle görsel canlı diyebileceğimiz birisi orda dans etse onun danslarını yapsak daha güzel olurdu."

"[S09] Can be increased."

"[S09] Arttırılabilir."

"[S08] I would increase movements. I mean, there are only movements for the arm. There is a leg, bend over, but I think some of the movements are missing. This is probably a Kinect issue."

"[S08] Hocam hareketleri arttırırdım. Yani sadece kola yönelik hareketler var. Bacak ta var ama eğilip kalkma şu bu, hani bazı hareketler eksik bence. Bu da belki kinectten kaynaklanan bir şeydir."

"[S07] Diversity needs to be increased."

"[S07] Çeşitliliğin arttırılması gerekiyor."

"[S15] It could be different in the first set, different in the second, different in the third."

"[S15] 1. Sette farklı, ikinci sette faklı, üçüncü sette farklı olabilirdi."

"[S18] Low level."

"[S18] Düşük düzeyde."

"[Res] So you find the level of movement low, you should add movements for certain muscle groups, you say. Anyone agrees? Everyone agrees."

"[Res] Yani hareketlerin düzeyini düşük buluyorsun, belli kas gruplarına yönelik hareketler eklenmeli diyorsun. Katılan var mı? Herkes katılıyor."

"[S21] Yes useful, but if movements are improved."

"[S21] Evet kullanışlı ama hareketler geliştirilirse."

"[S18] Scope should be developed."

"[S18] Biraz kapsam gelişmeli."

"[S13] If there were other movements."

"[S13] Başka hareketler de olsaydı."

"[S05] I think the variety of movement needs to be increased, like push-ups, crunches."

"[S05] Bence arttırılması gerekiyor hareket çeşitliliğinin şınav mekik gibi"

"[S10] Several movements can be removed and other movements can be entered."

"[S10] Birkaç hareket çıkartılıp başka hareketler de girilebilir"

"[S15] 1 hour is quite normal for sports, but because the movements are always the same, the time is too much for us because we are bored."

"[S15] 1 saat gayet normal bir süre spor için ama hareketler hep aynı olduğu için biz sıkıldığımız için süre bize fazla geliyor"

Daily exercise duration may be shortened

"[S02] It was also very long … It was an hour. Half an hour (would have been better.)"

"[S02] Bir de çok uzundu… Bir saatti, yarım saat (olsa daha iyi olurdu.)."

"[S12] I would also shortened the time."

"[S12] Bir de süresini kısaltırdım."

"[S11] Exactly."

"[S11] Aynen."

"[S13] And also may be less repetitions. We were doing eight times I guess ."

"[S13] Bir de tekrar sayısı az olabilirdi. 8 defa yapıyorduk herhâlde."

"[S13] The number of sets may also be low."

"[Res] How do you want it to be?"

"[S13] 25 minutes."

"[S13] Set sayısı da az olabilir."

"[Res] Sen nasıl olmasını istersin?"

"[S13] 25 dakika."

"[S14] I would have shortened the time. I would shorten it in the second and third set, but not in the first set."

"[S14] Süresini kısaltırdım. İlk sette kısaltmasam da ikinci ve üçüncü sette kısaltırdım."

"[S16] Let us determine ourselves. If I have half an hour or fifteen minutes, I choose a set, three sets enter and it is not finished."

"[S16] Kendimiz belirleyelim. Atıyorum benim yarım saat ya da on beş dakika vaktim varsa bir set seçerim, üç set girip yarım kalmamış olur."

"[Res] Does a fifteen minute sport have effect?"

"[S16] No it does not, but 45 minutes is long, for example"

"[Res] On beş dakikalık bir spor etki eder mi?

"[S16] Etki etmez de hocam 45 dakika da uzun mesela"

Add exercise programs focusing on different regions

"[S09] There could be different programs. For example, a package for the arms . A package for the legs . Regional work…"

"[S09] Farklı programlar olabilirdi. Mesela kollar için bir paket. Bacaklar için bir paket gibi. bölgesel çalışma…"

"[S16] It would be nice to have someone who we can call a visual live like that dances there."

"[S16] Bir tane böyle görsel canlı diyebileceğimiz birisi orda dans etse onun danslarını yapsak daha güzel olurdu."

"[S08] There were 20 moves. We were making 3 sets. It would be better if the arms were 10 moves, leg 10 moves, chest 10 moves."

"[S08] 20 tane hareket vardı. 3 set yapıyorduk. Şöyle olsa daha iyi olurdu, kollar 10 hareket, bacak 10 hareket, göğüs 10 hareket gibi."

"[S12] Diversity needs to increase, I would like to choose which region to operate, obviously. The abdominal region for me."

"[S12] Çeşitliliğin artması lazım, hangi bölgeyi çalıştıracağımı seçmek isterim açıkçası. Benim için karın bölgesi."

