INVESTIGATION OF FACTORS INFLUENCING PROBLEMATIC INTERNET USE, AND DEVELOPMENT OF THE APPLICATION "hEp" TO REGULATE UNIVERSITY STUDENTS' PROBLEMATIC INTERNET USE

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# ABSTRACT

## INVESTIGATION OF FACTORS INFLUENCING PROBLEMATIC INTERNET USE, AND DEVELOPMENT OF THE APPLICATION "hEp" TO REGULATE UNIVERSITY STUDENTS' PROBLEMATIC INTERNET USE

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This study has two sub-purposes that related to problematic Internet use (PIU). The first purpose is to comprehensively describe undergraduates' Internet use behaviors in terms of use patterns and problematic behaviors, as well as to investigate the effects of self-regulation, procrastination, and academic achievement on problematic Internet use behavior. The second purpose is to develop an effective Internet use program (hEp) within self-regulation context, evaluate its usability, and present its design characteristics. In the first stage, cross-sectional data were gathered from 479 undergraduates (291 females, 188 males). Survey and correlational research were utilized. PIU has negative relationship with undergraduates' academic Internet usage time, and positive relationships with their social and recreational Internet usage time. In addition, PIU factors are predicted by self-regulation, academic procrastination variables, but not by GPA. In the second stage, design-based research was used to develop a self-regulating effective Internet usage application (hEp), for increasing academic performance by regulating PIU behaviors, which's deficiency were emphasized in previous studies, and to determine

usability, perceived effectiveness and design features. This stage consisted of 6 steps, 2 pilot studies, 3 consecutive cycles and the final design. In main cycles, at least 4 participants were involved in each cycle and a total of 16 unique participants were involved in the study. Participants created at least 3 hEps in the cycle/s. Semi-structured interviews conducted. Findings regarding the usability, perceived effectiveness, and design principles of hEp were presented and discussed in line with the literature. Suggestions provided for future studies.


Keywords: Problematic Internet Use, Self-Regulation Strategies, Goal Setting, Mental Contrasting, Implementation Intentions

# ÖZ


## PROBLEMLİ İNTERNET KULLANIMINI ETKİLEYEN FAKTÖRLERİN İNCELENMESİ VE ÜNİVERSİTE ÖĞRENCİLERİNİN PROBLEMLİ İNTERNET KULLANIMLARININ DÜZENLENMESİ İÇİN "hEp" UYGULAMASININ GELİŞTİRİLMESİ

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Bu çalışmanın, problemli İnternet kullanımıyla ilgili iki alt amacı vardır. Birinci amaç, lisans öğrencilerinin İnternet kullanım davranışlarını kullanım alışkanlıkları ve problemli davranışlar açısından kapsamlı bir şekilde tanımlamak ve lisans öğrencilerinde öz düzenleme, erteleme ve akademik başarının problemli İnternet kullanım davranışına etkilerini araştırmaktır. İkinci amaç ise öz düzenleme kapsamında etkili bir İnternet kullanım programı (hEp) geliştirmek, kullanılabilirliğini değerlendirmek ve tasarım özelliklerini ortaya koymaktır. İlk aşamada 479 lisans (291 kadın, 188 erkek) öğrenciden kesitsel veri toplanmıştır. Nicel araştırma yöntemlerinden tarama ve ilişkisel araştırmalardan yararlanılmıştır. Elde edilen bulgulara göre, katılımcıların problemli Internet kullanımları akademik İnternet kullanım süreleri ile negatif, sosyal ve eğlence amaçlı İnternet kullanım süreleri ile pozitif ilişkilere sahiptir. Ek olarak, problemli İnternet kullanım faktörleri doğrudan ve dolaylı olarak öz düzenleme, akademik erteleme değişkenleri tarafından yordanmakta ancak not ortalaması (GPA) ile yordanmamaktadır. İkinci aşamada ise, geçmiş çalışmalarda eksikliği vurgulanan, problemli Internet kullanım davranışlarını düzenleyerek akademik performansı artırmayı amaçlayan, öz-düzenleyici etkili bir

Internet kullanım uygulaması (hEp) geliştirmek ve kullanılabilirlik, algılanan etkililik ve tasarım özelliklerini belirlemek amacıyla tasarım tabanlı araştırma kullanılmıştır. Çalışmanın bu aşaması 6 adımdan, 2 pilot çalışma, 3 ardışık döngü ve son tasarımdan oluşmuştur. Ana döngülerde, her döngüde en az 4 katılımcı yer almıştır ve toplamda 16 farklı katılımcı çalışmaya dahil edilmiştir. Katılımcılar döngü/lerde en az 3 hEp oluşturmuşlardır. Yarı yapılandırılmış görüşmeler ile hEp mobil uygulamasının kullanılabilirliği, algılanan etkililiği ve tasarım ilkelerine ilişkin bulgular sunulmuş ve literatür doğrultusunda tartışılmıştır. Gelecekteki çalışmalar için öneriler sağlanmıştır.

Anahtar Kelimeler: Problemli İnternet Kullanımı, Öz-Düzenleme Stratejileri, Hedef Belirleme, Zihinsel Karşılaştırma, Uygulama Planları

To my family and health

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# TABLE OF CONTENTS

# LIST OF TABLES

TABLES

xvii

# LIST OF FIGURES

FIGURES

# LIST OF ABBREVIATIONS

ABBREVIATIONS

*PIU:* Problematic Internet Use

*POSI*: Preference for Online Social Interaction

*MREG*: Internet Use for Mood Regulation

*DSR*: Deficient Self-Regulation of Internet Use

*MCII:* Mental Contrasting with Implementation Intentions

*hEp*:  hedef-edinim-engel-plan

**CHAPTER 1**

**INTRODUCTION**

## 1.1    Introduction

Although the year of the first message sent from one computer to another is as close as 1969, history has witnessed a dramatic technological advance in which millions of electronic devices can easily communicate with each other. From the writing of this thesis to ordering snacks, a wide variety of transactions can be carried out easily thanks to the Internet. With today's technological advancements, the Internet makes life a lot easier and saves individuals' time and energy considerably.

In the last few decades, the Internet has become an important tool in lives of people in all age groups. Individuals use the Internet for various academic, social, and recreational purposes. Although the Internet has become widely used channel to communicate, have fun, and search for information (Assunção, & Matos, 2017) it has also brought a number of problems with itself. Specifically, it raised concerns about unfavorable, deregulated, or exaggerated use. Research studies have shown that use of the Internet can have negative effects on individuals' psychological and physical health, social relationships, academic performance, etc. (Calvete, Gámez-Guadix, & Cortazar, 2017; Laconi et al., 2019; Mei, Yau, Chai, Guo, & Potenza, 2016; Mihara et al., 2016; Öksüz, Güvenç, & Mumcu, 2018; Öztürk & Özmen, 2016; Park & Lee, 2017). Within the author's knowledge, the first study on unfavorable, exaggerated Internet use was conducted by Young in 1996 (Young, 1996). Since that day the Internet access and use has been greatly facilitated and increased because of technological advancements. Currently, around 7.75 billion people live in the world, and according to 2020 data, the number of Internet users is around 4.54 billion. This

means that more than half of the people in the world are Internet users. Moreover, the number of Internet users increased by 1266% between 2000 and 2020 years (Internet World Stats, 2020). Considering the rate of social media usage, it is seen that it is almost 50% of the world population. In Turkey, the Internet and social media usage ratio appears to be above the world average. WEARESOCIAL's 2020 report showed that social media penetration in Turkey is 64%. It has appeared that 37 million people are active Facebook users, and Turkey ranks 10th worldwide. Similarly, it is seen that 38 million people are Instagram users and Turkey ranks 6th in the world. Moreover, the average daily use duration of social media in Turkey is 2 hours 51 minutes and the general Internet usage duration is 7 hours 29 minutes (Kemp, 2020). According to the report, both Internet use and social media use in Turkey are above the world average. Moreover, most of the people who use the Internet and social media are young adults. The specified age group is a group that includes university students. A report shared in the recent past revealed that 70% of people in Turkey thought that the Internet have opportunities rather than risks (Kemp, 2018). In addition, a meta-analysis study that covers the research studies conducted in 31 countries, claimed that while the unfavorable use rates in the worldwide is 6%, it is 10.9% in the Middle East countries which involves Turkey (Cheng & Li, 2014). Recently conducted numerous academic studies (Jelenchick et al., 2014; Li, O'Brien, Snyder, & Howard, 2015; Zhang, Lim, Lee, & Ho, 2018) and abovementioned sources showed that young adults are one of the most vulnerable groups to adverse effects of unfavorable, deregulated, or exaggerated Internet use and our awareness on the negativities caused or might be caused by Internet use is not at a sufficient level. Moreover, we use the Internet more problematically compared to the world average.

Although, there have been studies about deregulated, exaggerated, unfavorable Internet use approximately three decades, considering the Internet access and use rates as well as research studies conducted on this deregulated use, the last decade has witnessed to an exponential growth of this negative type of use (Brand, Young, Laier, Wölfling, & Potenza, 2016; Casale, Caplan, & Fioravanti,

2016; Monaghan, 2014; Öksüz et al., 2018). From an educational point of view, numerous studies have examined the relationship between students' Internet use behavior and their academic outcomes. A group of studies focused on the relationship between in-class non-academic Internet use behavior -multitasking with Internet- and academic outcomes. These studies claimed a negative association between these variables (Junco & Cotten, 2012; Lau, 2017; Ravizza, Hambrick, & Fenn, 2014; Rosen, Carrier, & Cheever, 2013; Van Der Schuur, Baumgartner, Sumter, & Valkenburg, 2015). Regarding general Internet use, several studies showed that; there is a positive relationship between the time spent online for non-academic purposes and deregulated Internet use (Lee, 2009), the use of the Internet for recreational purposes negatively affects academic performance (Kubey, Lavin, & Barrows, 2001; Strasser, 2016), and the longer the duration with smartphone, the lower the academic success (Felisoni & Godoi, 2018). A recent meta-analysis study stated that there is a negative relationship between the use of social networking sites and academic performance in line with the data obtained from 101,441 people examined in 28 studies (Liu, Kirschener, & Karpinski, 2017). That is, according to the literature, there is a negative relationship between students' Internet use behaviors and their academic performance. Van Der Schuur et al. (2015) reviewed research studies regarding the relationship between media multitasking and academic performance and claimed a small to moderate negative association between them with the lack of the direction of this relationship. A later study focused on the direction of the relationship found that non-academic social media use and social media multitasking have significant and negative effects on academic performance (Lau, 2017). However, still more studies are needed to examine the relationship between these variables to discern the direction.

Some studies have seen the unfavorable, deregulated, exaggerated use of the Internet as problematic or addictive behavior rather than a negative effect and researched it in this direction. Most of these studies named this behavior as Problematic Internet Use (PIU). PIU is defined as an incontrollable overuse of the Internet which has negative consequences on individual's life (Davis, 2001). PIU is

a situation that is closely related to concepts such as depression, attention deficit, loneliness, deficient self-regulation / self-regulation failure, etc. In recent years, PIU has shown serious harmful effects not only on academic performance but also on social, psychological, and physical health of the students. Numerous research studies focused on this topic. Some of them focused directly on Social Networking Sites (SNSs) and looked at the effects of different SNSs on friendship and well-being (Wang, Jackson, Gaskin, & Wang, 2014), relationship between SNS use and academic performance (Liu et al., 2017; Ozer, 2014). Some other, on the other hand, have studied Internet use as a general concept and investigated the relationship between PIU and concepts such as psychological wellbeing, happiness, depression, and loneliness (Muusses, Finkenauer, Kerkhof, & Billedo, 2014), emotional dysregulation, escapism, and metacognition (Casale et al., 2016), defense mechanism, coping strategies and pathological traits (Laconi, Vigoroux, Lafuente, & Chabrol, 2017), depression, substance use, behavioral addiction, impulsivity, self-control (Yau, Potenza, & White, 2012), self-perception, personality and academic characteristics (Öztürk & Özmen, 2016), poor / deficient self-regulation (Assunção & Matos, 2017; Billieux & Van Der Linden, 2012; Caplan, 2010; Larose, Lin, & Eastin, 2003).

In up-to-date PIU literature, investigation of self-regulation and self-regulation related concepts draw attention. Several studies investigated the relationship between PIU and self-regulation have shown that failure of self-regulation is an important associate of PIU (Assunção & Matos, 2017; Billieux & Van Der Linden, 2012; Calvete et al., 2017; Caplan, 2010; Yang, Asbury, & Griffiths, 2019). Users, who have difficulties in self-regulation show more problematic Facebook usage behavior for regulating their mood (Moretta & Buodo, 2018). Kirschner and Karpinski (2010) claimed that when compared to middle and high school students, young adults, which includes undergraduate students, are more vulnerable to the SNS use as they have less parental inclusion in terms of their academic behaviors. That is, they can decide when to study, when to attend classes etc. For this reason, they need more self-regulatory behaviors regarding their study

habits. Based on their claim, strengthening self-regulation might help to alleviate problematic behavior which seen as an obstacle to academic performance. As a support to this claim, Zimmerman (2000) suggested that self-regulation associate with believes and motives of individuals, that is, it is not a singular trait or mental ability. It is developable, like a muscle. A sufficiently worked muscle becomes stronger. The opposite is also correct; a muscle that has not been sufficiently worked is weakened. In this sense, improvement of self-regulation can allow the repair of PIU. For this reason, the effect of self-regulation on problematic Internet use might be examined in a more comprehensive and detailed manner by future research studies.

Studies have shown that if people have deficient self-regulation regarding Internet use, they also show academic procrastination behavior. Although procrastination behavior is as old as human history, it is more common today than before, in line with the limitless possibilities offered by the Internet. On the other hand, today's conditions constantly require a large number of jobs / tasks to be done in short periods of time. To escape from the unpleasantness of these tasks, people prefer Internet-related activities that provide short-term mood regulation (Reinecke et al., 2018; Sirois & Pychyl, 2013). Although this short-term mood regulation brings short-term positive emotions, it brings negative emotions such as guilt and unhappiness in the long run. Procrastinators are individuals who also show a low level of self-control (Steel, 2007). Reinecke et al. (2016) claimed that procrastinators are also problematic Internet users due to low level of self-control. Procrastinators with impaired control over the Internet usage, hang on the Internet for longer than they intended, and their recreational Internet use rises and result in negative outcomes. When the relationship between procrastination behavior, self-control, and Internet use behavior was examined in the light of literature, it was thought that in the context of problematic Internet use, academic procrastination behavior might also be noteworthy.

Researchers in psychology and education have made a number of studies on PIU. However, most of these studies remained at a descriptive level. A study,

conducted in Turkey, with high school students suggested that there is a need for conducting more educational research in order to protect students from the adverse effects of the PIU and help them to develop healthy Internet use behaviors (Öztürk & Özmen, 2016). Another study focusing on high school students showed that the adolescents in Japan have PIU about 8%, and emphasized the urgency of planning and implementing precautions to control Internet use behavior and prevent PIU (Mihara et al., 2016). Another study investigating the relationship between academic performance and social media use emphasized the necessity of intervention programs to regulate the use of smartphone in academic settings (Giunchiglia, Zeni, Gobbi, Bignotti, & Bison, 2018). Based on the literature, preventative and regulative interventions are necessary to prevent or alleviate the negative effects of Internet use on academic performance.

## 1.2    Problem Statement

The Internet, which has become an indispensable necessity in our lives, by providing numerous opportunities and being easily accessible, also has brought several disadvantages with itself. Recently, a growing number of research studies started to give importance to exaggerated, dysregulated Internet use behaviors of people, especially in adolescents and young adults.

Problematic Internet use is defined as incontrollable overuse of the Internet which have negative consequences on individual's life (Davis, 2001). Numerous studies, especially in recent years, has focused on the researches regarding adolescents' and young adults' PIU. These studies showed that excessive use of Internet has a relationship with underachievement and poor social relationships (Caplan, 2010; Dunbar, Proeve, & Roberts, 2017; Mei et al., 2016; Mihara, et al., 2016; Öztürk & Özmen, 2016). Although PIU has become a growing health problem on global scale, the studies are mostly limited to descriptive psychological and educational researches.

There are two main types of problem situations that mediate the execution of this study.

The first problem is about describing Internet usage behavior comprehensively. Missing points in this regard:

a) Internet usage types are not divided into sub-use types:

Most of the studies on Internet use behavior have taken Internet use purposes as a whole. That is, despite the fact that today there are several types of Internet use purposes, these types have not been studied separately and Internet use has been examined as a whole. However, the literature emphasizes the necessity of conducting research studies based on Internet use purposes in order to reach more clear findings about not only general Internet use behaviors but also problematic form of it (Jelenchick et al., 2014; Mei et al., 2016, Monaghan, 2014).

b) The relationship between the sub-dimensions of problematic Internet use and self-regulation, academic procrastination, and academic performance variables has not been studied in detail:

Numerous studies revealed positive relationship between addictive behaviors and deficient self-regulation capacities (Assunção & Matos, 2017; Billieux & Van Der Linden, 2012; Calvete et al., 2017). Although PIU's relationship with variables such as self-regulation, academic procrastination, and academic performance, which are widely studied in the field of education, its sub-dimensions such as online interaction preference, mood regulation, deficient self-regulation of Internet use have not been studies comprehensively. Self-regulation, which is thought to have a crucial role for addictive behaviors and PIU which is considered as addictive behavior (Billieux & Van Der Linden, 2012), still needed to be examined comprehensively in the educational context. That is, previous studies could not be sufficient in terms of thoroughly, comprehensively examining the self-regulation-PIU association by considering sub-dimensions and other critical variables such as academic procrastination and academic performance. Moreover, this deficiency might prohibit

researchers to conduct protective, remedial studies for young adults who have PIU behaviors, although it has become an important hazard for young people.

The second problem is that the vast majority of Internet use behavior-related studies in the literature remain at a descriptive level. That is, the relationship between problematic Internet use and other variables has been examined to some extent, but no interventions have been developed based on these relationships. Therefore, there is a gap in the literature with regard to investigation of Internet use behavior deeply and suggestion of intervention studies for effective Internet use behavior (Giunchiglia et al., 2018; Mihara et al., 2016; Öztürk & Özmen, 2016).

## 1.3    Purpose of the Study

This study has two sub-aims related to problematic Internet use. First aim is to describe undergraduate students' Internet use behaviors in terms of use patterns and problematic behaviors and investigate the effects of self-regulation, procrastination and academic performance on undergraduate students' problematic Internet use behavior in a comprehensive manner.

The second aim is to provide an effective Internet use program (hEp) within the framework of self-regulation, examine its usability features, perceived effectiveness, and present its design characteristics.

## 1.4     Research Questions

### 1.4.1       Stage 1

1. What are the **Internet use behaviors** of the undergraduate university students?
    a. What are the **academic** Internet use behaviors of the undergraduate university students?
    b. What are the **social** Internet use behaviors of the undergraduate university students?
    c. What are the **recreational** Internet use behaviors of the undergraduate university students?
2. What are the relationships among demographics, Internet use patterns, and problematic Internet use behaviors of undergraduate university students?
3. To what extent are constructs of problematic Internet use predicted in a model that include the direct and indirect effects of self-regulation, academic procrastination, and academic performance?