"[S12] For example, a tour that we did first could have been a warm-up."

"[S12] Mesela önce bizim yaptığımız bir tur ısınma turu olabilirdi."

"[S13] For example, the first round is over, which would be an option as you would like to work in the region, so we could continue again."

"[S13] Mesela birinci tur bitti, hangi bölgeyi çalışmak istiyorsunuz gibi bir seçenek gelebilir biz ona göre tekrar devam edebilirdik yani."

"[S18] So this project needs to be developed. We only do warm-up movements. For example, certain movements can be added regionally."

"[S18] Yani bu proje geliştirilmeli. Biz sadece ısınma hareketleri yapıyoruz. Mesela bölgesel olarak belli hareketler eklenebilir."

"[S12] may also be a teacher, for example. My problem is not in my arms or my neck, for example. I have a problem with my regional abdominal area. The movements could be related to the abdominal area."

"[S12] bir de şey olabilir hoca mesela. Benim problemim kollarımda ya da boynumda değil mesela. Benim bölgesel karın bölgemle ilgili bir problemim var. Hareketler karın bölgesiyle alakalı olabilirdi…"

"[E2] Here's the specific sport, say, about warming ... How to warm up with the various parts of the body or how to warm up from the top of the two dimensions we see, or we see more sizes of those muscles, even if we can capture the points of intramuscular loads better . Or in technical studies, for example, a shot putter

or weightlifter that technique was exactly straight you know something, or 100 to 80 90 accuracy level ... Here is the first lifting moment of the point where the weightlifter holds the bar ... Or a sloppy gradient given the turn . .. Their rankings can be improved in terms of the best use of the technique, as well as world record-breaking weightlifters, or world record-throwers.”

“[E2] İşte özgü spor branşına, diyelim ki, ısınma ile ilgili… Vücudun çeşitli bölgeleri ile ısındırmamızı ya da yukarıdan aşağı nasıl ısındırma yapacağımız hani iki boyutta görüyorduk ya biz daha fazla boyutta görüp o kasların hatta kas içi yüklenmelerin noktalarını yakalayabilirsek daha iyi olur. Ya da teknik çalışmalarda, mesela bir gülle atıcısının ya da haltercinin o tekniği tam düz hani sizde bir şey oluşuyordu ya 100 de 80 90 doğruluk düzeyi... İşte haltercinin barı tuttuğu noktanın ilk kaldırma anının... Ya da bir güllecinin dönüşte verdiği eğim... Onların derecelerinin işte en iyi yapan ya da dünya rekortmeni halterciler, ya da dünya rekortmeni gülleciler bu işi nasıl yapıyor ise, tekniğin en düzgün şekilde kullanılması açısından geliştirilebilir.”

Number of days can be increased

“[S19] What I'm saying is actually, I think it wasn't very productive. Because it's not continuous. I think it's a short time. Not enough time for sports. It could be on certain days of the week and at certain hours. It could be longer than a month and a half. Three periods, but I think it was very tiring.”

“[S19] Benim söylediğim şey aslında bu, yani çok verimli değildi bence. Çünkü sürekli değil. Kısa bir süre bence. Spor için yeterli bir süre değil. Haftanın belli günlerinde ve belli saat aralığında olabilirdi. Bir buçuk aydan daha uzun olabilirdi. Mesela o üç periyottan oluşuyordu ama çok yoruyordu bence.”

“[S20] It may be 3 or 4 days.”

“[S20] 3 gün 4 gün olabilir.”

“[S04] I think the number of days should increase later on. We were doing two days a week, it should increase.”

“[S04] Sonradan sayısı fazlalaşmalı bence hocam. İki gün yapıyorduk haftada o bence artmalı.”

“[Res] Should it be up to 3 days?”

“[S04] Yes.”

“[Res] 3 güne mi çıkmalı?”

“[S04] Evet.”

“[S09] I think it should be more than two days a week.”

“[S09] Bence haftada ikiden fazla olması lazım.”

“[E2] Strength endurance training features that they show the effect at long-term work, what else?”

“[Res] We looked at other aerobic anaerobic power…”

"[E2] What was the work that you did that day, the step. Stepping with a total of 40 minutes of work gives flexibility back, but of course they are always in the long run. It definitely increases their power. It definitely increases max vo2 but they will do it every day, for example. The will do it for months, and only then will they see the effects."

"[Res] You say maybe it was, a month and a half, short."

"[E2] Yes."

"[Res] Bir buçuk ay çalıştılar haftada iki gün."