### 1.4.2       Stage 2

1. What are the participants' Internet use behaviors?
2. What are the usability features of the of Internet use regulation application *hEp*?
3. What do the participants describe their experiences on the of Internet use regulation application hEp?
4. What are the design characteristics of Internet use regulation application *hEp*?

## 1.5    Significance of the Study

This study is important as it aims to close the gaps in the literature, provide theoretical and practical contributions, and present a technological product. In addition to these, it is also important as it provides an intervention to improve the self-regulation skills of university students in emergency remote teaching process that emerged during the Covid-19 pandemic, which is an unexpected situation.

This study consists of two stages. In the first quantitative stage, Internet use behaviors of undergraduate students described comprehensively and an SEM model was created addressing to what extent the problematic Internet use of university students is predicted by self-regulation, academic procrastination, and academic performance variables. In the second qualitative stage, it was aimed to design and develop an intervention program that takes its theoretical background from Mental Contrasting and Implementation Intentions (MCII) self-regulation strategies to regulate Internet use behavior, reduce academic procrastination and increase academic performance. Moreover, it is aimed to provide design characteristics of this intervention program.

In terms of addressing the gaps in the literature, this study has three contributions:

The literature review conducted on the first stage showed that problematic Internet usage behavior was reviewed without distinguishing Internet usage purposes (academic, social, recreational) and whether this behavior changed according to use purposes. In order to address the problematic Internet use comprehensively and to address this gap in the literature, the relationship between Internet usage purposes and PIU was investigated in this study. This study is important as it aims to address this gap.

Various studies in the literature have examined the relationship between PIU and self-regulation, PIU and academic procrastination, PIU and academic performance. However, no study has been found in which all these variables were

examined together in a comprehensive manner. This study is important because it is a study in which all these variables are considered together. It was deemed important to consider these variables as a whole, because based on the literature, it was predicted that these variables could be important in the intervention programs to be designed for PIU in the academic context.

Studies conducted in recent years have revealed that MCII self-regulation strategies are effective in many areas (eating disorder, coping with stress, communication skills, etc.). In the second stage of this study, these strategies were used in a new area and it was the first intervention program that aimed to reduce PIU behavior and increase academic performance. In this respect, this study is important as it aimed to examine the effectiveness of MCII strategies in a new area with a new study.

In terms of providing theoretical contribution, this study has three contributions:

The design characteristics that emerged in the hEp development process are important due to their guiding feature for researchers who aim to develop such intervention programs.

Centers for advancing learning and teaching, which have become widespread in recent years and aim to improve learning and teaching processes, can prepare various programs for the academic development of students by using the design characteristics emerged in this study. This study is important with this contribution.

In the second stage of this study, unlike other PIU studies, an intervention program was designed and developed. This intervention program was developed as a mobile application with a design-based research method and provided evaluations for the effectiveness of this application. This study is also significant and unique in this respect.

In terms of providing practical contribution this study has two contributions:

The hEp application developed in this study is available to all university students. This application aims to improve students' self-regulation skills, reduce academic procrastination and problematic Internet use behaviors. This study is important, as aiming to provide an application targeting these behaviors.

Product of this study can be a supportive alternative source for centers for advancing learning and teaching to contribute to the academic development of students. This study is important as it aims to provide a supportive alternative source to such centers.

Emergency remote teaching, which came with the Covid-19 pandemic, has been a system where all stakeholders have problems because it is sudden and unexpected involvement. Combined with the fear, anxiety, and social isolation caused by the pandemic, university students' self-regulation skills have weakened and problematic Internet usage behavior has increased. It was observed that the students needed a supportive intervention program during this period. This study is important as it provides a supportive program in such unexpected situations.

## 1.6 Operational definitions

**Academic Internet use:** All Internet behaviors that have academic aim (eg. Watching a video on an academic topic, looking for comics with regard to an assignment, messaging with friends on a course related topic, getting involved in a study related social media group, etc.)

**Deficient self-regulation**: A state in which conscious self-control is relatively diminished (LaRose et al., 2003, p. 232).

**hEp:** An intervention, which will be developed based on study results of first stage of this study in regard to Self-regulation, procrastination, Internet use behavior, and academic performance.

**Internet use behavior:** Internet use habits

**Internet use:** Social media, texting, video, gaming,

**Multitasking:** The performance of more than one task at the same time.

**Problematic Internet use:** Incontrollable overuse of the Internet which have negative consequences on individual's life (Davis, 2001).

**Procrastination:** Voluntarily delay an intended course of action despite expecting to be worse off for the delay (Steel, 2007, p.66).

**Recreational Internet use:** Non-academic use of Internet such as watching video, movie, TV series, searching for information for leisure purposes, reading news, etc.

**Self-regulation failure:** Problems that arise when one intentionally tries to initiate, alter, or inhibit a specific response or behavior and fails to do so because one does not put in sufficient effort (underregulation) or because one's active efforts are ineffective or counterproductive (misregulation) (Heatherton & Baumeister, 1996, p. 92).

**Social Internet use:** Non-academic use of all texting related behaviors.

**Task-switching:** It is an executive function that involves the ability to unconsciously shift attention between one task and another.

**Unfavorable Internet use:** Task-switching behavior while studying, multitasking with social media or texting.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1    Internet Use Patterns as Academic, Social, and Recreational Use

In 2000, in their review, Mckenna and Bargh used the following sentence: "Although the Internet is not yet a vital utility such as the telephone, it will not be long before having a connection to the Internet will be equally as important" (2000, p.57). After two decades, currently, the Internet has a state as vital as telephone, even a greater necessity for some people. A tool that seen as a necessity, with such a rapid rate of use, has brought scientific questions and studies with itself. As mentioned before, recently, one of the biggest problems regarding Internet use is its problematic form. Numerous studies conducted regarding this problem with different denotations, such as PIU, Internet addiction, Internet use disorder, and excessive Internet use, etc. However, Internet usage, whether problematic or not, can be classified into various sub-types. Several research studies touched upon a limitation of previously conducted problematic Internet use studies. The problematic use has been examined without separating Internet use patterns. Moreover, little is known about Internet use patterns and a clear categorization has not been fully achieved yet. In several problematic Internet use questionnaires, time spend online shown as a sign of problematic Internet use; however, professionals whose jobs necessitate Internet use can be the reason for higher Internet use hours (Monaghan, 2014). Therefore, it is suggested to re-examine problematic use after separating Internet use patterns, habits or online behaviors of individuals (Jelenchick et al., 2014; Mei et al., 2016, Monaghan, 2014). In this study, before the Internet use patterns were separated into sub-categories, literature was examined in order to define the categories in the most appropriate way. According to the literature review, a few studies made the Internet

use pattern categorization. Jelenchick et al., (2014) suggested separation of Internet use types as recreational and school-work activities in their article on "Problematic and Risky Internet Use Screening Scale Development". Monaghan (2014) also preferred same wording, used the term recreational for all activities other than school and work life. Mei et al., (2016) also mentioned distinguishing use types, such as; social networking, academics, online gaming, etc. Considering all these, most of the studies prefer using school-work activities or academics as one category of Internet use. For this reason, and considering the population of this study, it was decided that the first category need to be named as academic use. In its first years of public use, the Internet was a place for interpersonal communication aims (Kraut, Mukopadhyay, Szczypula, Kiesler, & Scherlis, 1998). In addition, there are growing number of studies on social use of the Internet (Giunchiglia et al., 2018; Lau, 2017; Rosen, Carrier, & Cheever, 2013) and one of the most common problematic Internet use scale also have a sub-factor for as *Preference for online social interaction* (Caplan, 2010). For these reasons, the second category for Internet use is decided as social use. Nowadays, besides the social use aims, the Internet gained numerous features that allow users to spend time in various ways such as watching videos, listening music, browsing entertainment, playing online games, etc. These activities are referred as recreational use (Li et al., 2016; Kim, 2011). Kim (2011) described recreational use as a type of Internet use beside social and academic use. Therefore, the last category which include above-mentioned activities was decided as recreational use. In this respect, separation of use patterns as academic, social, and recreational was decided for the current study. After this separation, investigating problematic use in line with the sub-categories will make a contribution in filling an important gap in the literature.

### 2.1.1    Academic Internet Use

Several studies focused on specific Internet use for academic purposes. Most of them revealed that there is a positive relationship between the academic use of the

Internet and the academic performance of students (Jones, Johnson-Yale, Perez, & Schuler, 2007; Kim, 2011; O'Brien, 2011; Strasser, 2016). Kim (2011), in his study, found that academic Internet use has a positive relationship with the academic performance of adolescents and a negative relationship with their externalizing problematic behavior. Jones et al. (2007) claimed that college students take the advantage of the Internet while researching. Moreover, these students perceive that their academic use of the Internet has a positive relationship with their success. Similarly, a study conducted with 489 undergraduates in Turkey revealed that intense social media use for academic purposes have a positive effect on their perceived academic performance (Chang, Tu, & Hajiyev, 2019). According to research studies which were conducted mostly with the adolescents and undergraduate students, the use of the Internet for academic purposes positively affects academic performance and perceived academic performance. Moreover, it has a negative relationship with problematic Internet use behavior.

### 2.1.2 Social Internet Use

Around the first decade of publicized Internet use, a study referred Internet as a place in which most of its users use it for interpersonal communication purposes (Kraut et al., 1998). In years, it has gained numerous features, but it also maintained its characteristic of letting people to engage in social interaction. Burns (2008) claimed that the World Wide Web has been dramatically transformed from an information pool to an environment in which people have become active participants, and content creators. Social Internet usage, which contributes to individuals being active participants with its interaction opportunity, has been examined in relation to numerous variables, such as: psychological symptoms (Truzoli, Osborne, Romano, & Reed, 2016), well-being (Xu, Wang, David, 2016), eating behavior (Park & Lee, 2017), academic performance (Giunchiglia et al., 2018; Kim, 2011). Relationship between social Internet use and academic performance, which is one subject of the current study investigated by several previous research studies. A study conducted

17

with adolescents revealed that social use of the Internet has a negative relationship with academic performance and a positive relationship with their externalizing problematic behavior (Kim, 2011). Another study on social Internet use of college students claimed that students who connect with their family or relatives on the Internet may be candidates to live with Internet related problems (Lavin, Marvin, McLarney, Nola, & Scott, 1999). Moreover, Boogart (2006), focused on specifically on the social use of Facebook and found a significant relationship between intense Facebook use and poor academic performance. Most of the research studies emphasize that the relationship between social Internet use and academic performance is negative.

## 2.1.3    Recreational Internet Use

There are several studies on recreational Internet usage. However, there is no consensus on recreational Internet use definition. For this reason, a clear definition of recreational Internet use cannot be given at this stage. But, literature on recreational Internet use will be provided.

It is stated recreational activities are the activities that performed during time intervals out of compulsory activities (food, sleep, and other primary activities (Cordes & İbrahim, 1999).  Recreational use of Internet is specified as "emailing, messaging with friends, reading websites and listening to digital music" by Bowers and Berland (2013, p. 51). They categorized recreational Internet use as "for fun" which comprises listening music, communicating with friends, and browsing Internet and "videogaming" (p. 56). But this categorization is inconsistent with other studies. Because in many studies, "communicating with friends" is taking place under social Internet usage (Kraut et al., 2002; Kim, 2011). A study with a focus of Internet use and academic performance made a definition of recreational Internet use as using the Internet as entertaining purposes like listening music, online gaming, picture downloading, searching for information for leisure purposes (Kim, 2011).

18

Moreover, it has suggested a negative relationship between recreational use and academic performance.

Several studies emphasized that there is a positive relationship between recreational Internet usage rate and problematic Internet use (Jelenchick et al., 2014; Tao et al., 2010). Moreover, a recent study investigating Internet use during the Covid-19 epidemic (Dong, Yang, Lu, & Hao, 2020) indicated that recreational use increased during this period and it also increased problematic Internet use. In other words, according to the literature, there is a positive relationship between recreational Internet use and problematic Internet use.

## 2.2    Problematic Internet Use

Currently, there are 4.54 billion Internet users around the world. Approximately 62 million of these users are from Turkey (Kemp, 2020). Considering the population of Turkey which is 83 million, the rate of Internet users in this country is 74%. This intense exposure to the Internet has brought an inappropriate overuse, which has social, psychological, and physical negative outcomes. Although there is no consensus on denotation of this Internet use behavior yet, most commonly used denotations are problematic Internet use (Calvete et al., 2017; Casale et al., 2016; Dunbar, Proeve, & Roberts, 2017; Laconi et al., 2017; Mei et al., 2016; Mihara et al., 2016; Öztürk & Özmen, 2016; Park & Lee, 2017), Internet addiction (Brenner, 1997; Greenfield, 1999), Internet dependence (Scherer, 1997), pathological Internet use (Davis, 2001; Morahan-Martin & Schumacher, 2000), and Internet addiction disorder (Goldberg, 1996). In this study, problematic Internet use term is used to refer to uncontrollable, excessive Internet use as it widely used in recent studies (Aboujaoude, 2010; Mihara et al., 2016; Shapira et al., 2003; Spada, 2014). Besides, the literature suggests that there are two types of PIU; specific and generalized PIU. Specific PIU means using the Internet excessively for a particular aim, such as gaming, pornography, gambling, etc. (Davis, 2001). Generalized PIU, on the other

hand, refers to using the Internet excessively without a specific use purpose (Caplan, 2002). For the current study, generalized PIU is referred with the PIU term.

DSM-5 involved Internet Gaming Disorder as "Conditions for Further Study" (APA, 2013, p.795). However, several authors argued that Internet addiction, as a general concept, should have been included in DSM-5 as an addictive disorder (Griffiths, King, & Demetrovics, 2014; Monaghan 2014). In her doctoral dissertation, Monaghan (2014) criticized the approach of DSM-5 in two ways: first, the proposed criteria (See Table 2.1) for justification equates Internet Gaming Disorder with gaming addiction, Internet addiction, or Internet use disorder (APA, 2013, p. 796). For this reason, she stated "…it is ill-advised to combine problematic use of one function of the Internet (i.e., gaming) with every other type of problematic use" (p.18). Second, narrowing the diagnosis to a single use type, which is gaming, limits its applicability to numerous potential misuses of Internet technology. For this reason, she suggests a solution as characterizing disorder as "Internet use disorder" and adding subtypes to it (Monaghan, 2014). A later study conducted on how Internet addiction and behavioral addictions match up with, revealed a substantial overlap of the experiences of individuals with excessive Internet use and individuals with behavioral addiction (Li et al., 2016). Although PIU has become a growing health issue around the world, there is no consensus on the extent to which the level of Internet use will be regarded as what kind of dependency.

Table 2.1 DSM-5 Proposed Criteria for Internet Gaming Disorder (APA, 2013, p. 796)

| |
|---|
| *Persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period:* |
| *1. Preoccupation with Internet games.* |
| *2. Withdrawal symptoms when Internet gaming is taken away (e.g., irritability, sadness)* |
| *3. Tolerance-the need to spend increasing amounts of time engaged in Internet games* |
| *4. Unsuccessful attempts to control the participation in Internet games* |
| *5. Loss of interests in previous hobbies and entertainment as a result of, and with the exception of, Internet games.* |

*6. Continued excessive use of Internet games despite knowledge of psychosocial problems.*

*7. Has deceived family members, therapists, or others regarding the amount of Internet gaming.*

*8. Use of Internet games to escape or relieve a negative mood (e.g., feelings of helplessness, guilt, anxiety).*

*9. Has jeopardized or lost a significant relationship, job, educational or career opportunity because of participation in Internet games.*

In recent years, a number of studies have given importance on PIU by examining its effects on, relationship with numerous variables, such as; emotional dysregulation, escapism, and metacognition (Casale et al., 2016), psychological wellbeing, happiness, depression, and loneliness (Muusses et al., 2014), self-perception, personality and school type (Öztürk & Özmen, 2016), depression, behavioral addiction, impulsivity, self-control (Yau et al., 2012), defense mechanism, coping strategies and pathological traits (Laconi, et al., 2017). Most of the studied groups in these studies are adolescents and young adults. Both groups have the highest Internet use rates and they are the most vulnerable groups to be negatively affected by PIU. People in these ages, have serious problems with regard to academic performance, social relationships, psychological wellbeing due to PIU. Problematic Internet use has negative effects not only on adolescents or young adults but also on young children. American Academy of Pediatrics (2017) study on speech development showed a significant relationship between "*handheld screen time"* and expressive speech delay. That is, PIU adversely affects all age groups from childhood.

Studies regarding PIU in the context of Turkey have remained limited. A study on high school students' problematic Internet use in Turkey claimed that technical high school students are more prone to use the Internet problematically rather than Anatolian or science high school students. The underlying reasons of this situation still need examination. Moreover, educational researches are needed in order to protect students from the adverse effects of the PIU and help them to develop healthy Internet use behaviors (Öztürk & Özmen, 2016). Another study on PIU of undergraduate students in Turkey revealed that Internet activities, chat,

entertainment and social networking significantly predicts PIU levels on social comfort, loneliness/ depression, diminished impulse control, and distraction dimensions. It is also revealed that, the dimensions of loneliness and diminished impulse control are significantly predicted by the time of the day. Moreover, male students are found to be more problematic in using Internet in all dimensions than female students (Tekinarslan & Gürer, 2011). Another study, specifically conducted with undergraduate CEIT students in Turkey, showed similar results, in terms of gender differences; male students more inclined to use Internet problematically when compared to female undergraduates. Moreover, it is stated CEIT students are medium level problematic Internet users. The study suggested that urgent measures must be taken (Ünal, 2013). The literature emphasizes the need for individuals to display healthier Internet usage behaviors, it also emphasizes the urgency of preparing the necessary intervention programs.

## 2.2.1    Problematic Internet Use and Academic Performance

Many studies over the past 10 years have examined the impact of SNSs and Internet use on academic performance (Junco & Cotten, 2012; Korie, 2015; Nichols, 2011; Norris, 2010; O'Brien, 2011; Özer, 2014, Strasser, 2016). In a study comparing Turkish and American college student SNS use habits, it has been revealed that Turkish students' SNS use has a significant negative impact on their academic performance. Moreover, students from Turkey have significantly lower levels of collage self-efficacy compared to US students (Özer, 2014). Numerous studies focused academic performance of students who multitasks, task-switches during studying. Previous research has shown that switching between tasks frequently leads to poorer learning results and performance (Ophira, Nass, & Wagner, 2009). While doing schoolwork, texting and Facebook use negatively impact deeper understanding and cognitive processing of college students and it resulted in lower GPAs. While studying, multitasking with Facebook or texting inhibits students' "representational holding" (p. 511) of the course material in their

working memory, therefore the information in the study material could not be processed in a meaningful way (Junco & Cotten, 2012). Another study conducted in 2011 showed that university students had more mental health problems than past three decades. These mental health problems have adverse effects on students' academic performance and PIU has been shown as one of them. The study examined effects of problematic Internet use on university adjustment and results showed that PIU uniquely influenced university adjustment of students (Nichols, 2011). Studies examining the relationship between problematic Internet use and academic performance indicate a negative relationship. Various dimensions related to both Internet use and academic performance have been addressed in previous studies. For example, in addition to problematic Internet use, students' task-switching / multitasking behavior negatively affects their academic performance. Besides, problematic use behavior negatively affects the deeper understanding of the student.