"[E2] Kuvvet dayanıklılık zaten bunlar uzun süreli çalışmalarda etkisini gösterir geri kalan antrenman öğelerinden ne kaldı"

"[Res] Başka aerobik anaerobik güçlere baktık…"

"[E2] O günkü yaptığınız çalışma neydi, step çalışmasıydı. Toplam 40 dakikalık bir çalışmayla step çalışması esneklik geri verir ama tabii bunlar hep uzun vadede…Gücünü kesinlikle arttırır maxvo2 sini kesinlikle arttırır ama bunu mesela her gün yapacak. Ve aylar boyunca yapacak etkilerini ancak o zaman görürler."

"[Res] Belki bir buçuk ay kısa olmuş olabilir diyorsunuz."

"[E2] Evet."

Add weight lifting

"[S05] Weight needs to be added."

"[S05] Ağırlık eklenmesi gerekiyor."

"[S08] For example, using weight."

"[S08] Mesela ağırlık kullanma."

"[S11] Exactly. Fat cannot be burned without a support (gym equipment). Exercise only."

"[S11] Aynen. Destekleyici (spor aleti) olmadan yağ yakılamaz. Sadece egzersiz."

"[S12] For someone who has a treadmill at home, he will do these movements at first, and then he will write to me, he says that you run on the treadmill for an hour, then you don't need a tool for your abdominal muscle - if you show me a move about your abdominal muscle If I do it, then I close the program. It can be used if we do it this way. But for this we need something extra, such as sports equipment."

"[S12] Evinde koşu bandı olan biri için ilk başlarda bu hareketleri yapacak sonra şey yazacak bana, 1 saat koşu bandında koşunuz yazıyor, ondan sonra son setiniz diye -karın kası için bir alete gerek yok- karın kası ile ilgili bir hareket gösterse bana ben onu da yapsam ondan sonra programı kapatsam. Bu şekilde yapsak gayet kullanılabilir. Ama bunun için bizim ekstra bir şeylere ihtiyacımız var mesela spor aletleri."

"[PC3] The movements that can be done at home are already flexibility movements. There's stretching (exercises). Can we add weight or something? … At the beginning of the program, what the user will use, like two dumbbells, it can be written, for example, to be done with these weights."

"[PC3] Evde yapılabilecek hareketler zaten esneklik hareketleridir yani. Esneklik hareketleri var. Ağırlık falan eklenebilir mi? … Programın başında kullanıcı ne kullanacaksa, iki dumbbell gibi, o yazılabilir mesela, şu ağırlıklar eşliğinde yapılacak gibi."

"[PC2] Or, two bottles of water…"

"[PC2] Ya da, iki şişe su..."

"[E1] In fact, if the program can be improved. There needs to be work with some tools or something."

"[E1] Program daha çok geliştirilirse olabilir aslında. Biraz aletli falan çalışmak gerekiyor onun için yani."

Levels

"[S01] There could also be stages of this. According to progress, according to our score, it could move to the next level. One could have chosen that as well, I would like to jump to the next level."

"Bir de bunun aşamaları olabilirdi. İlerlemeye göre, aldığımız puana göre bir ileriki ya da bir geriki seviyeye geçirebilirdi.... Bir de seçimli olabilirdi hani ben sonraki seviyeye atlamak istiyorum gibi."

"[PC6] Programs that need to be upgraded from easy to difficult."

"[PC6] Kolaydan zora doğru arttırılması lazım programların. Sabit kaldıktan sonra bir gelişme olmaz..."

"[PC6] Startup program should be my teacher. You can set the program already."

"[PC6] Başlangıç programı olması lazım hocam. Programı ayarlayabilirsiniz zaten."

"[PC7] There can be difficulty levels."

"[PC7] Zorluk seviyeleri olabilir."

"[PC3] There may be a preliminary program that will measure the level of the person before starting a program and according to his degree... He already knows how to do jumping-jacks or jump, he will be assigned to a program a notch above, a program according to him. It is not equal to everyone, but it is measured at first according to the situation of the person and then a suitable program for him."

"[PC3] Eğer bir programa başlamadan önce kişinin hangi seviyede olduğunu ölçecek bir ön program olabilir onun derecesine göre de... Zaten bu ayak çırpmayı ya da zıplamayı biliyor, onun bir tık üstüne konulacak, ona göre bir program hazırlanabilir. Hani herkese eşit seviyede değil de, kişinin durumuna göre ilk

başta ölçülür daha sonra ona uygun bir program... Kat kat artan bir program..."

6.2. Design Suggestions

Change the position of the instructor on the screen

"[S12] Already before the show, then you can miss him, for example, could be closer to the back."

"[S12] Zaten önce gösteriyor da, sonra sen onu kaçırabiliyorsun mesela arkadan daha yakın olabilirdi."

"[S18] yes, it had to come to the fore."

"[S18] evet ön plana çıkması gerekiyordu."

"[S12] He didn't appear in the back."

"[S12] Arkada gözükmüyordu."