## 2.3    Self-Regulation and Internet Use Behavior

Theories developed on the ego have claimed that people will be successful in managing their life only when they can understand how they manage their egos. The way to understand how individuals manage their egos is through understanding the "self-regulation", which is the whole body of all emotions, thoughts, feelings, actions and choices that define the human self (Baumeister, 2018). In other words, the individuals' being happier in school-work-family life, increasing their physical and psychological well-being (and thus developing awareness on the underlying causes of negative behavior and thus reducing the frequency and intensity of negative behavior) is achieved through self-regulation. Although self-regulation is a concept that has emerged in the last 40 years, it has been the field of study of researchers from the fields of education and psychology, and even the whole professional life of some researchers.

In 1980s, self-regulation becomes one of the major focus of Bandura's Social-Cognitive Theory. It is seen as a focal point of complex learning. As regards

complex learning, many theories describe the forms of thinking and behavior that represent complex learning. On the other hand, social-cognitive theory defines the factor necessary for complex learning and this factor is self-regulation system. Self-regulation includes three sub processes, namely, self-observation, self-judgement, and self-reaction. Self-observation necessitate monitoring one's own behavior in a deliberate and conscious way. For example, a student observes that she/he is more successful working alone rather than in group work (Bandura, 1986). Self-judgment indicates the comparison between the current performance of an individual and the predetermined goals she/he set (Schunk, 2001). Self-reaction can be thought of as a reaction of individual after observing and judging her/his performance. These sub processes can be explained in an example: Ernest Hemingway is the author recorded his daily production of words (self-observation) on a mounted chart. If the amount was less than originally planned (self-judgment), Hemingway curtailed his time spent fishing (self-reaction; Graham & Harris, 1994, p. 206). Besides sub-processes of self-regulation, there are two impulses that influence self-regulation, namely, self-efficacy and achievement. As an internal factor, self-efficacy is important because it effects "the level of selected goals and one's responses to failure to meet those goals, such as persistence and effort" (p.368). As an environmental factor, achievement is important because it will provide feedback on how much the individual has done and will arrange her/his next behavior properly. These behaviors can be increasing the effort, lowering the goal, or changing the learning strategy (Gredler, 2009).

Several definitions of self-regulation are available in the literature. According to one of the mostly used definition, self-regulation is "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals." (Zimmerman, 2000, p.14). Another definition is: "a purposive process, self-corrective adjustments are taking place as needed to stay on track for the purpose being served, and the corrective adjustments originate within the person" (Carver & Scheier, 2004, p.3). "Self-regulation", because it depends on individuals believes about themselves. It is a self-directed transformation process of mental

abilities to task related skills (Zimmerman, 2000). Moreover, it has a context dependent nature. That is, it cannot be identify as a singular trait (Schunk, 2001).

As stated in operational definitions, "behavior" word in the "Internet use behavior" is used synonymous with "habit" word. Habit is defined as the "situation-behavior sequences that are or have become automatic, so that they occur without self-instruction" (Triandis, 1979, p. 204). As an automatic situation-behavior sequence, habits decrease the effectiveness of self-regulation. A review on the Internet use behavior laid emphasis on two aspects of self-regulation, namely, automatic and controlled aspects of self-regulation. Automatic aspect of self-regulation is the reaction of the motivational system when encountering a certain stimulus. On the other hand, controlled aspect of self-regulation is about the impact of executive processes. That is, an individual with controlled self-regulation capacities is aware of and can intentionally influence her/his emotions, thought, and behaviors. It is claimed that, for regulating the Internet use behavior, automatic self-regulation capacities should be turned to the controlled self-regulation capacities (Billieux & Van Der Linden, 2012).

Several studies on the relationship between self-regulation and problematic Internet use revealed negative relationship. A study conducted on the pathological SNS use emphasized that continuous scrolling on social media would indicate pathological use and poor self-regulation capacities (Holmgren & Coyne, 2017). Another study on the relationship between self-regulation and Internet use indicated that student with high self-regulation capacities show less problematic use behaviors (Rouis, Limayem, & Salehi-Sangari, 2011). Researchers not only focused on the use of the Internet as a whole, but also studied some specific Internet usage behaviors. A study showed that individuals who prefer online social interaction are more prone to have deficient self-regulation in terms of Internet use (Caplan, 2010). Moreover, individuals who use Internet for regulating their mood also have deficient self-regulation (LaRose et al., 2003). A thesis study investigated role of self-regulation in non-academic Internet browsing during class sessions showed that due to poor

self-regulation capacities of students, Internet can offer an attractive distraction to academic performance (YangKim, 2009).

### 2.3.1    Deficient Self-Regulation and Problematic Internet Use

Self-regulation is seen as a key component in connection with PIU (Assunção & Matos, 2017). Several studies suggest that there is a positive relationship between PIU and deficient self-regulation (DSR) (Billieux & Van Der Linden, 2012; Caplan, 2010; Kim & Davis, 2009). DSR is defined as "a state in which conscious self-control is relatively diminished". (LaRose et al., 2003, p. 232). As mentioned above, self-regulation has three sub-processes. In these processes, (self-observation, self-judgment, and self-reaction) people with PIU are thought to display deficient self-regulation. A study, investigated the influence of DSR on media behavior of 465 college students found that there is a positive correlation between pathological Internet use and DSR. It was also found that the participants increase the use of media to get away from the depressed moods, but the result are worse, the self-regulation skills of the students decreases and the Internet usage increases (LaRose et al., 2003). A literature review on PIU and self-regulation association also showed that "poor self-regulation capacities, e.g., high impulsivity and sensation seeking, low inhibitory control, poor decision-making abilities" (p. 24) have significant effect on the development of PIU. Individual differences are important because PIU is seen as an addictive behavior and in addictive behaviors, individual differences in self-regulation are a crucial factor (Billieux & Van Der Linden, 2012). Another study which also focused on the individual differences in self-regulation claimed that poor self-regulation causes high impulsivity. High impulsivity has found in individuals who suffer from PIU (Cao, Su, Liu, & Gao, 2007). Therefore, indirect association between PIU and self-regulation is also emphasized.

Studies addressing the relationship between self-regulation and PIU with various aspects emphasize the negative relationship between these two variables. Although some of these studies prefer the expression of deficient self-regulation and

some prefer the expression of self-regulation failure, it is striking that Internet use is problematic when self-regulation is insufficient or not strong enough.

## 2.4    Procrastination

Procrastination, is a well-known and prevalent phenomenon that seen as a weakness of human being regarding self-regulation (Senécal, Koestner, & Vallerand, 1995). It is defined as "voluntarily delay an intended course of action despite expecting to be worse off for the delay" (p. 66). Two types of procrastination are defined in the literature, namely, positive and negative forms of procrastination. Positive form of procrastination refers to a convenient delay or avoidance from hurrying up. Negative form of procrastination, on the other hand, mostly considered as an impediment of the behavior, irrationally (Steel, 2007). The term "procrastination" used in this study refers to the negative form.

In several studies it has been emphasized that procrastination is a behavior as old as human history (Janssen, 2015; Reinecke et al., 2016), and various evidences have been presented dating back to 1400 B.C. on this behavior. That is, human beings tend to procrastinate by nature. This tendency negatively affects not only individuals but also societies (Janssen, 2015; Steel, 2007). A meta-analysis examining the variables associated with and causes of procrastination based on 691 correlations revealed that consistent and strong predictors of procrastination are self-efficacy, impulsiveness, task delay, task aversiveness, and conscientiousness (with its aspects of achievement motivation, self-control, distractibility, and organization). Moreover, causes of procrastination are classified under four categories as individual differences, the nature of task, proximal outcomes, and demographics (Steel, 2007). Procrastination behavior involves waiting until the last time with an unnecessary deliberate postpone. The individuals postpone not because they have more important tasks, but because they do not prefer to avoid from procrastination behavior (Janssen, 2015). Procrastination occurs when individuals prefer to work on the tasks that are less important or more pleasurable. Steel (2007) asserted that this situation is

increasing more and more in modern societies. Due to the wide range of bigger tasks required by modern society and the longer time needed to successfully complete these tasks, people may prefer instant reward and short-term gratification (Reinecke et al., 2016). The literature has emphasized that individuals who have problems in delaying pleasure experience procrastination problems (Tice, Bratslavsky, & Baumeister, 2001). For this reason, regarding the delay behavior, the lack of self-regulation should be addressed in detail (Janssen, 2015). Pychyl and Flett (2012) emphasized in their article that the possible problems that procrastination will create are not sufficiently recognized. In a way that confirms this claim, various studies have shown that as a self-regulatory failure, procrastination has negative effects on psychological well-being (Ferrari, Johnson, & McCown, 1995), physical health (Sirois, 2007), academic achievement (Reinecke et al., 2016), financial strength (Mehrabian, 2000), etc. that is, in the all areas of life. Based on these literature, Pychyl and Flett (2012) emphasized that the seriousness of the negativities that this form of self-regulatory failure may cause should be better recognized by the society.

### 2.4.1 Procrastination and Self-Regulation

Steel (2007) claimed that procrastination is the very definition of self-regulation failure. Heatherton and Baumeister (1996, p. 92) defined self-regulation failure as:

> *"Problems that arise when one intentionally tries to initiate, alter, or inhibit a specific response or behavior and fails to do so because one does not put in sufficient effort (underregulation) or because one's active efforts are ineffective or counterproductive (misregulation)."*

People set a wide variety of goals for themselves and strive to achieve those goals. In the realization of the goals, individuals should be able to make the necessary actions and the necessary arrangements in the process to achieve their goals. When this is done, it means that an effective self-regulation is occurred. However, the failure of individuals to take the right steps to achieve the goals or to take steps that

will distract them from achieving the goals means that self-regulation failure is occurred. As stated earlier, to describe self-regulation, the muscle metaphor has been used. A muscle that is exercised sufficiently and regularly will be strengthened, and similarly, impulsivity can be controlled through sufficient and regular practice (Heatherton & Baumeister, 1996). As can be understood from the definition above, self-regulation failure is not only about procrastination. This failure can be observed under various impulsivity related conditions (Cao et al., 2007). Several impulsivity related studies, on gambling, obesity, etc. revealed that these self-regulation failures increased over the years (Griffith & Parke, 2002; Wadden, Brownell, & Foster, 2002) and these results are consistent with the results of studies on procrastination form of self-regulation failure (Kachgal, Hansen, & Nutter, 2001).

Despite the human tendency to procrastinate, some postpone less and others more. Low procrastinators are those who properly employ self-regulation strategies to overcome this behavior (Ariely & Wertenbroch, 2002). Effective self-regulation has two important dimensions. These are: to achieve the goal in an optimal time and to achieve it with a high amount of correctness (Bratslavsky,, Baumeister, Muraven, & Tice, 1998).

## 2.4.2 Academic procrastination, Academic Performance, and Problematic Internet Use

Procrastination behavior of individuals has been examined under different domains in the literature. Some of those are academic, work, health, and relationships (Klingsleck, 2013). Studies on procrastination mostly focused on academic domain. A wide range of these studies revealed academic procrastination's negative effects on academic performance (Balkıs & Duru, 2017; Ferrari, O'Callaghan, & Newbegin, 2005; Goroshit, 2018). Studies have examined the effects of academic procrastination not only on academic performance but also on the other areas of life. A study investigating effects of academic procrastination revealed that it can be seen as a risk factor that adversely affect not only academic performance but also mental

and physical health of students (Grunschel, Schwinger, Steinmayr, & Fries, 2016). Besides numerous studies, two meta-analysis studies also highlighted the negative relationship between procrastination and academic performance (Kim & Seo, 2015; Steel, 2007). Steel (2007) emphasized in his meta-analysis study that there is a significant negative relationship between these two variables, but also drew attention to the weakness of this relationship. On the other hand, some studies have not found a significant relationship between these two variables. As an explanation for this unexpected result, it was stated that taking only GPA as an academic performance criterion might have created such a result (Janssen, 2015).

Academic procrastination is a common behavior for students from all educational levels (Balkıs & Duru, 2017). Several studies have pointed out that the prevalence of academic procrastination is quite high (Klingsieck, 2013; Özer, Demir, & Ferrari, 2009; Steel, 2007). According to Janssen (2015), although it is the mostly researched procrastination type, the literature on the prevalence of academic procrastination and its relationship with academic performance is limited. When we look at the context of Turkey, two studies conducted on prevalence of academic procrastination revealed similar percentages as 53% (Özer, 2011) and 55% (Özer & Ferrari, 2011) which are above the half of the studied samples.

Studies conducted in recent years have shown that students use the Internet as a tool for academic procrastination (Panek, 2014; Reinecke et al., 2016). In the historical process, not only the tasks people have to complete on due time but also the variety of stimuli that will distract them and mediate procrastination have increased gradually (Janssen, 2015). Therefore, today's technology-rich conditions create a much more favorable ground for procrastination than in the past. In 1992, Milgram argued that people living in technologically advanced societies procrastinate more because of their interminable deadlines and commitments (As cited in Steel, 2007, p. 66). After about three decades, considering today's world, ever-growing Internet use and media exposure increases procrastination and creates a powerful barrier in the fulfillment of unpleasant duties and obligations (Reinecke & Hofmann, 2016). Considering continuous availability of it, Internet, has a crucial

role in the exhibition of procrastination behavior. Internet's characteristic of easy distraction paves the way for procrastination behavior. Procrastination has a long history, but it is argued that technological developments promote it. Several studies suggest that easy and widespread access to Internet technologies result in self-control challenges for an increasing number of Internet users in different areas of life (Meier, Reinecke, & Meltzer, 2016; Xu et al., 2016). Internet use in academic procrastination behavior, which is one of the subjects of the current study, has been the focus of various studies in recent years (Hayat, Kojuri, & Amini, 2020; Li, Gao, & Xu, 2020; Odacı, 2011). While, Odacı (2011) found a non-significant relationship between these variables, a number of studies found a negative significant relationship between these variables (Hayat, Kojuri, & Amini, 2020; Li, Gao, & Xu, 2020).

Academic procrastination has been a topic studied by numerous studies. Although most of these studies gave similar findings on the direction of the relationship between academic procrastination and various variables, some studies yielded different results. The relationship between academic performance and procrastination was found to be negative by most of the studies. In addition, there is a significant positive relationship between Internet use and academic procrastination. However, there are studies that present different findings for both relationships. Therefore, investigating these relationships in a detailed manner might contribute to the literature.

## 2.5    Theoretical Framework for Mental Contrasting with Implementation Intentions (MCII)

In 2002, in his article "Becoming a Self-Regulated Learner: An Overview", Zimmerman described "new technologies" of the period -portable phones, CD players, computers, and televisions- as constant distractors for students. He claimed that these distractors inhibit students to learn how to self-regulate their academic learning (Zimmerman, 2002). Today, although the tools, we have described as "new technology" have changed and diversified dramatically, learning how to self-regulate learning is still, even a bigger problem.

In today's world, accessibility and variety of technological tools have shown a great increase. No matter what the technological tool is, there is such a technology that decides whether or not to use those tools: The Internet. In recent years, for researchers in the field of education, the Internet has emerged as a factor that negatively affects students' psychological, physical well-being, interpersonal relationships, and academic performance (Caplan, 2010; Kim & Davis, 2009; Laconi et al., 2019; Mei et al., 2016; Öksüz, Güvenç, & Mumcu, 2018; Öztürk & Özmen, 2016; Park & Lee, 2017). Some of these studies emphasized the relationship between deficient self-control / self-regulation and unfavorable / problematic Internet use behavior (Billieux & Van Der Linden, 2012; Caplan, 2010; Kim & Davis, 2009; Mei et al., 2016; Yau et al., 2012).

Baumeister (2018) stated that self-control is one of the two most important features that lead to positive outcomes in the lives of individuals. He claimed that the individuals with high self-control are more successful in school and work life, experience less stress, develop fewer behavioral problems (such as eating disorder, gambling, smoking, etc.), enjoy life more, and feel better mentally and physically. The other important feature that leads to positive outcomes in the lives of individuals is intelligence. Although intelligence is a factor that positively affects self-control, it has been proven by numerous studies that it is difficult to improve the level of intelligence. However, since self-control is like a muscle, it can be developed with

32

effort. Therefore, self-control seems to be the most important key factor to positively affect the well-being of individuals and societies. In addition, theories developed on the personality claimed that individuals will be successful in managing their life only when they can realize how they manages their personality. The way to understand how individuals manage their personality is possible through understanding the "self-regulation", which is -the entire system of emotions, thoughts, feelings, actions, choices that define self- (Baumeister, 2018). In order for the individuals to be happier in school, work and family life and to increase their physical and psychological well-being, it is necessary to develop awareness on the underlying causes of negative behavior. Thus, thanks to self-regulation, individuals will have the opportunity to reduce the frequency and intensity of negative behavior.

Theories on self-regulation suggest that self-regulation is an accompanying component of goal setting theory. Self-regulation emerges throughout the goal setting process, because setting goals and transforming them into action is a process that requires volition (Locke & Latham, 1990). Locke (1991) suggested that the first and most important condition for triggering discrepancy is goal setting. Similarly, Bandura claimed (1988, p.47):

> *Human self-motivation relies on discrepancy production as well as discrepancy reduction. It requires feedforward control as well as feedback control. People initially motivate themselves through feedforward control by adopting performance standards that create a state of disequilibrium and then mobilizing their effort on the basis of anticipatory estimation. Feedback control comes into play in subsequent adjustments of effort expenditure to achieve desired results. After people attain the standard, they have been pursuing, they generally set a higher standard for themselves. The adoption of further challenges creates new motivating discrepancies to be mastered. Similarly, surpassing a standard is more likely to raise aspiration than to lower subsequent performance to conform to the surpassed standard. Self-motivation thus involves a dual cyclic process of disequilibrating discrepancy production followed by equilibrating discrepancy reduction.*

To put it simply, goal defines what individual aims to achieve and goal setting ease self-regulation. For example, failure to perform targeted goal may result in a negative performance assessment for the individual. This negative assessment leads

problem solving and so allows individual to enhance the performance to an acceptable level by eliminating the source of dissatisfaction. Actions that allow individual to achieve an acceptable performance lead her / him to evaluate the performance positively. However, achieving the same performance subsequently may cause a negative or neutral assessment. Therefore, the individual may set a higher-level goal. That is, self-regulatory behavior sequence is a process in which a person can adjust current and future behaviors and evaluate her / his progress while reaching her / his goals (Kanfer, 1986).

Goal theories commonly focus on two concepts regarding attaining the goals. First, the content of the goal such as, learning goals, competence, promotion goals etc. Second, regulation of the goal pursuit such as, emotional control, forming implementation intentions, making mental simulations, etc. which support goal attainment. However, how people succeed in setting goals is a topic that has not received sufficient attention from researchers (Oettingen, Pak, & Schnetter, 2001). A relatively new theory, named fantasy realization theory focuses on goal setting, claims that goal setting is a self-regulatory phenomenon (Oettingen, 1996; Oettingen, 1999). According to fantasy realization theory, people think about future in two ways: First, expectations. Here, expectation means, individual's own judgements of her / his ability to carry out related goal-directed action, whether or not these actions result in desired outcome, beneficialness of the actions in future life, and judged possibility of reaching the desired outcome based on individual's performance history. Second, free fantasies which are imaginations about future outcomes without considering possibility of attaining these outcomes (Oettingen et al. 2001).

Fantasy realization theory suggests that there are three ways of self-regulatory thought regarding goal setting (See Figure 2.3). First, expectancy-based mode of goal setting; is about mentally contrasting imaginations about desired future with present reality which poses obstacle regarding desired future. With mental contrasting, desired future is transformed into to be achieved situation while present reality is transformed into a situation that has to be altered. In this mode, expectations

play key role to achieve success. The higher the person's expectations, the higher the goal commitment. Second mode of goal setting is fantasizing. Fantasizing about desired future does not necessitate consideration of present reality. Individual just focuses on allure of desired future. Due to not considering present reality, neither success expectations nor acting for reaching desired future activated properly. In fantasizing mode, there is an inverse ratio between the success expectation and attempt to achieve and his / her goal with a moderate level commitment. That is, when success expectation is low, individual tend to try hard. Third mode of goal setting is focusing only on negative reality. Since the individual does not have any positive fantasies about the future, there is nothing to trigger her / him to act. Similar to fantasizing mode, individuals have moderate commitment to their goal and make a lot or no effort, regardless of their success expectations (Oettingen et al. 2001).

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                    ┌──────────────┐
                    │Self-regulatory│
                    │   thought     │
                    └──────────────┘
         ┌──────────────┬──────────────┐
┌──────────────┐ ┌──────────────┐ ┌──────────────┐
│   Mental     │ │              │ │              │
│ Contrasting  │ │  Indulging   │ │  Dwelling    │
└──────────────┘ └──────────────┘ └──────────────┘
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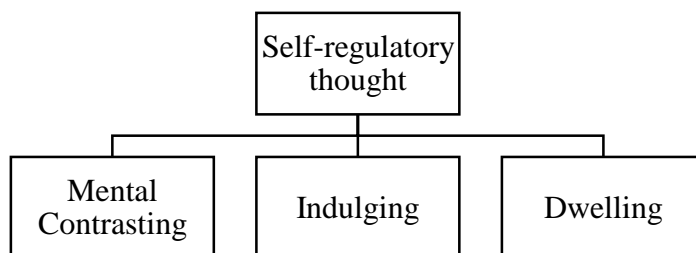
Figure 2.1 Self-Regulatory Thought Ways regarding Goal Setting

According to fantasy realization theory, cognitive elements of desired future and negative present reality needed to be accessible simultaneously. In other words, elements of both of them not only be realized but also be clearly elaborated by individual (Oettingen et al. 2001). At this point, researchers associated fantasy realization theory with cognitive dissonance theory. Cognitive dissonance theory suggests that dissonant cognitions need to be accessible simultaneously for the emergence of dissonance reduction (McGregor, Newby-Clark, & Zanna, 1999). For the current theory, single negative present reality or single desired positive future

doesn't allow simultaneous accessibility of both. However, mental contrasting of desired future with present reality allows individual to reach equally weighted scale pans and therefore, establishing a relationship between them. Hebb (2005), claimed that simultaneous activation of two brain processes evoke establishment of permanent connections between them. In fantasy realization theory, the link constructed between desired future and present reality gives the answers for how these cognitions are related, what kind of link becomes constructed. Researchers suggest "the relational construct activated by mental contrasting is that of the negative reality being an obstacle to or 'standing in the way' of desired future." (p. 738). By activating relational constructs, individual is allowed to create a requirement to act for fantasy realization (Oettingen et al. 2001).

While other theories on goals focus on influencing individuals' motivation to achieve the goal by affecting the level of success expectation (Anderson, 1983; Gregory, Cialdini, & Carpenter, 1982), Fantasy Realization Theory focuses on how commitment to the goal relates to expectations and ultimately how to transform individuals' free dreams into future-oriented dedicated goals.

In the mental contrasting self-regulation strategy emphasized in this theory, the questions such as where the goals come from, how they emerge are important questions. Because, it emphasizes the importance of answering these questions for effectively achieving the goals.

It has been suggested that considering the following variables in the goal setting phase will be effective in achieving the goal successfully.

While setting the goal;

1- Focusing on positive outputs that will be acquired instead of negative outputs that will be prevented if the goal is achieved (Higgins, 1997),

2- Striving to gain competence rather than showing competence (learning goals versus performance goals; Dweck & Sorich, 1999),

3- Expecting internal rewards rather than external ones (external goals versus internal goals; Ryan & Deci, 2001),

36

4- Setting short-term goals rather than long-term goals (Bandura & Schunk, 1981),

5- Using explicit expressions rather than vague expressions (Latham & Locke, 1991),

6- Feeling strong commitment to the goal (Ajzen, 1991);

will be effective in achieving the goal.

Feeling strong commitment to one's goal (goal commitment) is about how desirable and achievable (expectation of success) one finds the goal. Desirability and feasibility are necessary for strong dedication, but not always enough. As mentioned before, there are three ways of self-regulatory thought while setting goals; mental contrasting, indulging, and dwelling. Thanks to the mental contrasting strategy, the individual classifies the goals as achievable or not achievable goals and direct their attention to the goals that they can achieve. In other words, mental contrasting creates a commitment that is shaped by the success expectation. Studies have been conducted on the effectiveness of the mental contrasting strategy in various fields. Although the area in which studies were conducted varied, the observed differences among the mental contrasting, indulging, and dwelling groups remained constant. In all studies, only individuals in the mental comparison group felt more energetic in direct proportion to their success expectations, made more effort to reach the goal, and showed higher performance. Participants in the other two groups felt moderately energetic, displayed moderate effort and performance, regardless of their expectations of success (Oettingen et al., 2001; Oettingen, Mayer, Stephens, & Brinkman, 2010; Oettingen, Mayer, & Thorpe, 2010).

The Austrian neurologist and psychologist Viktor Emil Frankl (1985, p. 98), who survived the concentration camps during World War II, asked the question of how to overcome the difficulties of life at that time.

> *It did not really matter what we expected from life, but rather what life expected from us. We needed to stop asking about the meaning of life, and instead to think of ourselves as those who were being questioned by life—daily and hourly. Our answer must consist, not in talk and meditation, but in right action and in right conduct. Life ultimately means taking the responsibility to find the right answer to its*

*problems and to fulfill the tasks which it constantly sets for each individual. These tasks, and therefore the meaning of life can never be answered by sweeping statements. "Life" doesn't mean something vague, but something very concrete, just as life's tasks are also very real and concrete.*

Two situations are highlighted here. The first is that the individual should take responsibility for his / her own actions in solving daily life problems. The second is that problems and their solutions differ from individual to individual and from time to time. It has been suggested that goal pursuit in a self-regulated way is an effective method for individuals to take responsibility for their actions (Oettingen & Gollwitzer, 2010). Research on the psychology of goals claims that pursuing the goal effectively can be achieved by successive goal setting and goal implementation (Gollwitzer & Sheeran, 2006). In order to reach the desired future and fulfill the determined goals, the individual must be prepared and planned for the existing obstacles (Gollwitzer, 1990). Since mental contrasting enables us to see the current negative situation as an obstacle to the desired positive situation, it is quite possible that individuals with high expectations of success have already developed coping strategies regarding the possible obstacles they will encounter in the goal striving process. In their meta-analysis study, Gollwitzer and Sheeran (2006) argued that, when faced with the obstacle, regardless of the life area, determining how to apply what kind of a plan to cope with it strengthens the striving for the goal. Rather than just goal setting ("I want to achieve goal X"), also determining and using self-regulation strategies, which are called implementation intentions ("I will show behavior Y if case Z occurs"), has a remarkable positive influence on goal attainment. The underlying reason for the effectiveness of creating implementation intentions is the psychological process that creates a mental link between the expected negative situation (obstacle) and the planned counter behavior. Making a mental representation of the expected negative situation ensures that this situation is active and highly accessible in the mind (Gollwitzer, 1999). This high accessibility ensures that the situation described in detail is easily remembered and the individual pays attention to the relevant situation quickly when the situation occurs (Oettingen & Gollwitzer, 2010). While creating implementation intentions, it is necessary to

identify situation-specific problems that may arise in the process of achieving the desired future and to make plans for the solution of those problems (Gollwitzer, 1999). Since these plans emerge during mental contrasting, they serve as a cognitive mechanism responsible for the effects of mental contrasting in the goal acquisition. The relationship between the goal processes, mental contrasting, and implementation intentions self-regulation strategies is given in Figure 2.4.
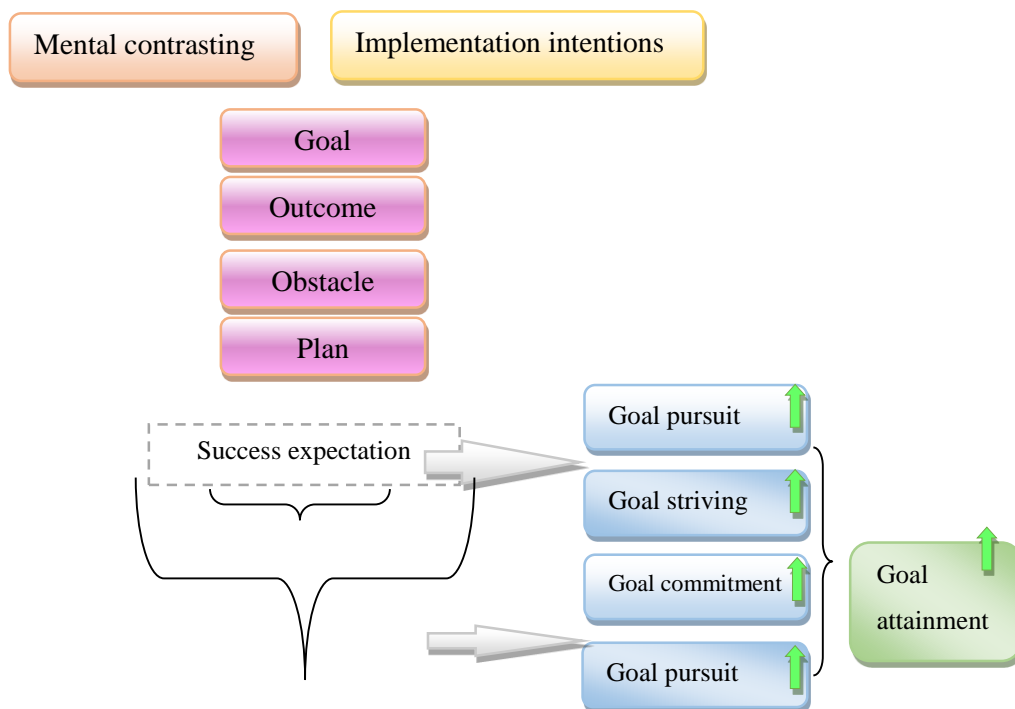


Figure 2.2 The Relationship between the Goal Processes, Mental Contrasting, and Implementation Intentions Self-Regulation Strategies

In the past, many studies have been conducted separately on mental contrasting and implementation intentions self-regulation strategies. The effectiveness of these strategies in achieving the goals has been proven. Several studies on mental contrasting self-regulation strategy revealed its effectiveness on goal attainment. These are: learning a second foreign language (Oettingen et al., 2000, Study 1), reading abroad (Oettingen et al., 2001, Study 1), finding a balance

between work and family life (Oettingen et al., 2000, Study 2), achievement in mathematics (Gollwitzer & Oettingen, 2009), English vocabulary learning in German primary school children, and multilingual vocabulary learning in American middle school children (Gollwitzer, et al., 2011). Although mental contrasting strengthens the goal commitment, for various reasons people may neglect to show the actions necessary to achieve their goals, even if they are strongly committed (Stadler, Oettingen, & Gollwitzer, 2010). In these cases, pre-planning before implementing the goal has the potential to positively affect pursuit of the goal. Implementation intentions are metacognitive, self-regulation strategies that can help individuals achieve their goals by encouraging them to face difficult situations that may arise during the goal implementation phase. This strategy consists of two parts: 1- Identifying the situations that might prevent striving for the goal; and 2- Creating an action plan that will facilitate goal-oriented behavior for each possible obstacle situation. Kirk, Oettingen, and Gollwitzer (2013) define the implementation intention as a conditional action plan. The implementation plan sentence is as follows: "If I encounter state X, then I will exhibit Y behavior". The 'if' part of the plan defines the expected potential obstacle situation and the 'then' part defines the goal-oriented behavior that is planned to be initiated when that obstacle is encountered. Implementation intentions have also been used as an effective strategy in various fields similar to mental contrasting. A few of these are changing eating behaviors (Stadler, et al., 2010), increasing mathematics achievement (Duckworth, Kirby, Gollwitzer, & Oettingen, 2013), initiating a goal that includes unpleasant goal-oriented behaviors (Orbell, Hodgkins, & Sheeran, 1997; Oettingen , Hönig, & Gollwitzer, 2000), and increased willpower (Gollwitzer, et al., 2010).

When applied alone, mental contrasting and implementation intentions have been strategies that make it easier to achieve the goal by affecting the striving and commitment to the goal. However, studies conducted in recent years have developed intervention programs using these two strategies together, and the results have revealed that using strategies together increases the success in achieving the goal (Duckworth & Carlson, 2013; Gawrilow, Morgenroth, Schultz, Oettingen, &

Gollwitzer 2013; Gollwitzer & Oettingen, 2010; Gollwitzer, Mayer, Frick, & Oettingen, 2018). Intervention studies using mental contrasting and implementation intentions together revealed that the implementation of these strategies is cost-effective and time-saving (Velasquez-Sheehy, 2015). Using these goal-oriented strategies makes it easier to achieve the goal, as it makes commitment to and striving for the goal stronger.

A goal of this study was to create an intervention program that would alleviate the negative impacts of problematic Internet use, which has been considered as behavioral addiction in the literature, while also improving academic performance. MCII strategies have been used as an intervention program in various studies to both alleviate behavioral addictions and improve academic performance. Therefore, MCII strategies fits the purposes of this study and theoretical framework of the intervention was formed based on these strategies.

### Summary

In this chapter, Internet use behavior, use of Internet for different purposes, namely, academic social and recreational uses were mentioned. Then, a recent topic, problematic Internet use was addressed. Then, self-regulation, which is of great importance in the lives of individuals was discussed, and the use behavior of the Internet in self-regulation deficiency/failure was addressed. Afterwards, academic procrastination, another important concept for the study, was explained and given to the relationship with Internet use, problematic Internet use, self-regulation and academic performance. And finally, the theoretical framework for the Internet use intervention program "hEp" was addressed. To be more specific, mental contrasting and implementation intentions self-regulation strategies discussed under Fantasy Realization Model.

According to the literature review, there are few studies that divide Internet usage behavior into sub-use types. In addition, there is a gap in the literature

regarding the relationship between problematic Internet usage behaviors and these sub-use types. Therefore, it is important to define sub-use types of the Internet and their relationship with PIU behavior.

It has been emphasized in the literature that self-regulation is insufficient in cases where Internet usage behaviors are problematic. Since this study aims to develop an intervention program in line with this relationship, it is important to reveal the relationship between these two variables. Moreover, the literature review highlighted the correlation between impulsivity and procrastination. Impulsiveness is also available in case of PIU. On the other hand, there is a strong negative relationship between procrastination and self-regulation. Therefore, another variable that should be taken into account when investigating the relationship between PIU and self-regulation is procrastination. In the current study, the academic type of procrastination behavior was examined since the academic effects of PIU use were addressed. Studies examining the academic effects of PIU have focused on the relationship between PIU and academic performance. These variables are important in the context of PIU and no study has been found in which all these variables were examined together in a comprehensive manner.

Recent research has found that MCII self-regulation strategies are effective in a variety of situations (eating disorder, coping with stress, communication skills, etc.). However, in the PIU context, these strategies were not used Therefore, there is a need for utilizing these strategies in problematic Internet use context.

# CHAPTER 3

# METHODOLOGY

This chapter presents the research methodology to fulfill the purpose of the current study. A multimethod study was conducted to fulfill the purpose of this study (Morse, 2003). This study aimed to describe undergraduate university students' current problematic and non-problematic Internet use behaviors, investigate the effects of self-regulation, procrastination, and academic performance on their PIU behavior and provide an effective Internet use program (hEp) which aims to increase academic performance by regulating Internet use behavior within the framework of self-regulation. That is, this study was two-fold and the first part is a quantitative and the second part is a qualitative design. In multimethod research, Morse (2003) claimed completeness of the researches that targets specific sub-goals. In other words, using qualitative and/or quantitative techniques, each of which aims to answer different sub-questions, is possible in multimethod studies. Since this study consists of two stages with different designs that aimed to answer different research questions, this study is a multimethod study. As for aiming different goals, methodology for each stage will be given separately.

For stage 1, research questions and hypotheses, research design, participants, data collection instruments and procedures, data analysis, and limitations sub-titles were included. For the stage 2, research questions, research design, participants, data collection instruments and procedures, contextual setting of the study, hEp development process, researcher role, data analysis, trustworthiness, ethics, and limitations sub-titles were included.

## 3.1 STAGE 1

### 3.1.1 Research Questions

1. What are the **Internet use behaviors** of the undergraduate university students?
    a. What are the **academic** Internet use behaviors of the undergraduate university students?
    b. What are the **social** Internet use behaviors of the undergraduate university students?
    c. What are the **recreational** Internet use behaviors of the undergraduate university students?
2. What are the relationships among demographics, Internet use patterns, and problematic Internet use behaviors of undergraduate university students?
3. To what extent are constructs of problematic Internet use predicted in a model that include the direct and indirect effects of self-regulation, academic procrastination, and academic performance?

Based on this research question, following hypotheses were formulated:

**Direct Effect Hypotheses**

**H1.** Self-regulation is a direct negative predictor of academic procrastination.

**H2.** Self-regulation is a direct positive predictor of academic performance.

**H3.** Self-regulation is a direct negative predictor of problematic Internet use.

**H3a.** Self-regulation is a direct negative predictor of preference for online social interaction (POSI).

**H3b.** Self-regulation is a direct negative predictor of Internet use for mood regulation (MREG).

**H3c.** Self-regulation is a direct negative predictor of deficient Internet use self-regulation (DSR).

**H4.** Academic procrastination is a direct positive predictor of problematic Internet use.

**H4a.** Academic procrastination is a direct positive predictor of POSI.

**H4b.** Academic procrastination is a direct positive predictor of MREG.

**H4c.** Academic procrastination is a direct positive predictor of DSR.

**H5.** Academic performance is a direct negative predictor of problematic Internet use.

**H5a.** Academic performance is a direct negative predictor of POSI.

**H5b.** Academic performance is a direct negative predictor of MREG.

**H5c.** Academic performance is a direct negative predictor of DSR.

**H6.** POSI is a direct positive predictor of MREG.

**H7.** POSI is a direct positive predictor of DSR.

**Indirect-Effect Hypotheses**

**H8.** The effect of self-regulation on problematic Internet use is mediated by academic procrastination.

**H8a.** The effect of self-regulation on POSI is mediated by academic procrastination.

**H8b.** The effect of self-regulation on MREG is mediated by academic procrastination.

**H8c.** The effect of self-regulation on DSR is mediated by academic procrastination.

**H9.** The effect of academic procrastination on DSR is mediated by POSI.

**H10.** The effect of academic procrastination on DSR is mediated by MREG.

**H11.** The effect of academic procrastination on MREG is mediated by POSI.

**H12.** The effect of POSI on DSR is mediated by MREG.

### 3.1.2    Research Design

Research design is defined as data collection, analysis, interpretation and report procedures that have different names and processes based on their characteristics (Creswell, 2012; Creswell & Plano Clark, 2007; Durrheim, 2006; Fraenkel, Wallen, Hyun, 2012). For fulfilling aim of this study quantitative research was utilized. In this first stage of the study, it was aimed to describe undergraduate students' Internet use patterns and problematic Internet use behaviors, and understand the relationship among problematic Internet use constructs and self-regulation, academic procrastination, and academic performance. These research purposes required the formation of pre-determined, measurable and observable research questions and in this direction, collecting numeric data from a large number of people with pre-arranged questions (Creswell, 2012). In addition, before conducting this research, the literature was thoroughly reviewed (Creswell, 2012; Fraenkel et al., 2012), and it was observed that in recent years the relationship among problematic Internet use behaviors and various variables was examined. In these studies, Internet use was not separated according to its sub-use purposes and it was stated as a gap. In addition, it has been observed that the problematic Internet use is not comprehensively examined in relation to sub-uses and its relationship with various important variables -that constitute the base for this study- has not been investigated thoroughly. Therefore, numerical data were collected from a large group of participants by using various measurement tools that were previously developed, they were analyzed with appropriate statistical methods and techniques, and the findings were reported with fixed expressions based on fixed criteria (Creswell,

2012; Creswell & Plano Clark, 2007; Durrheim, 2006; Fraenkel et al., 2012). The research design of this stage is quantitative research, since all the operations carried out at this stage have the characteristics of quantitative research.