"[S21] It feels like he's jumping, that can be fixed."

"[S21] Zıplıyormuş gibi oluyor ya hocam, o düzeltilebilir."

"[S14] It would have been better if the trainer was more noticeable."

"[S14] Eğitmen daha ön planda olsa daha iyi olurdu."

"[PC2] What action the athlete is going to do is causing confusion there. We're just doing it. He's coming. He's showing the score of the previous move. But I'm moving to the next move. When I say I'll look at the score, I miss the next move ... So this is perceived after one or two levels."

"[PC2] Sporcunun hangi hareketi yapacağı orada kafa karışıklığına neden oluyor. Tam yapıyoruz o gidiyor. Geliyor. Bir önceki hareketin puanını gösteriyor. Ama ben bir sonraki harekete geçmiş oluyorum. Puana bakacağım derken sonraki hareketi kaçırmış oluyorum... Yani bu bir iki seviyeyi yaptıktan sonra algılanabiliyor."

"[PC1] And the trainer goes in and out ... He shows and goes ... Let him, so he shows the movement, he stops, then he moves on

"[PC1] Bir de eğitmen çıkıp girip duruyor böyle... Gösterip gidiyor... Dursun, yani hareketi göstersin, dursun, sonra başka harekete geçsin"

Improve personalization

"[S01] There could also be stages of this. According to progress, according to our score, it could move to the next level. One could have chosen that as well, I would like to jump to the next level."

"Bir de bunun aşamaları olabilirdi. İlerlemeye göre, aldığımız puana göre bir ileriki ya da bir geriki seviyeye geçirebilirdi.... Bir de seçimli olabilirdi hani ben sonraki seviyeye atlamak istiyorum gibi."

"[S05] It can be changed from person to person, ie for those who do sports and those who do not."

"[S05] Kişiden kişiye göre değiştirilebilir, yani spor yapanlar ve yapmayanlar için."

"[S06] Yes."

"[S06] Evet."

"[S02] Yes, the music was bad."

"[S02] Evet müzik çok kötüydü."

"[S04] Characters can be more fun."

"[S04] Karakterler daha eğlenceli olabilir."

"[PC1] Then you can add something like Add your own music ..."

"[PC1] O zaman kendi müziğini ekle gibi bir şey ekleyebilirsiniz..."

"[PC3] Then it becomes the center, the trainers and the users. The trainers will move to their physics according to their limitations and send them to the house according to their limitations, then it will be. So it will be a trainer at the place where he will take the first material, the trainer will prepare a program according to that person's level. that person has to follow his / her development on a monthly basis, or is there any improvement, or a more heavier program can be applied to him?"

"[PC3] O zaman merkez olur, eğitmenler ve kullanıcıları. Eğitmenler fiziklerine kilosuna boyuna yapabileceği hareketlere kısıtlılıklarına göre hareketler düzenleyip ona göre evine gönderecek, o zaman olur. Yani ilk malzemeyi alacağı yerde bir eğitmen olacak, eğitmeni o kişinin seviyesine uygun bir program hazırlayacak, o kişinin gelişimini de aylık olarak takip etmesi gerekiyor, ki gelişme var mı? Yoksa ona uygun tekrar daha ağır bir program uygulanabilir. O şekilde kontrol altında olması gerekiyor. O şekilde olursa olur..."

"[E1] She could have something (music) of her own taste."

"[E1] Kendi istediği (müzik) falan da olabilir yani."

Motion instructions can be delivered with audio

"[S18] There was an informational part, how to do the movements ... they could be improved."

"[S18] Bilgilendirme kısmı vardı, hareketlerin nasıl yapılacağını... onlar geliştirilebilir."

"[S19] It would be better to have audio."

"[S19] Sözel (audio) olsa daha iyi olur."

"[S20] Sound can be added. Text can sometimes be too small, unreadable."

"[S20] Ses eklenebilir. Yazı bazen çok küçük kalabiliyor, okunmuyor."

"[S19] He will both show and say."

"[S19] Hem gösterecek hem söyleyecek."

"[S04] Sound makes sense."

"[S04] Ses mantıklıymış."

"[PC1] Also instructions can be spoken."

"[PC1] Bir de komutlar sesli olarak verilebilir."

Allow simultaneous multiuser

"[S12] He could have allowed to do it at the same time. For example, let's do it at the same time."

"[S12] Aynı anda yapmaya izin verebilirdi. Mesela ikimiz de aynı anda yan yana yapalım."

"[S13] Exactly."

"[S13] Aynen."

"[S15] Exactly."

"[S15] Aynen."

"[S12] In fact, the lack of the gym, my teacher. Two or three people can do the same thing at the same time. If we do the same movements at the same time or if the movements are different, we do not need the gym, but we do one person ... waiting for an hour friend."