There are several types of quantitative research. These are: survey, single-subject, correlational, causal-comparative, and experimental research (Fraenkel et al., 2012). Both survey research and correlational research were used in this study. Survey research was used to comprehensively display the current state of Internet usage behavior of university students. On the other hand, to define the relationship among the Internet use patterns, problematic Internet use, self-regulation, academic procrastination, and academic performance, correlational research was conducted (Fraenkel et al., 2012).

Survey research aims to make descriptions on a topic or issue by collecting data from a sample that is thought to represent the population. In this type of research, information is collected by asking questions to the participants. As stated, rather than the population, data is collected from the sample that will represent it and it is aimed to make inferences that will cover the population. Two types of survey research are defined as cross-sectional and longitudinal survey (Fraenkel et al., 2012). In the current study, for describing current state of Internet usage behavior of university students a cross-sectional survey was preferred.

Correlational research aims to examine the relationship between at least two variables without any attempt for influencing them. Since correlational research aims to describe the relationship between two or more existing variables, it is sometimes considered under descriptive research. However, unlike other types of researches, it answers the question of the degree of relationship between at least two variables. Correlation between two variables means that a change in a certain score in one of the variables result in a change in a certain score in the other variable (Fraenkel et al., 2012). In this study, since the relationship between Internet use patterns & problematic Internet use and the relationship among problematic Internet use, self-regulation, academic procrastination, and academic performance were aimed to

47

examined, correlational research was preferred. Fraenkel et al., (2012) claimed that there are two reasons for conducting correlational researches. These are; explaining human behaviors and predicting possible outcomes. The relationship between Internet use patterns & problematic Internet use is about the first one, to explain how individuals' academic, social, recreational Internet use durations and purposes related with problematic Internet use behavior. Effects of self-regulation, academic procrastination, and academic performance on problematic Internet use factors, is about the second one, which is predicting possible outcomes.

### 3.1.3    Participants of the Study

Study group included undergraduate students from accessible groups under faculties in Middle East Technical University. Creswell (2002) defines convenient (nonprobability) sampling as selecting participants because they are available and representative for the aim of the study. As data were collected from participants who were available, the sampling method of this study is convenient sampling. The sample consisted of 479 (291 females, 188 males) students in the 2018-2019 fall term from Middle East Technical University in Turkey. Majority of the participants were female (60,8 %). Most of the participants are 19-20 years old (48.0%). The participants were from five different faculties, 47.5% from Faculty of Education (FEDU), 18.0% from Faculty of Engineering (ENG), 14.4% from Faculty of Architecture (ARCH), 11.3% from Faculty of Arts and Science (FAS), and 9.0% from Faculty of Economics and Administrative Sciences (FEAS). More than half of the participants are 1st grade students (50.9%), followed by 2nd grade (22.3%), 4th grade (17.5%), 3rd grade (8.6%), and 5th grade (0.6%) students. Table 3.1 represent demographic information of the participants.

Table 3.1 Distribution of the Gender, Age, Faculty, Study Year (*N*=479)

| Gender | *f* | *%* |
|--------|-----|-----|
| Female | 291 | 60,8 |
| Male | 188 | 39,2 |
| Age | *f* | *%* |
| 17-18 | 22 | 4,6 |
| 19-20 | 230 | 48,0 |
| 21-22 | 124 | 25,9 |
| 23-24 | 84 | 17,5 |
| 25-37 | 19 | 4,0 |
| Faculty | *f* | *%* |
| ARCH | 69 | 14,4 |
| ENG | 86 | 18,0 |
| FAS | 54 | 11,3 |
| FEDU | 227 | 47,4 |
| FEAS | 43 | 9,0 |
| Study Year | *f* | *%* |
| 1 | 244 | 50,9 |
| 2 | 107 | 22,3 |
| 3 | 41 | 8,6 |
| 4 | 84 | 17,5 |
| 5 | 3 | 0,6 |

### 3.1.4    Data Collection Instruments

As the data collection instrument, questionnaire included sections related with demographic information, academic performance (GPA), Internet use patterns, problematic Internet use, procrastination, and self-regulation.

As demographic information, gender, age, grade level, and faculty variables were included in the questionnaire. GPA was included as the academic performance indicator. A questionnaire named Internet Use Patterns Questionnaire (IUPQ) adapted and used by the researcher that aims to get Internet use characteristics of undergraduate students. Moreover, translated version of Generalized Problematic Internet Use Scale-2 (GPIUS2) was applied to get information on problematic and addictive Internet use behavior of undergraduate students. To measure procrastination of students, Turkish version of the Tuckman Procrastination Scale was applied. Short Self-Regulation Questionnaire also applied to understand self-regulation of students.

### 3.1.4.1  Internet Use Patterns Questionnaire (IUPQ)

IUPQ was adapted from Monaghan (2014)'s "Questionnaire on Use of the Internet and Related Behavior" with the support of literature review (Choi & DiNitto, 2013; Kemp, 2017; Kemp, 2018; Monaghan, 2014; Weiser, 2000) and expert opinion. Monaghan (2014)'s questionnaire included;

1- *Demographics* (4 items),
2- *Internet use history* (12 items),
3- *Internet-related activity* (11 items), and
4- *Attitudes about Internet use* (6 items) sections.

From this questionnaire, 7 questions of *Internet use history* and 3 questions of *Attitudes about Internet use* sections were included. Regarding the *Internet use history,* the questions on the "first Internet use age" (short answer) and "Internet access tool" (check all that apply) were taken directly, and a new question added as Internet access place (check all that apply). Moreover, the items on the daily Internet usage durations (short answer) (4 questions, merged as 2 questions in the current study and asked separately for each use type: academic, social, and recreational) and Internet usage purposes (yes/no) (1 question with 21 sub-items, 14 of them adapted

50

and used) were adapted and used. Therefore, in the Internet use history sub-section, IUPQ included "first Internet use age", "Internet access tool", "Internet access place", academic, social, and recreational Internet usage duration besides Internet use purposes. As for the Internet use history sub-section, there are the following differences between Monaghan's questionnaire and the current questionnaire:

1- Monaghan asked individuals' Internet usage duration other than school or work purposes. In this study, on the other hand, Internet usage durations were classified as academic, social and recreational use durations and asked separately.

2- As for Internet use purposes, Monaghan formed 21 popular use purpose items other than work or school related Internet uses under Internet use purposes question in the *Internet use history* section. In this study, 14 of these purposes were classified, adapted, and used as social (4 purpose), recreational (9 purpose, 2 of them merged), and academic (1 purpose) purposes. Then the researcher has created six more items regarding academic (4 purposes) and social Internet use purposes (2 purposes) considering the literature review and the context of Turkey. A total of 19 popular use purpose items were asked as yes / no questions. The improvements are given in the following paragraph:

Although the framework of questionnaire was formed in line with the study of Monaghan (2014), from the year that questionnaire was developed until the year this study was conducted, the popular Internet applications were subject to various updates, and new applications were developed which made a great impact on the society in a short time. For these reasons, there was a need to reconsider development of Internet technologies with regard to usage types. The "Digital in 2017" and "Digital in 2018" reports published by WEARESOCIAL (Kemp, 2017; Kemp, 2018) were reviewed and the popular uses of Internet technologies both in the world and in Turkey were identified and necessary questions were added to the IUPQ. Based on above-mentioned sources, 5 academic sub-usage types (1 adapted and 4 newly created) were chosen as: creating educational informative web content (adapted),

sharing academic information on social networking sites (created), using MOOCS & online encyclopedias (created), using learning management systems (created), and accessing educational informative content (created). 6 social sub-use types (4 adapted and 2 newly created) included using direct messaging in social networking sites (adapted), using WhatsApp (created), commenting on shared posts in social networking sites (adapted), creating posts for interaction purposes (created), commenting on online questions for communication purposes (adapted), and using flirting apps (adapted). 8 recreational sub-uses (all of the 9 items adapted, two of them merged: online buying & online selling merged as online shopping) were defined as: listening music, watching videos/movies, searching the Internet, reading information from interested websites, looking photos, watching videos on social networking sites, individual gaming, multiplayer online gaming, online shopping, and reading books on Kindle. In addition, an open-ended other option was created for each use purpose. Students were requested to express other use purposes in these fields.

From *Attitudes about Internet use* sub-section, there were 6 questions and following 3 questions from this section were included (Monaghan, 2014, p.178):

1- Do you consider your use of the Internet to be excessive? (0= no, 1 =yes)
2- Do others consider your use of the Internet to be excessive? (0= no, 1 =yes)
3- Over the last year, do you feel that your recreational use of the Internet is : (01= Increasing, 02= Decreasing, 03=Remaining the same)

The third question was asked separately in the current study, as academic, social, and recreational use.

The newly created and adapted questions under IUPQ were presented to three experts from Instructional Technology field, and their opinions about the items were received. Based on the feedbacks, in order to increase the comprehensibility of the questions, examples were provided and table design was used in the necessary sections. IUPQ is presented in the Appendix C.

### 3.1.4.2 Generalized Problematic Internet Use Scale – 2 (GPIUS2)

GPIUS2 (Caplan, 2010) is a theory-driven multidimensional psychometric tool and it is the revised and updated version of GPIUS measurement tool (Caplan, 2002). It has 15 items which assesses generalized problematic Internet use cognitions, behaviors, and outcomes. It is formed from Davis' (2001) cognitive behavioral model of generalized problematic Internet use (GPIU). The original scale has $\alpha = .91$ overall reliability. The scale has four constructs; 1- preference for online social interaction; 2- mood regulation; 3- deficient self-regulation (3.1- compulsive use subscale, 3.2- cognitive preoccupation subscale) and 4- negative outcomes. As, deficient self-regulation is a second order factor and has two first order factors, there are a total of 5 factors of GPIUS2. Each factor has 3 items and measured on a 8-point Likert scale (1 = "Strongly disagree"; ……… 8 = "Strongly agree") The GPIUS2 index score is calculated by summing the scores of 15 items and the total score ranges from 15 to 120. Higher scores indicate more intense PIU. According to CFA results the data fit well to the model (Caplan, 2010).

Although its adaptation to Turkish language was done and reliability (internal consistency reliability Cronbach alpha was found 0.89) and validity of the scale was provided (Deniz & Ünal, 2016), it has been observed that there are some drawbacks in this version of scale and it is necessary to carry out a re-translation and factor analysis process. These drawbacks are: first, in the original version of the scale some items were expressed with simple present tense and some with present perfect tense. In the Turkish version of the scale, the items with the present perfect tense were expressed with the past perfect tense. As it is thought that past perfect tense cannot reflect current situation, it was determined that relevant items were insufficient to give the intended meaning of the original scale. Second, despite the Cronbach alpha internal consistency coefficient was found .50 for the preference for online social interaction (POSI) factor, which is a subscale of GPIUS2, no explanation has been made for this low value. Therefore, original GPIUS2 was translated back into Turkish and a new validation study was conducted by the researcher for Turkish

version of GPIUS2. In the translation process, original scale was translated by a language expert. Then, some terms such as "online" and "offline" in the translated scale revised by the researcher because these terms are not used in Turkish in the intended meaning. Then, the new version of scale and original scale were compared by two field experts and several changes were made in accordance with suggestions. Final version of the scale was applied a total of 328 undergraduate students to understand how many dimensions are necessary to explain relationships among observed variables and whether or not factor structure of the scale is applicable for Turkish undergraduate students. For this aim an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA) were conducted. Sample for EFA consists of 150 (106 female, 44 male), for CFA 178 (114 female, 64 male) university students.

*Exploratory Factor Analysis*

In the Turkish version of Generalized Problematic Internet Use Scale – 2 (GPIUS2) there are 15 items. Items presented on an 8-point Likert response scale, where 1 was "completely disagree" and 8 was "completely agree". Table 3.2 presents the variable names and the variable descriptions.

Table 3.2 Items of Translated Version of GPIUS2

| Variable name | Description of the variable |
| --- | --- |
| GPIUS2-1 | İnternet üzerinden kurduğum sosyal etkileşimi yüz yüze iletişime tercih ederim. |
| GPIUS2-2 | Kendimi yalnız hissettiğimde İnternet üzerinden başkalarıyla konuşurum. |
| GPIUS2-3 | Bir süre İnternet'e girmediğimde İnternet'e girme düşüncesi zihnimi meşgul eder. |
| GPIUS2-4 | İnternet'te harcadığım zamanı kontrol etmekte güçlük çekerim. |
| GPIUS2-5 | İnternet kullanımım hayatımı düzenlememi zorlaştırır. |
| GPIUS2-6 | Benim için İnternet üzerinden kurduğum sosyal etkileşim yüz yüze etkileşimden daha rahattır. |

Table 3.2 (continued)

| | |
|---|---|
| GPIUS2-7 | Mutsuz olduğumda kendimi daha iyi hissetmek için İnternet'e girerim. |
| GPIUS2-8 | İnternet'e giremesem kendimi kaybolmuş gibi hissederim. |
| GPIUS2-9 | İnternet kullanımımı kontrol etmekte zorlanırım. |
| GPIUS2-10 | İnternet kullanımım yüzünden sosyal aktiviteleri ya da etkinlikleri kaçırırım. |
| GPIUS2-11 | İnsanlarla İnternet üzerinden iletişim kurmayı yüz yüze iletişime tercih ederim. |
| GPIUS2-12 | Üzgün hissettiğimde kendimi daha iyi hissetmek için İnternet'e girerim. |
| GPIUS2-13 | İnternet'i kullanmadığım zamanlarda takıntılı bir şekilde İnternet'e girmeyi düşünürüm. |
| GPIUS2-14 | İnternet'i kullanmadığım zamanlarda İnternet'e girmemek için kendimi zor tutarım. |
| GPIUS2-15 | İnternet kullanımım yaşamımda sorunlar yaratır. |

Factorability of the Turkish GPIUS2 was investigated with correlation matrix. Results revealed that adequate correlations among observable variables are available. That is, there is an underlying relationship among these variables. A factorable matrix should include several sizeable correlations, moreover correlation between pairs of variables should be higher than .30 (Tabachnick & Fidell, 2007). Based on these criteria, factorability assumption is satisfied with the dataset.

Sample size adequacy was checked through KMO and Bartlett's Test and the value found .86 and Bartlett's test of sphericity which is found significant ($p < .05$). To satisfy sample size adequacy Kaiser-Meyer-Olkin value should be higher than .50 (Hair, Black, Babin, & Anderson, 2010). In addition, Field (2009) recommends that there should be 10-15 participants for each item. There are 150 participants and 15 items in the scale. Therefore, sample size adequacy assumption is satisfied. Breaking point for the scree plot was four, therefore it seems there are three potential factors. Moreover, another criterion, eigenvalues greater than 1 (Kaiser, 1960) also

support that there are three factors for translated version of GPIUS2. Principal axis factoring preferred for extraction method as p value of Mardia's Test was significant. Oblique rotation was preferred while conducting EFA. According to Field (2009) rotation choice depends on correlations between factors. If there are correlations among factors and they have theoretical basis, it means they are related and oblique rotation is necessary. Theoretical background provided for GPIUS2 suggest that there are correlations among latent variables and they are related. Moreover, according to Tabachnick and Fidell (2007), if factor correlations are ≥ .32 oblique rotation is more preferable. As for rotation, direct oblimin was preferred because correlation matrix among latent variables were higher than .32.

When the pattern matrix is checked, it is seen that GPIUS-3 is loaded two different factors with .48 (on F1) and .35 (on F2) values. It is suggested that there should be .2 or higher difference between two factor loadings (Bourke, 1984). GPIUS-3 does not satisfy this criterion. Therefore, removal of this item was decided.

Without PIU-3 a new EFA was conducted. Abovementioned assumptions of EFA still were satisfied with the new 14 item scale. Namely, principal axis factoring preferred for extraction method and direct oblimin was preferred as rotation method again. Factor correlation matrix was checked (See Table 3.3).

Table 3.3 Correlation Matrix

|     | I1  | I2  | I4  | I5  | I6  | I7  | I8  | I9  | I10 | I11 | I12 | I13 | I14 | I15 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| I1  | -   |     |     |     |     |     |     |     |     |     |     |     |     |     |
| I2  | .21 | -   |     |     |     |     |     |     |     |     |     |     |     |     |
| I4  | .09 | .22 | -   |     |     |     |     |     |     |     |     |     |     |     |
| I5  | .07 | .12 | **.77** | -   |     |     |     |     |     |     |     |     |     |     |
| I6  | .29 | **.32** | .10 | .13 | -   |     |     |     |     |     |     |     |     |     |
| I7  | .11 | **.33** | **.32** | .29 | .24 | -   |     |     |     |     |     |     |     |     |
| I8  | .18 | .26 | **.44** | **.46** | **.34** | **.33** | -   |     |     |     |     |     |     |     |
| I9  | .03 | .17 | **.76** | **.70** | .08 | **.35** | **.49** | -   |     |     |     |     |     |     |
| I10 | .16 | .25 | **.41** | **.43** | .19 | **.32** | **.54** | **.49** | -   |     |     |     |     |     |
| I11 | **.38** | **.38** | .17 | .20 | **.37** | .11 | **.34** | .22 | **.42** | -   |     |     |     |     |
| I12 | .20 | **.37** | .26 | .23 | .19 | **.82** | **.34** | **.30** | **.36** | .19 | -   |     |     |     |
| I13 | .23 | .27 | **.51** | **.46** | .22 | **.45** | **.64** | **.52** | **.50** | .23 | **.50** | -   |     |     |
| I14 | .15 | .20 | **.50** | **.55** | .15 | **.40** | **.56** | **.60** | **.49** | .21 | **.38** | **.73** | -   |     |
| I15 | .22 | .23 | **.54** | **.59** | .10 | .23 | **.43** | **.54** | **.46** | .26 | .22 | **.54** | **.58** | -   |

Then, Scree plot was examined to see potential factor number. Scree plot is presented in Figure 3.1.
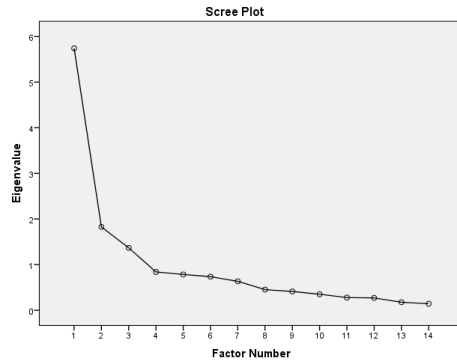


Figure 3.1 Scree Plot

Hair et al., (2010) suggest that factor loadings should be interpreted based on sample size. For n=150, factor loading need to be .45 or higher for statistical significance. Based on this criterion only GPIUS-2 has a lower value than the expected. However, they also suggest that, for practical significance, .30 - .40 represent the minimally acceptable values for interpreting factorial structure. Moreover, Tabachnick and Fidell (2007) claimed that factor loadings should be higher than .40. Item GPIUS-2 has a value of .41 and based on abovementioned references, it can be inferred that this item has an acceptable value. For the first factor, factor loadings ranged between .88 and .48 with eight items, for the second factor .90 and .88 with two items, and for the third factor .75 and .41 with 4 items. Table 3.4 represent the factor structure of translated version of GPIUS2.

Table 3.4 Summary of Factor Loadings for Oblimin Three-Factor Solution for translated GPIUS2

| Variable name | Factor Loadings | | |
|---|---|---|---|
| | F1 | F2 | F3 |
| GPIUS-5 | .88 | -.07 | -.10 |
| GPIUS -9 | .87 | .02 | -.12 |
| GPIUS -4 | .85 | -.01 | -.11 |
| GPIUS -15 | .69 | -.08 | .13 |
| GPIUS -14 | .67 | .16 | .05 |
| GPIUS -13 | .56 | .27 | .14 |
| GPIUS -8 | .51 | .08 | .30 |
| GPIUS -10 | .48 | .07 | .29 |
| GPIUS -7 | .06 | .90 | .05 |
| GPIUS -12 | -.01 | .88 | -.08 |
| GPIUS -11 | .09 | -.15 | .75 |
| GPIUS -6 | -.03 | .07 | .53 |
| GPIUS -1 | -.02 | -.01 | .50 |
| GPIUS -2 | .01 | .22 | .41 |
| **Factor Correlations** | | | |
| Factor 1 | - | | |
| Factor 2 | .39 | - | |
| Factor 3 | .34 | .36 | |

*Note*. Bold face indicates related factor loadings

Initial eigenvalues were checked to see variances explained by these three factors separately and all together. First factor explained 41.00% of variance, second factor explained 13.04% of variance, and third factor explained 9.77% of variance. A total of 63.81% of variance explained by all factors. Hair et al., (2010) suggest that explained total variance should be 60 % or higher for social sciences. Table 3.5

presents eigenvalues, percentages of variance, and cumulative percentage for factors of the scale.

Table 3.5 Eigenvalues, Percentages of Variance, and Cumulative Percentage for Factors of translated GPIUS2

| Factor | Eigenvalues | % of variance | Cumulative % |
|--------|-------------|---------------|--------------|
| 1 | 5.74 | 41.00 | 41.00 |
| 2 | 1.83 | 13.04 | 54.05 |
| 3 | 1.37 | 9.77 | 63.81 |

There are four factors in the original scale and these are: 1- preference for online social interaction (POSI); 2- mood regulation (MREG); 3- deficient self-regulation (DSR) (3.1- compulsive use subscale, 3.2- cognitive preoccupation subscale) and 4- negative outcomes. In the light of above information, three factor structures are determined for this scale. In the original scale, POSI factor includes GPIUS-1, GPIUS-6, and GPIUS-11. In the translated version besides GPIUS-1= .50, GPIUS-6= .53, and GPIUS-11 = .75 items, GPIUS-2 = .41 also loaded on this factor, which is loaded on mood regulation factor at original scale. Convincing reasons can be provided about GPIUS-2's loading on POSI in Turkish version as follows: the scale was developed in 2010, and in those years, communication through Internet was one of the most common use to regulate the mood. In recent years, for mood regulation people do not just communicate with other people, but watch movies, videos, listen music from numerous sources, and reach and generate diverse, rich content according to their interests, and so on. Consistent with this, while messenger operating income was 64 billion U.S. dollars in 2010 and 101 billion U.S. dollars in 2019 (US Department of Commerce, 2020), Netflix annual income was 2.2 billion U.S. dollars in 2010 and 20.15 billion U.S. dollars in 2019 (Netflix, 2020a). Besides, in 2011 there were 23,5 million subscribers of Netflix and in 2019, this number increased to 113 million (Netflix, 2020b). When we look at the increase rates, we can say that the increase rate of Netflix users and income are more dramatic than the

messengers. In addition, while 82 % of people prefer YouTube for entertainment purposes, just 8 % of them prefer it for communication purposes. Considering these new and diverse activities, people prefer activities as attractive as communicating with other people for mood regulation purposes. Therefore, the social use of Internet for mood regulation has shifted from the *MREG* factor to the *POSI* factor. GPIUS-7 and GPIUS-12, which were loaded on mood regulation factor in the original scale, also loaded on the mood regulation factor on Turkish version with GPIUS-7 = .91, GPIUS-12 = .89 factor loadings. GPIUS-4 = .81, GPIUS-8 = .64, GPIUS-9 = .84, GPIUS-13 = .71, GPIUS-14 = .75 items loaded on deficient self-regulation factor, which is a second order factor in the original scale. Beside these items, GPIUS-5 = .82, GPIUS-10 = .60, and GPIUS-15 = .71 also loaded on deficient self-regulation (*DSR*) factor. These items belong to negative outcomes factor in the original scale. When we examine contents of these items, they also reflect DSR. As mentioned before, DSR is described with diminished self-control (La Rose, Lin, & Eastin, 2003). Besides, Caplan (2010) express DSR as referring to Bandura (1986)'s definition of self-regulation; not to adequately monitor, judge, and adjust the use of the Internet. In this respect, GPIUS-5, GPIUS-10, and GPIUS-15 describe possible results of diminished self-control and inadequacy of self-regulation. Based on these statements, it is decided to include abovementioned items in DSR. Reliability analyses results showed that DSR factor Cronbach's α = .91 and MREG factor Cronbach's α = .90 internal consistency values and they reflect good reliability. Internal consistency of POSI, on the other hand, found as Cronbach's α = .65, which is a relatively low value. However, in social sciences it is still acceptable in exploratory research (George & Mallery, 2003; MacCallum, Roznowski, Mar, & Reith, 1994).

To sum up, Turkish version of GPIUS2 is a valid and reliable scale and it consists of three factors, namely, *deficient self-regulation, mood regulation, and preference for online social interaction* by explaining 63.81 % of total variance.

*Confirmatory Factor Analysis*

Confirmatory factor analysis (CFA) was performed to determine whether or not the factor structure of the original scale can be confirmed in the Turkish culture. CFA is a deductive approach to test whether or not a pre-established theoretical model can be verified (Lance & Vandenberg, 2002). Moreover, it is generally used in the adaptation of measurement tools developed in other cultures, races, and demographic groups (Brown & Moore, 2012). For the current study, before CFA, assumptions were checked. Regarding sample size, there were several criteria from different resources. Hair et al. (2010) suggests five subjects per item as the minimum number of participants. On the other hand, MacCallum et al., (1999) suggest ten subjects per item. Based on these recommendations sample size assumption is satisfied with 178 undergraduate students (114 female, 66 male) for 14 item scale. To measure acceptability of CFA model several fit indexes were examined. Overall goodness of fit examined through χ2/df (Chi-Square/Degree of Freedom), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), Adjusted Goodness of Fit Index (AGFI), and Tucker-Lewis Index (TLI). It is suggested to use abovementioned statistics because each of them provides different information regarding model fit (Brown & Moore, 2012). Findings revealed that Turkish version of GPIUS2 has a *χ2/df* value of 1.62 and which is an acceptable value. Moreover, RMSEA is indicator of approximation error, that is, "it assesses the extent to which a model fits reasonably well in the population" (Brown, 2015, p.71). RMSEA values, smaller than .05, shows excellent fit and between .05 and .08 shows a good and acceptable fit. For this study this value is .06 and it shows a good fit. Moreover, other critical values are as follows: *SRMR =.05, CFI = .95, GFI = .92, NFI = .89, RFI = .85, IFI = .95, AGFI = .88, and TLI = .94.* CFI, GFI, NFI, RFI, IFI, AGFI, TLI should have minimum of value of 0.90 and 0.95 accepted as perfect value. As seen, NFI, RFI, and AGFI values are lower than the acceptable values, but they are very

close to the acceptable lower limit of .90. Based on these criteria, provided CFA model has both acceptable and perfect values. Table 3.6 represents goodness of fit statistics comparison of the original and translated version of the scale.

Table 3.6 CFA Indices of Translated Version of GPIUS2

|  | Original Version | Translated Version |
|---|---|---|
| $\chi^2/df$ | 5.14 | 1.62 |
| RMSEA | .07 | .06 |
| SRMR | .05 | .05 |
| CFI | .95 | .95 |
| GFI | - | .92 |
| NFI | - | .89 |
| RFI | - | .85 |
| IFI | - | .95 |
| AGFI | - | .88 |
| TLI | - | .94 |

Regarding factor loadings, Stevens (2012) suggests that factor loadings should be greater than .40 for each item. Based on standardized path diagrams, items of current scale ensure this criterion (See Figure 3.2)
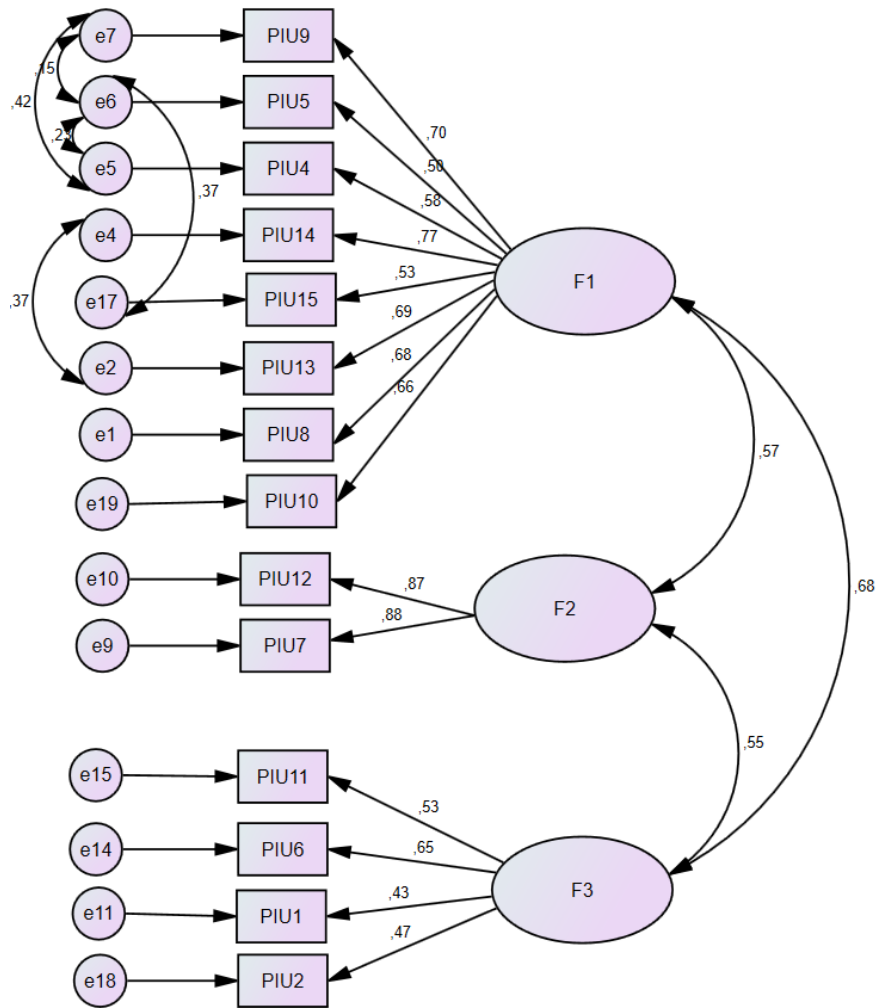
Figure 3.2 Item-Factor Structure of Turkish GPIUS2

Based on abovementioned findings, translated version of GPIUS2 is a reliable, valid, and acceptable measurement tool. Therefore, it can be used to measure undergraduate students' problematic Internet use behaviors.

### 3.1.4.3 Turkish version of the Tuckman Procrastination Scale

Turkish version of the Tuckman Procrastination Scale, TPS, (Özer, Saçkes, & Tuckman, 2013) was preferred to measure procrastination of undergraduate

students. TPS is a valid and reliable scale aimed to measure procrastination behavior regarding academic tasks (Tuckman, 1991). It is widely used in research studies and Turkish version of the TPS consists of 14 items with a single factor structure and measured on a five-point Likert type scale (1: strongly disagree, … 5: strongly agree). Based on exploratory factor analysis results, this factor structure explained 42.52% of the total variance. Item total correlations of the scale ranged from .36 to .74. Moreover, confirmatory factor analysis results revealed a good fit of the factor structure for college students. Validity and reliability analyses also suggested that this scale is a valid and reliable scale. Internal consistency coefficient Cronbach's alpha was calculated as .90 and stability coefficient (test-retest value) was found as Pearson $r=$ .80. These values suggested reliability of the scale. Based on abovementioned evidences, researchers stated that this scale seemed to provide valid and reliable measures for college students in Turkey (Özer, Saçkes, & Tuckman, 2013).

### 3.1.4.4    Short Self-Regulation Questionnaire-SSRQ

Self-Regulation Questionnaire (SRQ) was developed by Brown, Miller and Lawendowski in 1999 with 63 items. It is claimed that SRQ measures seven dimensions of self-regulation. These dimensions were defined by Brown and Miller (1991) as: 1- **Reception** of relevant information, 2- **Evaluation** of the information (comparing the information with norms**)**, 3- **Trigger** of the change, 4- **Search** for options, 5- **Formulation** of the plan**,** 6- **Implementation** of the plan, 7- **Assessment** of efficiency of the plan. Although this seven-dimensional model was developed specifically to examine addictive behaviors, the self-regulatory processes it identifies are the common principles of behavioral self-control. Since problematic Internet use is also discussed as an addictive behavior, it is thought that using a measurement tool specifically developed for addictive behaviors that also include common principles of behavioral self-control, can increase power of the study. The SRQ is a valid and reliable scale. Test-retest reliability results revealed a significant r value as .94 (p <

.0001). Moreover, internal consistency of the SRQ was found as .91, which is also quite high. Carey, Neal and Collins (2004) widen the psychometric evaluations of SRQ and suggested a short version of it. Short Self-Regulation Questionnaire (SSRQ) was found as a reliable (Cronbach alpha = .92) and valid tool with a single factor structure (31 item). The item-total correlations of this scale were calculated between .42 and .72. Besides, correlation between SRQ and SSRQ was found as *r*= .96. Carey et al. (2004) claimed that SSRQ has a strong relationship with SRQ, emphasizing that it can be a good alternative to reduce the burden of respondents. Turkish adaptation of the scale was done by Ay (2014). After the translation process, EFA analysis was performed to determine factor structure. The sample of the exploratory factor analysis consists of 341 students (56.3% female, 43.7% male). After analysis, an item (item13) was removed from the scale due to the low factor loading. The remaining 30 items were named according to the original factors of SRQ and formed a 5 factors structure. Factors are defined as; *informational input* (items 4, 11, 22, 26, 28), *focusing on alternatives* (items 1, 14, 18, 21), *planning* (items 2, 6, 7, 9, 10, 30), *implementing* (items 3, 12, 16, 19, 20, 24, 25, 27), and *evaluating* (5, 8, 13, 15, 17, 23, 29). This factor structure explained 42.18% of variance. In addition, factor loadings were ranged between .36 - .63. Then, a first order and a second order CFA analyses were conducted with 312 university students (63,8 % female, 36,2 % male) and results revealed the fit indexes of the translated SSRQ with five factor structure was significant ($\chi2/df$= 2,13, *p*= .00) with a RMSEA value of .60.

### 3.1.5 Data Collection Procedures

Ethics Committee approval was gathered from Middle East Technical University to collect data from undergraduate students (See Appendix A). Paper and online surveys were used to collect data. First of all, it was thought that the data would be collected through paper surveys. Therefore, for paper survey, various instructors were sent e-mails and they were asked to reserve time for a survey to be

applied in the last 10 minutes of their lectures. Almost half of the participants were reached in this way. Due to the fact that a lot of time was spent for the application of paper survey and the number of participants reached was less than desired, an online questionnaire was prepared through Metu Survey system. Then, necessary permission was obtained for the survey to be accessible and implemented to the participants. An instructor who attended the courses in all departments of the faculty of education and department of industrial design was connected, permission was obtained from her, and the survey was shared on the LMS system of her courses. It was stated to the participants that if they fill out the questionnaire, they will get bonus points from the course. Other half of the participants were reached in this way.

### 3.1.6    Data Analysis

For the first stage's data analyses, both descriptive and inferential analyses were conducted. Statistical Package for the Social Sciences (SPSS) 26 was utilized to conduct analyses. Descriptive results shed light on demographics, academic information and Internet use patterns of participants. Inferential results aimed to enlighten the effects of self-regulation, academic procrastination and academic performance of undergraduate university students on their problematic Internet use behavior. Before the inferential analysis, missing data, sample size adequacy, univariate & multivariate normality, linearity, and influential outliers assumptions were checked. Little's Missing Completely at Random (MCAR) test was utilized to reveal whether the missing data are completely at random. For univariate normality assumption, it was checked whether the Skewness and Kurtosis values were between -3 and +3. Mardia's test was checked for multivariate normality (Tabachnick & Fidell, 2012). For the absence of influential outliers assumption, Mahalonobis distance was checked. Moreover, Pearson Correlation, Independent Samples T-test, ANOVA, and Chi-square analyses were conducted among demographic information, GPA, problematic Internet use (PIU) and academic, social, recreational Internet use patterns (IUPs).

CFA was conducted to test the measurement model and SEM was conducted to test the hypothesized model. Before analyses, item parceling approach was utilized for the latent variables with eight or more items. A parcel is defined as the aggregate-level indicator which consist of sum or mean value of two or more items. Item parceling is frequently utilized in techniques such as EFA, CFA, and SEM. (Little, Cunningham, Sharar, & Widaman, 2002). In this study, the correlation among the error terms of the constructs which have 8 or more items was high, and it was a situation that negatively affects the model fit. Besides, normal distribution could not be provided for some items (based on several techniques) even if the latent constructs were normally distributed. It is claimed that item parceling mitigate the non-normal data and as a result it can increase the model fit (Thompson & Melancon, 1996). However, there are contradictory claims in the literature regarding item parceling. Mostly debatable issues are estimation bias and dimensionality of the measurement (Matsunaga, 2008). About estimation bias, while Stephenson and Holbert (2003) claimed that parceling the items result in weakened path coefficients based on their simulation study, Little et al. (2002) stated that score of a case on an individual item includes variances due to a true core aspect (target construct component), and uncorrelated sources (specific component + random error). When item parceling is conducted, the variance due to the random error might be reduced compared to the item-based approach if there are correlated errors. In addition, item communality can be increased because of the reduction of the variances based upon random error and specific component. Matsunaga (2008) emphasized that, in Stephenson and Holbert (2003)'s study, both the sample size was quite large and there was almost no correlation between errors. Cases with such "well-conditioned" data is rare in real research studies. About dimensionality of the measurement, Little et al. (2002) considers unidimensionality as a prerequisite for item parceling. If a measure involves only one construct it is unidimensional, if involves two or more constructs it is multidimensional. In this study, there was only one construct for each measure. Therefore, the measures used in this study were unidimensional and do not have any drawbacks regarding dimensionality.