"[S12] Aslında spor salonundan eksiği şu hocam. Aynı anda iki üç kişi yapabilsek yine aynı şey olur. Aynı anda aynı hareketleri yapsak ya da hareketler farklı olsa spor salonuna biz gerek duymayız ama tek kişi yapıyoruz ... bir saat bekliyor arkadaş."

"[S12] Improved. In fact, I would not do it alone on two or three people would be more fun."

"[S12] Geliştirilse. Aslında ben tek başıma yapmasam iki üç kişi yapsak daha eğlenceli olur."

"[PC3] Even if there is a lot of people in the environment, even if it goes inevitably competing in itself. It's ambition. The environment is important even if it goes alone. Why would he be greedy for doing it alone at home?"

"[PC3] Tek gitse bile orda ortamda bir çok kişi olduğu için, kendi içinde ister istemez yarışıyor yani. Hırsa biniyor yani. Tek başına gitse de ortam önemli. Evde tek başına yaptığı için niye hırs edecek yani?"

"[PC3] Two-person program, not for individual use, two avatars may appear..."

"[PC3] Bir kişilik değil de iki kişilik program, iki postür çıkabilir..."

"[PC2] An extra program ... Two instructors, two athletes can be ... You know, a little more fun to entertain the environment ... Contest ..."

"[PC2] Extra bir program daha... İki eğitmen, iki sporcu olabilir... Hani biraz daha ortamı eğlendirmek amaçlı... Yarışma..."

"[PC1] For example, there are group activities, for example, more than one person goes there."

"[PC1] Mesela grup aktiviteleri oluyor ya, mesela birden fazla kişi orda çıkar."

Improve background design

"[S18] I think (background) it's very unsuccessful."

"[S18] Bence (arkaplan) çok başarısız."

" [S18] But it could have been a more fun background. It was a little overcast plan. Could have been more joyful. The colors were very dark. And it looked pretty crowded."

"[S18] Ama daha eğlenceli bir arka plan olabilirdi. Birazcık böyle basık bir plandı. Daha hareketli olabilirdi. Renkler çok koyuydu. Bir de baya kalabalık görünüyordu."

"[S21] It could have been a natural environment."

"[S21] Doğal bir ortam olabilirdi."

"[S14] Can we change the design? I don't like it. It wasn't heartwarming."

"[S14] Tasarımı değiştirebilir miyiz? Benim hoşuma gitmedi. İç açıcı değildi."

"[E1] … may be video as if you were in nature."

"[E1] …video olabilir doğadaymışsın gibi."

Improve user control

"[S17] Too much interruption is happening by the way, I wish I could pause it though. So, for example, when I make this movement, it would be appropriate to have a little stop. If only we can stop it anytime we want, and then go on. Because when we leave, it gives zero."

"[S17] Çok bölünme oluyor ya arada, keşke durdurma olsa. Yani mesela bu hareketi yaptığımda biraz durdurma olsa gayet uygun. İstediğimiz zaman durdurup sonra devam edebilsek. Çünkü sonra ayrılıyoruz sıfır veriyor."

"[S01] Yes, if I could stop it, that two-minute break could have been longer, if it was exhausting. We could have a choice of movements, for example there would be 50 instead of 20 movements, today I want to do the following movements we can adjust accordingly. Because after a while people get tired of doing the same movements and recite."

"[S01] Evet durdurabiliyor olsaydım, o iki dakikalık araları daha uzun olabilirdi, yorucuysa eğer. Hareketleri seçme şansımız olabilirdi, orda mesela 20 değil de 50 tane hareket olur, ben bugün şu şu hareketleri yapmak istiyorum diye süreyi de ona göre ayarlayabiliriz. Çünkü bir zaman sonra insan aynı hareketleri yapmaktan sıkılıyor ve ezbere oluyor."

Motion instructions can be delivered with video

"[S18] …sometimes the instructor seemed to be jumping, ascending, technical error. With a video, that misunderstanding could be remedied."

"[S18] … bazen eğitmen zıplıyormuş, yükseliyormuş gibi görünüyordu, teknik hata vardı. Video ile o yanlış anlaşılma giderilebilirdi."

"[S01] Their videos can be shot and given with a cd, you may also do it more comfortable if you watch them, something like that."

"[S01] Onların videoları çekilip, ekte cd de onlar verilirken, bunları izlerseniz daha rahat yapabilirsiniz gibi bir şey olabilir."

"[PC6] Video is better than animation, video can be more effective."

"[PC6] Video daha iyi olur o animasyon yerine, video daha etkili olabilir."

Allow seeing the scores of others

"[S12] Motivates us."

"[S12] Motive yapar bizi."

"[S14] exactly motivated."

"[S14] aynen motive."

"[S10] We both started on the same day, I say how he is losing weight before me."

"[S10] İkimiz de aynı gün başladık o nasıl benden önce kilo veriyor derim."

"[S15] So yes, there is a comparison."

"[S15] Yani evet bir kıyaslama olur aralarında."

"[S12] At the end, for example, to connect with the feeling of racing."

"[S12] Hocam en sonda şey olurdu mesela yarış duygusuna bağlanabilirdi."

Allow seeing my video online

"[S12] If it has internet, then I should be able to see a copy of what I did. If you save it online."

"[S12] Hocam internet varsa, ben kendimin yaptığımın kopyasını görebilmeliyim. İnternete atıyorsunuz."

Improve feedback

"[S09] Auditory feedback seems more reasonable."

"[S09] Ses daha mantıklı gibi geldi."

"[PC1] Sound effect, for example, the trainer, in the back ... Right wrong ... Looks red, but maybe he can miss it at the moment while doing sports ... He can say that you're doing it right, you're doing it wrong, raise your arm or something."

"[PC1] Ses efekti de olabilir mesela eğitmenin, arkada... Doğru yanlış... Kırmızı gözüküyor ama, belki o an kaçırabilir sporu yaparken... Söyleyebilir yani doğru yapıyorsun yanlış yapıyorsun kolunu kaldır falan."

Provide user manual

"[PC3] There may also be a user manual, that is, when you give the program, when you give these tools or something, how the user manual will start, which key will be pressed, if he teaches them from the beginning, then the housewife will not have any problems."

"[PC3] Kullanma kılavuzu da olabilir, yani programı verdiğinizde bu aletleri falan verdiğimizde kullanma kılavuzu nasıl başlayacak, hangi tuşa basacak, onları baştan öğretirse zaten o zaman ev hanımı falan sıkıntı yaşamaz."

Gamification

"[PC3] Teacher, the people in the house are already bored quickly, so that's why they are in that situation. It can be made a bit of fun."

"[PC3] Hocam evdeki insanlar zaten çabuk sıkılan insanlar, onun için hani bu durumdalar. Bu biraz eğlenceli hale getirilebilir."

"[PC3] For example, it can be used as a game at the beginning or end of the program. The same moves can be combined with a game at the level of the program it applies ... More fun. Not before the program is completed, the program will be completed ..."

"[PC3] Mesela programın başında ya da sonunda bir oyun şeklinde kullanabilir. Aynı yaptığı hareketlerin, uyguladığı programın seviyesindeki bir oyunla birleştirilebilir... Daha eğlenceli olur. Program tamamlanmadan önce olmasın, program da tamamlanmış olur..."

"[PC2] An extra program ... Two instructors, two athletes can be ... Behold a little more environment to entertain ... Competition ..."

"[PC2] Extra bir program daha... İki eğitmen, iki sporcu olabilir... Hani biraz daha ortamı eğlendirmek amaçlı... Yarışma..."

"[E1] It can also give you a warning, because the clock has started and so on. Now people like it, for example, you walked so far today, for example, you acted so much."

"[Res] As you reached the target."

"[E1] Yes it can be added in a way that needs to enjoy the pleasure of reaching the goal, or doing daily sports."

"[E1] Hem uyarı verebilir bu, işte saatin başladı vesaire diye. Şimdi insanlar hoşlanıyor mesela, bugün şu kadar yürüdün diyor mesela, bu kadar hareket ettin."

"[Res] Hedefe ulaştın gibi."

"[E1] Evet hedefe ulaşmanın, ya da günlük spor yapmanın hazzını duyması gerekiyor bir şekilde, o eklenebilir."

Real image instead of Avatar

"[PC3] For example, I'm doing here, but in the program posture (avatar) is moving slower. Then I'm saying that I'm doing the wrong thing, as my friend said .. If it reflects exactly the same there would be something more if I see myself ... I don't have a chance to see myself on the screen instead of the posture? … An avatar is not the same as a human. For example, if I put myself and users see themselves, then a better result can be achieved."

"[PC3] Mesela ben burada yapıyorum, ama programda postür (avatar) daha yavaş hareket ediyor. O zaman ben hani şey diyorum acaba yanlış mı yapıyorum.. Aynı arkadaşımın dediği gibi.. Birebir aynısını yansıtsa oraya ben kendimi

görsem orda daha şey olurdu… postürün yerine kendimi ekranda görme şansım yok mu? … insanla bir postürün ki aynı olmuyor. Mesela ben kendimi koysam, kullanıcılar da kendini görse, o zaman daha güzel sonuç elde edilebilir.”

"[E1] It is used in the mirror in some activities in the gym. People want him to see himself. That's why it would be better for him to see himself one-on-one at work or at folk dances. But it would be an option. That's when it's closed when it's online, when it's on its own. Nowadays he is in a selfie environment sürekli so he might want to see his movements and maybe even record it there and send it. … It would be better to see one-on-one movements in terms of improvement yani the other end is a computer game. So I think that in the first moves he would like to see himself later."