67

In social sciences, generally, there are numerous variables that should be investigated and analyzed. The latent constructs which involve large number of observed variables with numerous error correlations and non-normality necessitate the use of item parceling considering the literature review. In line with the literature, item parceling was preferred for the constructs with eight or more items, since it is thought that item parceling will provide more accurate results than traditional item-based method and therefore increase the model fit.

The proportion at which the measurement error can be reduced depends on how the parcels are created. An important issue with parceled data is estimation stabilization. To achieve more stable results, sample size must be larger. Various criteria are presented in the literature for sample size (Matsunaga, 2008). Jackson (2007) emphasized that the sample size should be at least 400. Another issue is model complexity. The more complex the model, the larger the sample size should be. When these criteria are taken into consideration, the sample size of the present study is considered sufficient for item parceling.

There are several approaches for building of item parcels. In the current study random algorithm was utilized to create parcels. It has been claimed that other parceling methods may have various disadvantages, therefore, random parceling is found as the most applicable. Four parcels were created for each measure. The recommendations in this regard are that there may be 2, 3 and 4 parcels (Matsunaga, 2008). The researcher found it appropriate to create 4 parcels.

After the parcels are created, the measurement model was tested with the CFA. Then, the hypothesized model, that aimed to understand effects of self-regulation, academic procrastination, academic performance on preference for online social interaction, Internet use for mood regulation and deficient self-regulation of Internet use was tested through SEM. Exogenous variable of the study was self-regulation and the endogenous variables were academic procrastination, academic performance, preference for online social interaction, Internet use for mood regulation, and deficient self-regulation of Internet use. Through the

standardized parameter estimates, direct and indirect effects were calculated. For CFA and SEM, Analysis of Moment Structures (AMOS) 21 program was utilized.

## 3.2    STAGE 2

### 3.2.1    Reasearch Questions

1. What are the participants' Internet use behaviors?
2. What are the usability features of the of Internet use regulation application *hEp*?
3. What do the participants describe their experiences on the of Internet use regulation application hEp?
4. What are the design characteristics of Internet use regulation application *hEp*?

### 3.2.2    Research Design

The second stage of this study aimed to prepare an intervention program for regulating problematic Internet us behavior of undergraduate students and accordingly improving their academic performance and build design principles which can lead further development efforts. To fulfill the purpose of this second stage, a design-based research (DBR) method was utilized. Education is referred as a design science because of its interdisciplinary and problem-oriented nature. Traditional researches which have descriptive nature, mostly cannot suggest prescriptions about ill-specified problems experienced in complex educational contexts  (Reeves, 2000). This stage necessitated use of a methodology that warrants simultaneous improvement of design, research and practice. Moreover, considering problem-oriented nature, research process required the collaborative work of the researcher and the participants. The most appropriate methodology in these regards appeared to be the DBR to design and implement systematical interventions for continuous improvement of initial designs that eventually provide enhancements for theoretical and pragmatic aims which affect practice (Wang & Hannafin, 2005).

Design based research is firstly used in 2003 (DBRC, 2003) to embrace several terms such as design research (Cobb, 2001), design experiments (Brown, 1992), formative research (Reigeluth & Frick, 1999), and developmental research (Richer & Nelson, 1996) as they have similar underlying goals and approaches in spite of slightly different focuses (Wang & Hannafin, 2005). Wang and Hannafin (2005, p. 6-7), defined design-based research as:

> *A systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories.*

For the current study, an educational intervention was planned, therefore, by providing solutions to complex problems, having the flexibility for systematic improvement, being nourished by theory, and providing suitable conditions for theory and design principle development by allowing collaboration of researcher and participants (Reeves, 2000; Van Der Akker, 1999) DBR was seen as the most suitable methodology. Reeves (2000) claimed that researchers who have developmental goals focus on two objectives. First, to generate creative approaches to solve human performance, learning, and teaching problems, second, to build design principles that may lead further development efforts. In this second stage, the structure of the intervention program (hEp), which aimed to regulate problematic Internet use behavior, was based on self-regulation to improve academic performance of undergraduate students. hEp was prepared as an interactive mobile app in line with instructional design principles and aimed to build design principles both for its further development and to guide the development of similar applications. In this study, the design principles were determined by following the stages in Figure 3.3 (Reeves, 2000).

**1st Step**

Analysis of Practical Problems by Researchers and Practitioners in Collaboration

**2nd Step**

Development of Solutions Informed by Existing Design Principles and Technological Innovations

**3rd Step**

Iterative Cycles of Testing and Refinement of Solutions in Practice

**4th Step**

Reflection to Produce "Design Principles" and Enhance Solution Implementation

Refinements of problems, solutions, methods, and design principles

1- Literature Review
2- Needs analysis (Via questionnaire)

1- Developing the first version of self-regulated effective Internet use application

**Theoretical framework:** Fantasy Realization Theory

Analysis
Design
Development
Implementation
Evaluation

Pilots

1st Cycle

2nd Cycle

3rd Cycle

Final

Pilots

1st Cycle

2nd Cycle

3rd Cycle

Final

Documentation of study results and development of solutions

Figure 3.3 Procedure of the Study

72

### 3.2.3 Participants of the Study

As this stage of the study is a qualitative study, the nature of qualitative inquiries necessitates purposefully selected small samples to allow in-depth focus (Patton, 2002). Purposeful sampling let researchers to select participants consciously, based on some specific attributes (Stringer, 2014). To examine the sample in detail in this qualitative stage, purposeful sampling was preferred. First, it was thought to study with the participants of the first stage who had higher PIU scores, in line with their volunteering. In this direction two pilot studies were conducted. In the first pilot study two students with high problematic Internet use scores from stage 1 and two PhD candidates in the field of instructional technologies used the prototype. A total of 4 participants, three females and one male, were included in the PPT pilot study. Information on PPT pilot study participants is presented in Table 3.7.

Table 3.7 Information on PPT Pilot Participants

| Participant | Gender | Grade | PIU Score | PROC Score | SR Score | Created hEp Number |
|---|---|---|---|---|---|---|
| P1P1 | Female | 1 | 6,29 | 3,36 | 3,10 | 3 |
| P1P2 | Male | 1 | 5,86 | 3,00 | 3,27 | 3 |
| P1E1 | Female | PhD | - | - | - | 3 |
| P1E2 | Female | PhD | - | - | - | 3 |

After PPT pilot, to examine the automated steps which were intended to use in hEp, a WEB pilot was conducted. Two female and one male participant with very high PIU scores participated in the Web Pilot. Web Pilot participants are presented in Table 3.8.

Table 3.8 Information on WEB Pilot Participants

| Participant | Gender | Grade | PIU Score | PROC Score | SR Score | Created hEp Number |
|---|---|---|---|---|---|---|
| P2P1 | Female | 1 | 6,14 | 4,50 | 2,53 | 3 |
| P2P2 | Male | 1 | 5,86 | 4,43 | 3,33 | 3 |
| P2P3 | Female | 1 | 6,64 | 4,79 | 2,27 | 2 |

Based on two pilot studies, it was observed that although they participated in the study voluntarily on ask, they did not want to change neither their academic behavior nor the Internet use behavior. Moreover, it was also observed that undergraduate students, whose only responsibility is studying midterm and final exams were seemed to be unwilling to study in the absence of exams. Therefore, based on the pilot studies, it was decided that the users who had to study regularly for a long time would participate in the main study. Considering the pilot studies and the length of the data collection process of the main study (3 cycles and 1 final cycle), and in line with expert opinion, it was thought that it would be more appropriate to select the participants from undergraduate students who are willing to study more effectively by changing Internet use behavior and need to study regularly in a long term. In Turkey, there is a program named Pedagogical Formation Certificate Program (PFCP) that provided to the students from various faculties other than faculty of education. This certificate program gives courses regarding teaching competencies for a year and the students who get the certificate are entitled to be teachers. Most of the students participating in this program were 3rd and 4th grade students from a number of faculties. These students not only study for the courses in their field but also, they study for the courses in the field of educational sciences. Moreover, there is an exam called PPSE (Public Personnel Selection Exam), which is entered to find a job in the state after graduating from the university. One of the

most important aims of PFCP students is to get high scores from this exam. Considering their long-term and intense paced responsibility to study, (field courses, educational sciences courses, and PPSE exam) students in the PFCP were determined as the suitable participants. Considering accessibility, PFCP students from a public university were selected purposefully. Therefore, three developmental cycles and the final cycle were conducted with mostly PFCP students at a public university in the main study. Two additional non-PFCP participants were included, one in the 2nd cycle and one in the 3rd cycle. Information about them in the related cycles is also provided. In the final cycle, four participants from previous cycles were included in line with their volunteering. From the first cycle, C1P1 participated in the final cycle as C4P1. Three participants from the 3rd cycle were also included in the 4th, final cycle: C3P1 participated as C4P3, C3P4 participated as C4P4, and C3P5 participated as C4P5.

### 3.2.3.1    Cycle 1

Participants were four undergraduate female students (n=4) from a public university who involved in Pedagogical Formation Certificate Program. Participants' ages range from 21 to 24. PIU scores of the participants were determined by measurements, two participants showed intermediate level PIU, one participant showed high level PIU, and one participant showed low level PIU. Table 3.9 presents information of participants involved in cycle 1.

Table 3.9 Information on Cycle 1 Participants

| | CYCLE 1 | | | |
|---|---|---|---|---|
| **Participant** | **C1P1 (C4P1)** | **C1P2** | **C1P3** | **C1P4** |
| **Age** | 22 | 22 | 21 | 24 |
| **PIU Score** | 2,57 | 4,86 | 4,07 | 6,50 |
| **POSI Score** | 2,5 | 2,75 | 3,75 | 4,50 |
| **MREG Score** | 8,00 | 7,00 | 4,50 | 8,00 |
| **DSR Score** | 1,25 | 5,38 | 4,13 | 7,13 |
| **SR Score** | 4,80 | 3,03 | 3,30 | 3,07 |
| **PROC Score** | 1,50 | 3,29 | 2,71 | 4,21 |
| **hEp number** | 8 | 3 | 3 | 3 |
| **Shortest hEp** | 5 hours | 5 days 6 hours | 12 hours | 2 hours |
| **Longest hEp** | 14 hours | 8 days 6 hours | 4 days 12 hours | 7 days |

## 3.2.3.2    Cycle 2

Three female PFCP students were included in the study. Moreover, another female student who was not in PFCP but volunteered to participate in the study was also included in this cycle. This participant is studying at the Faculty of Health Sciences and is a 3rd grade student. Therefore, this cycle was conducted with 4 female participants. Participants' ages range from 20 to 32. Two participants in this cycle do not show PIU, while two participants have high level PIU. Table 3.10 presents information of participants of Cycle 2.

Table 3.10 Information on Cycle 2 Participants

| | CYCLE 2 | | | |
|---|---|---|---|---|
| **Participant** | **C2P1** | **C2P2** | **C2P3** | **C2P4** |
| **Age** | 32 | 20 | 21 | 21 |
| **PIU Score** | 5,07 | 1,43 | 1,64 | 7,57 |
| **POSI Score** | 4,00 | 1,00 | 3,00 | 7,00 |
| **MREG Score** | 7,00 | 1,00 | 1,00 | 8,00 |
| **DSR Score** | 5,13 | 1,75 | 1,13 | 7,75 |
| **SR Score** | 2,90 | 3,63 | 3,10 | 3,30 |
| **PROC Score** | 4,50 | 2,57 | 2,93 | 3,79 |
| **hEp number** | 3 | 4 | 5 | 3 |
| **Shortest hEp** | 1 hour | 1 hour 15 mins | 6 hours | 5 hours |
| **Longest hEp** | 1 day | 3 hours 30 mins | 4 days 6 hours | 10 hours |

### 3.2.3.3    Cycle 3

Five female PFCP students were included in the study in this cycle. In addition, another female undergraduate student volunteered to take part in this cycle. This participant is studying at the Faculty of Education and is a 3rd grade student. Therefore, this cycle was conducted with six female participants. Participants' ages range from 21 to 28. Five of the participants showed intermediate level PIU, while one showed low level. Table 3.11 presents information of participants of cycle 3.

Table 3.11 Information on Cycle 3 Participants

| | CYCLE 3 | | | | | |
|---|---|---|---|---|---|---|
| Participant | C3P1 (C4P3) | C3P2 | C3P3 | C3P4 (C4P4) | C3P5 (C4P5) | C3P6 |
| Age | 23 | 21 | 23 | 28 | 22 | 23 |
| PIU Score | 3,50 | 4,50 | 2,36 | 4,71 | 4,43 | 4,93 |
| POSI Score | 2,50 | 4,50 | 2,75 | 2,75 | 3,25 | 4,50 |
| MREG Score | 1,50 | 6,50 | 2,50 | 8,00 | 6,00 | 8,00 |
| DSR Score | 4,50 | 4,00 | 2,13 | 4,88 | 4,63 | 4,38 |
| SR Score | 3,30 | 4,00 | 3,90 | 3,33 | 3,30 | 3,53 |
| PROC Score | 4,14 | 2,36 | 2,79 | 2,14 | 4,00 | 3,43 |
| hEp number | 5 | 12 | 9 | 5 | 9 | 17 |
| Shortest hEp | 45 mins | 45 mins | 45 mins | 3 days | 1 hour 30 mins | 1 hour |
| Longest hEp | 1 day | 7 hours 30 mins | 1 day | 10 days | 1 day | 3 hours |

### 3.2.3.4    Cycle 4

In this cycle, hEp design was finalized (within the bounds of possibility), and all participants who participated in past cycles were informed and invited for the final cycle via WhatsApp. The information that participation is completely voluntary has been conveyed with the request of only those who want to participate to respond to this message. Eight participants from previous cycles continued to use hEp after this message. However, only four of these gave feedback to the researcher that they wanted to be participants. Thus, four former participants took part in the final cycle.

Apart from this, two more female participants, one PFCP student and one preparatory class student from faculty of education voluntarily participated in the final cycle. Their ages were 25 and 20. Therefore, a total of six female participants participated in this cycle. One of the new participants showed moderate level PIU while the other showed high level PIU. Table 3.12 presents information of participants of Cycle 4.

Table 3.12 Information on Cycle 4 Participants

| CYCLE 4 (Only unique participants were presented) | | |
|---|---|---|
| **Participant** | **C4P2** | **C4P6** |
| **Age** | 25 | 20 |
| **PIU Score** | 4,00 | 5,43 |
| **POSI Score** | 4,50 | 5,25 |
| **MREG Score** | 1,00 | 8,00 |
| **DSR Score** | 4,50 | 4,88 |
| **SR Score** | 3,37 | 3,53 |
| **PROC Score** | 3,57 | 4,36 |
| **hEp number** | 4 | 9 |
| **Shortest hEp** | 5 hours | 45 mins |
| **Longest hEp** | 20 days | 4 hours 15 mins |

### 3.2.4    Data Collection Instruments and Methods

Two data collection instruments and methods were used. First, interview protocol, second, database contents.   Interview data were collected from all participants who take part in the second stage. Database contents were gathered from the hEp users.

### 3.2.4.1    Interview Protocol

In the main cycles, the interview protocol consists of three main topics. These are; Internet usage behaviors, effectiveness of hEp, and usability of hEp. The processes related to the interview are presented in more detail in the following paragraphs.

Interview questions were prepared on two main topics during the pilot stages. These were on the effectiveness and usability features of hEp. In the effectiveness interview questions (seven questions), it was asked whether there was any change in the users' academic behavior, Internet usage behavior, procrastination behavior and general behaviors after the use of hEp. Moreover, the effects of each screen (goal, time, emotion, outcome, obstacle, and plan) in the process of goal striving and on the goal achievement were asked. Apart from these, they were asked if they were willing to use hEp and if they had any other comments. The usability interview protocol (nine questions) in the pilot stages included questions on the visual design of the application, the page compatibility they directed with the buttons, the transition experience between the pages, the suitability of the hEp creation time, the ease of learning and use of the hEp and the user satisfaction.

The interview questions on the effectiveness and usability features of hEp used in the pilot cycles were also used in the first cycle. However, eight new questions on usability features of mobile hEp were added. These questions were about the installation, sign up / in, introduction screens, hEp guide, hEp creation and completion experiences, error experience, and suggestions. Questions on the

effectiveness of hEp remained same in the first cycle. Besides, in the main cycles, with the recommendations of the thesis monitoring committee, the participants were asked about their Internet usage behaviors and the results of these behaviors (five questions). To be more specific, the questions were about daily Internet usage time, Internet usage behaviors and effects of these behaviors on the academic and social life.

Four new usability questions were added in the second cycle in line with the comments made by the first cycle participants during the interviews and the observations of the researcher. Therefore, the number of questions was increased from 17 to 21. New questions were on the hEp sample contents, hEp main screen, warning messages, and the experience on the "complete hEp" button. In this cycle, same seven questions on the effectiveness of hEp used without any changes. A new question regarding Internet use behavior was added regarding the task-switching behavior. The questions on the effectiveness of hEp remained same in the second cycle.

In the third cycle, a total of eight new questions were added to the usability and effectiveness sections. Under usability section, two questions were added regarding utility and necessity of hEp guide and hEp sample contents. One question was added regarding the experience on "Ongoing hEps" screens. One other question was added on the complete hEp button. 5 of the participants in the 3rd cycle are iOS users and volunteered to participate in the study before the first cycle. However, the iOS version of the application has become available as of the 3rd cycle. Therefore, these participants used hEp after a waiting period of about 60 days. Therefore, a question on how this waiting situation affected the participants' use of hEp has been added to the effectiveness section. Moreover, three notifications were added in this cycle. Hence, participants were asked about the effects of the notifications on hEp use. Although it is available from the first cycle, no questions were asked about the awareness screen in the first two cycles, as it is not a mandatory section. However, in line with the feedback of the participants, a new question has been added on this

screen. Finally, participants were asked whether they would recommend hEp to their friends.

In the fourth (final) cycle, interview questions same as third cycle were utilized. Table 3.13 present the question numbers of each section (usability, effectiveness, and Internet use behavior) in each cycle. See Appendix D for interview protocol.