"[E1] Spor salonunda bazı etkinliklerde aynada kullanılıyor. İnsanlar birebir kendisini görmesini istiyorlar. Onun için danstı işte ya da halk oyunları gibi şeylerde bire bir kendisini görmesi daha iyi olacaktır. Ama öyle bir seçenekte olacaktır zaten. İşte online olduğu zaman kapatılıp, kendi başına olduğu zaman... İnsanların kendisini görmesi daha hoşuna gidiyor nihayetinde. Günümüzde sürekli selfie çekilen bir ortamda… yani hareketlerini görmek hatta belki orda kaydedip onu göndermek isteyebilir…. Birebir hareketleri görmek, iyileştirme yönünden de daha iyi olacaktır yani… öteki sonuçta bir bilgisayar oyunu. Yani ilk hareketlerde tamam daha sonra kendisini görmek ister diye düşünüyorum.”

Allow sharing

"[E1] Of course you may want to share. Here today I made these movements, how did you do it. Also, he may want to send to his teacher in that way. I mean, that should be an option for him anyway."

"[E1] Tabii paylaşmak isteyebilir. İşte bu gün bu hareketleri yaptım, siz nasıl yaptınız diye. Hem hocasına göndermek isteyebilir o şekilde. Yani onun için öyle bir seçenek olması lazım zaten yani.”

6.3.   Technical Suggestions

Improve Kinect's motion detection capacity

"[S05] The connection could break when someone passed in front of us. We could get zero. This problem can be fixed."

"[S05] Birisi önünden geçtiği zaman bağlantı kopabiliyordu. Sıfır alabiliyorduk. Bu problem giderilebilir.”

"[S01] Detection first. Kinect's detection could be clearer."

"[S01] Algılaması ilk önce. Algılaması daha net olabilirdi.”

"[PC3] The program does not have trouble recording the movement of the application or something nice. But there is a problem in the perception of the posture there

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is something that you do not fully perceive the movement. For example, we do not jump but it jumps. So that can be corrected."

"[PC3] Programın hareket kaydetmesinde sıkıntı yok hani uygulaması falan güzel. Ama postürün onu algılamasında sıkıntı var işte oradaki şeyde yaptığınız hareketi tam algılamıyor. Mesela biz zıplamıyoruz ama zıplıyor. Yani o düzeltilebilir. O zaman kullanıcıya da sıkıntı yaşayabilir"

Implement usage of equipment

"[E1] As I said to improve, it can also be developed in an instrumental way. Here's how to hold the racket. What you need to pay attention to when making forehand. It can be improved on this."

"[E1] Geliştirmek için de dediğim gibi yani aletli şekilde de geliştirilebilir. İşte raket nasıl tutulur? Forehand yaparken neye dikkat etmek gerekiyor gibi. Bu konuda geliştirilebilir."

"[E2] Here's the specific sport, say, about warming ... How to warm up with the various parts of the body or how to warm up from the top of the two dimensions we see, or we see more sizes of those muscles, even if we can capture the points of intramuscular loads better. Or in technical studies, for example, a shot putter or weightlifter that technique was exactly straight you know something, or 100 to 80 90 accuracy level ... Here is the first lifting moment of the point where the weightlifter holds the bar ... Or a sloppy gradient given the turn. .. Their rankings can be improved in terms of the best use of the technique, as well as world record-breaking weightlifters, or world record-throwers."

"[E2] İşte özgü spor branşına, diyelim ki, ısınma ile ilgili… Vücudun çeşitli bölgeleri ile ısındırmamızı ya da yukarıdan aşağı nasıl ısındırma yapacağımız hani iki boyutta görüyorduk ya biz daha fazla boyutta görüp o kasların hatta kas içi yüklenmelerin noktalarını yakalayabilirsek daha iyi olur. Ya da teknik çalışmalarda, mesela bir gülle atıcısının ya da haltercinin o tekniği tam düz hani sizde bir şey oluşuyordu ya 100 de 80 90 doğruluk düzeyi... İşte haltercinin barı tuttuğu noktanın ilk kaldırma anının... Ya da bir güllecinin dönüşte verdiği eğim... Onların derecelerinin işte en iyi yapan ya da dünya rekortmeni halterciler, ya da dünya rekortmeni gülleciler bu işi nasıl yapıyor ise, tekniğin en düzgün şekilde kullanılması açısından geliştirilebilir."

Integrate smart watches or smartphones

"[E1] It can also warn you that this is where the watch started and so on. Now people like it, for example, it says that you walked so far today, you acted so much."

"[E1] Hem uyarı verebilir bu, işte saatin başladı vesaire diye. Şimdi insanlar hoşlanıyor mesela, bugün şu kadar yürüdün diyor mesela, bu kadar hareket ettin."

"[E1] Advancing by developing. Or it becomes boring. He wants to see progress as a human being. If we are losing weight, there is already that type of thing, body weight and so on. Or, for example, this could be improved with something. Smart watches and so on. You walked up and down and ran so much effort."

"[E1] Geliştirerek ilerlemek. Yoksa sıkıcı hale gelir. İnsan olarak ilerlemeyi görmek istiyor zaten. Kilo veriyorsak, zaten bunun o tip şeyi de vardır herhalde, vücut ağırlığı vesaire, buna etkisi, işte başladığında kilom şuydu şimdi şu, bunlar gerçi manuel girilecek ama ya da mesela bunun şeyle geliştirilebilir. Akıllı saatlerle vesaire. Şu kadar yürüdün şu kadar koştun, şu kadar efor sarf ettin. Yani bunu saat tutarak değil de, manuel değil, otomatik olarak belki geliştirilebilir."

Artificial intelligence

"[PC5] I also think that my teacher may be different if it is artificial intelligence. Movements perceive more and more clearly perceive objects in the face of today's technology, some brands are already using more efficient results."

"[PC5] Bir de hocam yapay zeka olsa belki daha farklı olabilir diye düşünüyorum. Hareketleri daha fazla algılar karşısındaki cisimleri daha net algılayabilir günümüz teknolojisi, zaten bazı markalar kullanıyor daha verimli sonuçlar elde ediliyor."

E. CODE NAMES OF PARTICIPANTS

Table E.1. *Code names of the users*

Participant Code	Interview Group No	Class	Gender	Age	Height	Weight[1]	Weight[2]	BMI[1]	BMI[2]	Fat[1]	Fat[2]
S01	-*	3	F	20	161	43,9	43,6	16,9	16,8	10,7	12,7
S02	1	2	F	19	159	54,3	54,8	21,5	21,7	24,6	27,8
S03	1	2	F	20	148	37,2	38,5	17,0	17,6	12,0	13,3
S04	1	2	F	19	158	51,6	51,3	20,7	20,5	22,0	22,1
S05	2	3	M	21	175	72,5		23,7		10,0	
S06	2	3	F	20	163	52,3	52,6	19,7	19,6	21,6	23,5
S07	2	3	M	20	176	69,8		22,5		13,8	
S08	2	3	M	23	177	71,2	72,7	22,7	23,2	17,8	17,8
S09	2	3	M	23	175	66,4		21,7		7,5	
S10	3	3	M	20	175	61,1	61,2	20,0	20,0	4,4	4,7
S11	3	3	M	23	172	117,6	111,8	39,8	36,9	31,5	30,8
S12	3	3	F	22	167	56,2		20,2		26,6	
S13	3	3	F	20	168	52,5	53,1	18,6	18,8	21,3	23,4
S14	3	3	F	20	161	44,8	45,2	17,3	17,4	12,6	13,8
S15	3	3	F	21	157	49,2	51,1	20,0	20,7	26,0	26,3
S16	3	3	M	21	187	90,6	91,8	25,9	26,3	17,4	17,6
S17	3	3	F	20	160	47,6	48,7	18,6	19,0	16,8	17,8
S18	4	2	F	20	152	45,3	45,6	19,6	19,7	18,6	17,8
S19	4	2	F	29	170	58,9	61,2	20,4	21,2	24,8	23,5
S20	4	2	F	19	175	53,1	51,0	17,3	16,5	21,5	19,5
S21	4	2	F	21	158	55,7		22,3		25,4	
S22	4	2	M	20	162	77,3		29,5		25,5	
-	-	3	M	20	173	53,0	54,2	17,7	18,1	4,4	4,4
-	-	3	F	20	158	51,3	51,9	20,5	20,8	19,8	21,6
-	-	3	F	22	150	54,5	50,6	24,2	22,5	29,8	28,4
-	-	3	F	20	172	48,5	47,4	16,4	16,0	18,8	21,1

Pretest: Weight[1], BMI[1], Fat[1]   Posttest: Weight[2], BMI[2], Fat[2]
* S01 has been interviewed one to one for pilot of the interview protocol

Table E.2. *Code names of the preservice coaches*

Code Name	Class	Gender	Age
PC1	4	F	21
PC2	4	F	23
PC3	4	F	22
PC4	3	F	21
PC5	4	M	21
PC6	4	M	22
PC7	3	M	20
PC8	3	M	21

Table E.3. *Code names of the experts*

Code Name	Gender	Title	Teaching Experience
E1	M	Assistant Prof. Dr.	2 years
E2	M	Teaching Staff	11 years