Table 3.13 Question Numbers of Each Section (Usability, Effectiveness, and Internet Use Behavior) in Each Cycle.

|  | **Pilots** | **Cycle 1** | **Cycle 2** | **Cycle 3** | **Cycle 4** |
|---|---|---|---|---|---|
| **Usability** | 9 | 17 | 21 | 25 | 25 |
| **Effectiveness** | 7 | 7 | 7 | 11 | 11 |
| **Internet use** | - | 5 | 6 | 6 | 6 |

## 3.2.4.2 Database Contents

A database containing the answers given to the questions on the sequential screens of hEp has been created. Here, there are records of each user's goal, time, outcome, emotion, obstacle, plan, awareness content, when they created the relevant hEp, how long this hEp has been on, whether it was completed, and whether the hEp was deleted. The purpose of requesting this information was, initially, to examine whether users have created hEps properly. Besides, their hEpping behavior were also considered as the data while examining the perceived effectiveness of hEp. Moreover, in the process, a common point was observed among some users who were not participating in this study but started to reach and use hEp through digital distribution platforms. They had turned the hEp into a "wish tree" in which they expressed their big, long-term, and general goals in a short sentence and wrote their obstacles and plans on a superficial and abstract level. It was thought that the

presence of participants who use hEp in this way might give an idea about the users who will start using hEp without any training, and in future versions, necessary interventions can be designed for users to use hEp more effectively. For this reason, these contents are included in the study as a data collection instrument. Figure 3.4 represent a screenshot from this database.



Figure 3.3 A Screenshot from hEp Database

### 3.2.5    Contextual Setting of the Study

Under this title, the context in which the study is conducted is described. Pilot studies were conducted in the spring semester of 2018-2019. The first pilot study was conducted during the first two weeks of April, and the second pilot study during May. No unexpected situation occurred during this period.

The main study was conducted in the spring semester 2019-2020. Since the main study consists of 4 different cycles, it was conducted between February 2020 and June 2020. An average of 25 days is allocated for the execution of each cycle and necessary improvements in the application. During the first cycle, an earthquake of 6.8 magnitude occurred in the province where the participants lived. This situation caused the participants to be negatively affected psychologically. Therefore, their academic behavior and experiences with hEp may have been affected by this

situation. In the second cycle, Coronavirus Disease (Covid-19) started. For this reason, education was suspended for three weeks in all universities in Turkey, but when it became clear that schools could not be reopened, face-to-face education was switched to emergency remote teaching (ERT). In addition to the change in teaching method, there have been important changes in daily life, curfews were declared on weekends and holidays, all areas where people could socialize were closed, and warnings were made to people not to socialize outside of their homes. For these reasons, people were locked in their houses. As the number of social activities can be engaged in decreased, people started to spend more time on the Internet, even the Internet became the only way to socialize. As a result, people's Internet usage behavior changed in a negative manner.

Until Covid-19, online teaching was a teaching method provided by very few educational institutions in Turkey. However, it has suddenly turned into a method that expected to be provided by all universities. Not only students, but also lecturers were novice to this method. In this process, not only in Turkey, but also all over the world, studies have been published indicating that the quality of education has been negatively affected. (Bozkurt & Sharma, 2020; Daniel, 2020; Onyema et al., 2020). Both the emergency remote teaching and the uncertainty and anxiety caused by Covid-19 pandemic affected the students academically and psychologically. The current study coincided with such a period. According to cycles, teaching methods and the unexpected events were presented in Figure 3.5.

```
┌─────────────┐        ┌─────────────┐
│   Cycle 1   │        │  Cycle 2,3,4│
└─────────────┘        └─────────────┘
    ┌──────────────┐       ┌──────────────┐
    │ Face to Face │       │  Emergency   │
    │  Education   │       │   Remote     │
    │              │       │  Teaching    │
    └──────────────┘       └──────────────┘
    ┌──────────────┐       ┌──────────────┐
    │  Earthquake  │       │   Covid-19   │
    └──────────────┘       └──────────────┘
```
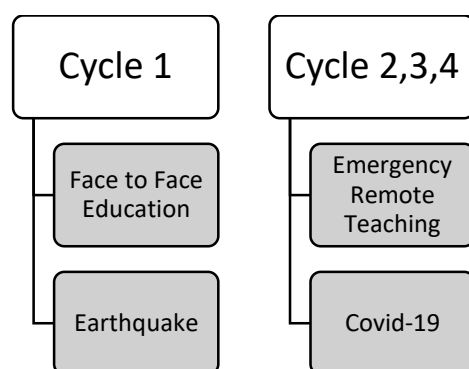
Figure 3.4 Teaching Method at University and Unexpected Events According to Cycles

### 3.2.6        hEp development Process

hEp is an application with a long development history. First, the researcher examined previous intervention studies on behavioral addictions and interventions aimed at increasing academic effectiveness. Mental Contrasting Implementation Intentions (MCII) intervention studies (the theoretical background is discussed in Chapter 2) were attained in accordance with this review. Then, the researcher elaborated her investigation on this MCII self-regulation strategies. MCII strategies have been investigated from both a theoretical and a practical aspect.

The researcher started the process with a literature review and reached the WOOP application which is developed using the same theoretical background as the hEp. She continued the process using WOOP for a while, gaining insight into how to improve hEp, which aims to increase the academic performance of users by regulating their problematic use of the Internet, based on MCII self-regulation strategies. She decided that the goal-emotional outcome-obstacle-plan screens that exist in WOOP app should also be included in the hEp as being base concepts for MCII self-regulation strategies. While preparing the screens where this information is requested, the texts used in WOOP were inspired. After pilot application and based on the studies conducted on MCII strategies, outcome and emotion screens were separated. In addition, time constrain in goals can be a factor that can increase an individual's performance (Latham & Locke, 1975). For this reason, a screen that requires users to set time limits for their goals was added as a time screen. In line with the suggestions of two experts in the mental health fields, awareness screen was also added. Since MCII self-regulation strategies (theoretical basis of hEp) are considered as strategies that allows the individuals to evaluate themselves and the process, it is assumed that it will create insight in individuals (Martenstyn & Grant, 2021). For this reason, adding this screen has been deemed important.

hEp was presented to users first as a PowerPoint presentation, then as a website, and finally as a mobile application. Figure 3.6 shows the development process of hEp at each phase and usage period for each phase.

**Before Pilot Studies**
- Literature review
- Examination of WOOP App

**PPT Pilot Design**
- High interface quality
- Manuel operations
- Three Weeks

**WEB Pilot Design**
- Low interface quality
- Automated operations
- Four Weeks

**Cycle 1**
- First mobile version based onliterature, Woop App and Pilots
- Emojis added
- Two weeks

**Cycle 2**
- Improvements regarding interface and contents
- Error recovery
- Two weeks

**Cycle 3**
- Improvements regarding interface and contents
- Notifications added
- Error recovery
- Two weeks

**Cycle 4**
- Improvements regarding interface and contents
- Draft feature added
- Completion delay field added
- Confetti rain added
- Four weeks

Figure 3.5 The Development Process of hEp Mobile Application

### 3.2.6.1    Procedures of Pilot Cycles

Since a mobile application that aims to regulate Internet use behavior would be developed in this study and a long time was needed for this development, pilot studies were not conducted with the mobile application in order not to waste time. Instead, two designs were made: a PowerPoint presentation in order to examine the visual features of the application and a website in order to examine the automated process steps in the application.

*PPT Pilot (High Usability, Manuel Processes)*

First, the prototype of the mobile application was created with the PowerPoint (PPT) presentation program. While creating this prototype, a number of articles on MCII strategies were viewed, several MCII applications (paper based, online, etc.) were examined. Besides, the WOOP app (Oettingen, 2021), developed by Gabrielle Oettingen in 2014 which based on MCII strategies, was viewed. The research studies utilized MCII strategies and the WOOP app had been two constituents to form the basis of the hEp application. Apart from these, several mobile applications on goal setting, planning, gaining motivation, focusing, etc. were also examined, and these applications were benefited while determining the design of the hEp. Three of these are Goalswizard, Goalmap, and GoalPlanDo applications. Blue or green was determined as the base color in all the apps examined. For this reason, blue tones were used in the visual design of hEp. Regarding screen contents although these applications had screens similar to WOOP, they did not include all of the screens in WOOP. For this study, considering the contribution of each screen from goal to plan in achieving the goal, it was decided that it would be more appropriate to take WOOP as a basis. After the arrangements were made based on abovementioned investigations, the design was finalized in line with the recommendations of four instructional technology experts. Then two students with high problematic Internet use scores and two PhD candidates in the field of

instructional technologies used the prototype. The implementation was conducted between March 18<sup>th</sup> – April 7<sup>th</sup> 2019. Before the implementation, students and experts were explained and exemplified how to use the PPT prototype of hEp through individual face-to-face trainings. In addition, the hEp guide (See Appendix F) was sent via e-mail, and it was stated that they could both benefit from the guide and get support from the researcher if they needed. They were told to use the hEp prototype at least three times. Figure 3.7 includes the screenshot of goal screen from PPT pilot version of hEp.



Figure 3.6 Screenshot of Goal Screen from PPT Pilot Version of hEp

After implementation process, to reveal participants opinions on the usability of the hEp and their perception on the effectiveness of hEp, they were interviewed. Usability features were grouped under three headings as interface, information quality, and system usefulness.

**Usability Features of PPT hEp**

*Interface*

Interface quality was defined as the "Quality dimensions with which a user may feel about interfaces and interactivity, including proximity, compatibility, navigation, appearance, and layout." (Pang, Suh, Hong, Kim, & Lee, 2010, p.410). Under interface quality, several issues emerged regarding visual features.

*Visual Features*

*Filing*

One of the student participants (P1P2) stated that it would be appropriate to create a homepage and to be able to both start new hEp and view all previously created hEps under the homepage.

***In the website version of hEp, a page has been created where participants can view their ongoing hEps. In the main cycles, a home page has been created where both ongoing hEps are displayed and new hEp can be created.*** Figure 3.8 includes a screenshot from ongoing hEps main page.
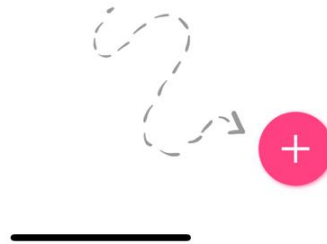
Figure 3.7 A Screenshot from Ongoing hEps Main Screen

*hEp Logo*

P1E1, one of the experts of the ppt pilot, stated that making and using a logo design for hEp will increase the attractiveness and noticeability of it.

***The hEp logo has been added to the mobile hEp application.*** Figure 3.9 presents the hEp logo.

Figure 3.8 hEp Logo

*Fonts*

P1P1 emphasized that the font sizes of the description sentences should be larger.

***Text sizes increased in line with this recommendation.***

***Information Quality***

Information quality is defined as "Quality dimensions related to information a website provides including completeness, timeliness, comprehensibility,

trustworthy, presentation variability, architecture, and search capability" (Pang, Suh, Hong, Kim, & Lee, 2010, p.410). Several usability issues emerged under information quality heading in PPT Pilot.

*Notifications*

One of the experts in PPT Pilot, P1E1, stated that sending a notification giving the "let's start" message of the application will reduce the procrastination behavior and establish a connection as the user will feel that application interacts with the user.

***Notifications were added after the 2nd cycle.***

*Guidance*

An expert (P1E1) stated that she was not sure what to write to the textboxes during hEp creation and she emphasized that exemplification might be effective to make it clearer. Moreover, P1P2 stated that he could not understand the purpose of the application. For both reasons;

***hEp guide has been improved to present the aims of the hEp more clearly and explanations with sample sentences are made for each hEp screen.***

***Introductory sentences were improved to increase comprehensibility.***

*Content*

*Outcome emotion screen:* P1P2 stated the question on outcome emotion screen "What will you feel?" was a difficult question to answer and he will feel the same for all hEps, he will feel happy. The researcher stated that interactive emojis can be added in addition to the textbox to express emotions. The participant stated that this would be appropriate and it would be preferable to choose emoji rather than typing in the textbox.

***Emojis were added to the emotion screen of mobile version of hEp for the main cycles.***

*Outcome screen:* Although it is an important part of MCII strategies, in the PPT Pilot version of hEp, the outcome screen was not used where participants would write their gain but used where participants can write emotional outcomes after goal attainment. However, outcomes do not always have to be affective (e.g. obtaining a master's degree). In line with the MCII studies, considering that these outcomes can be diversified, a separate screen for emotion and a separate screen for outcome has been considered. When this situation is suggested to the participants, P1P2 stated that it would be appropriate to include a separate outcome screen as people may have different outcomes and that it is reasonable to indicate them.

***In line with the literature, a new screen, the outcome screen, has been added.***

*Preventing Errorneous Use*

hEp is an application that requires the participants to focus, think and express the thoughts in the clearest way. For this reason, there should be a feature that slows the users down when they want to quickly switch the screens in the hEp. Also, the user filling the textboxes using a small number of characters was a sign that they could not use hEp effectively enough. Therefore, it is thought that creating both the character lower limit and the waiting time lower limit will reduce the mistakes that the user can make while using the hEp. When the participants were asked to regarding character and time criteria, they stated that it would be appropriate to set such criteria, although they stated that these criteria would change for each person. After conducting various researches and applications on this subject, the researcher decided that criteria of 5 characters and 5 seconds would be appropriate.

***System Usefulness***

System usefulness is about the situations such as the ease of use of the system and the ability of the user to do their work quickly and efficiently.

*Ease of Use*

In this pilot phase, the only code related to system usefulness was ease of learning and use. All participants of this phase stated that it is easy to learn and use hEp.

### *Experiences on hEp*

Under this heading, the participants' hEp usage behaviors were described, their thoughts on the effectiveness of hEp were examined, their pre- and post-use tendencies about hEp were reviewed and some other variables were investigated.

#### *Perceived Effectiveness of hEp*

*Change on Internet use behavior:* Both student participants emphasized that their Internet usage behaviors have changed after creating hEp. P1P1 said that she was using the Internet facility in the campus to download TV series and watch it when she went home. However, after creating the hEp, she stated that she did not download the TV series for that week. Moreover, she turned her phone to do not disturb mode and focused on her goal.

P1P2, on the other hand, emphasized that because he has created hEp, he felt obliged to adhere to it and has conditioned to complete his goal. He also stated that under normal circumstances, his attention would shift to a notification received on the phone, but after using hEp, he could focus on his goals for one hour.

*Boost for goal achievement:* One participant and an expert stated that hEp is effective in focusing on the goal achievement. It was striking that the words used by the participants related with achieving their goals after hEp creation were "conditioned", "having to".

#### *hEp Related Tendencies*

Participants' attitudes towards hEp differed. P1P1 stated that when using hEp, it is difficult to focus on hEp even for 5 minutes. Moreover, she stated that hEp showed her shortcomings to herself. After hEp creation, she felt obliged to achieve

the goal she had set in hEp and did not like this situation because she faced her shortcomings.

P1P1 also stated that she was an ambitious person and that this ambition could encourage her to use hEp. P1P2 stated that his GPA is already high in the current situation, he did not want to change his Internet usage behavior, and the current Internet use behavior did not have any negative effect on him. Therefore, he expressed a negative opinion about continuing to use hEp.

Based on the statements above, participants' negative attitudes about continuing to use hEp was not because they found hEp ineffective, but because they did not want to change their current behavior. The PPT hEp interface was generally appreciated by the participants, although they did all of the operations manually (it was stated from the beginning) they did not see this as a problem. They thought that hEp is effective in achieving their academic goals by regulating Internet usage behavior. In line with the recommendations emerged in the hEp PPT pilot study, the updates made about the hEp app are given in the Table 3.14.

Table 3.14 Improvements in hEp Application in line with PPT Pilot Results

| • Introductory sentences that briefly explain hEp were improved to increase comprehensibility. |
| --- |
| • Notifications were added after the 2nd cycle. |
| • hEp guide has been improved to present the aims of the hEp more clearly and explanations with sample sentences are made for each hEp screen. |
| • Emojis were added to the emotion screen of mobile version of hEp for the main cycles. |
| • In line with the literature, a new screen, the outcome screen, has been added. |

*WEB Pilot (Low usability, automated processes)*

The researcher thought that the pilot study carried out with the PPT prototype was an important deficiency (no automated process steps), and because the hEp mobile application was not ready yet, other ways were sought to overcome this deficiency and to be able to investigate it. The researcher and her supervisor thought that the easiest and fastest way to automate the process steps and examine its effectiveness was to present hEp as website. While preparing the website, the steps such as which activity will direct to which page, which information will be presented from which page, and the transition between pages have been carefully prepared. However, the visual features of the website were kept at a basic level due to both the time constrain and the researcher's limited knowledge on web design. Web Pilot continued throughout May 2019. Figure 3.10 includes the screenshot of goal screen from WEB pilot version of hEp.
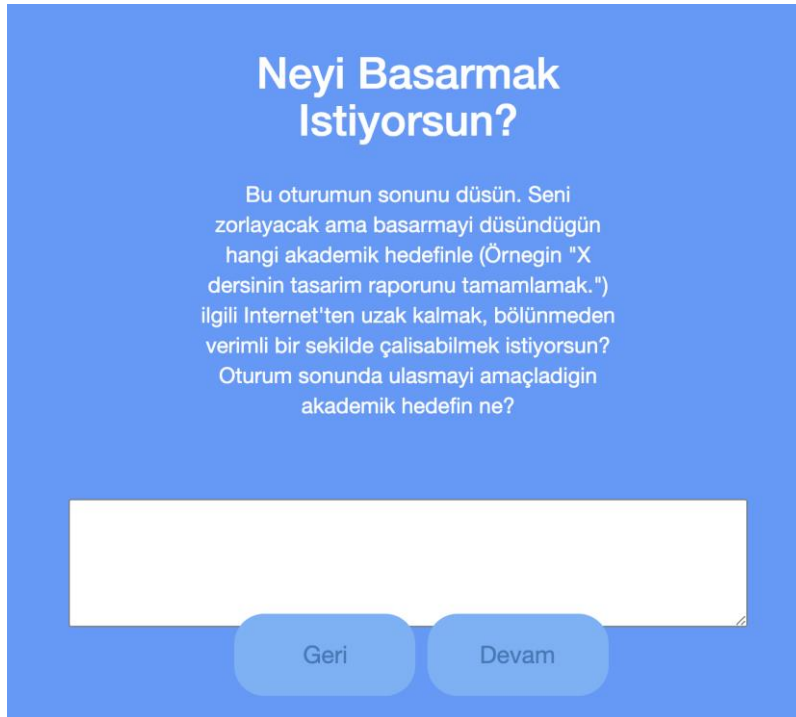


Figure 3.9 Screenshot of Goal Screen from WEB Pilot Version of hEp

### Usability Features of Web hEp

#### *Interface*

*Visual Features*

There have been several negative comments on the visual features of the hEp designed for the web. The participants emphasized that the screen was too blank, the buttons, fonts, and objects on the screen were too ordinary, and that more attention should be paid to the design.

***More emphasis has been placed on the visual design of hEp app.***

*hEp Logo*

As in the ppt pilot, since the logo design has not yet been made in the Web pilot, P2P3 has suggested creation of a logo for hEp.

***hEp logo has been created for the hEp app.***

*Fonts*

Two participants from the web pilot stage found the fonts as simple. One of them emphasized that the font shows the hEp as mediocre.

***More emphasis has been placed on the font styles of hEp app.***

*Buttons*

*Emotions:* Based on the ppt pilot, checkboxes containing name of the emotions are presented in the emotion screen in the web pilot instead of the textbox. However, P2P3, who used the web hEp on a mobile phone, stated that the writings and checkboxes slipped on the emotion screen and that uncertainty occurred. She stated that this situation created a perception that hEp was designed in a careless way.

#### *Information Quality*

Several usability issues emerged under information quality heading regarding notifications in Web Pilot.

*Notifications*

One of the participants (P2P3) stated that she always forgot to create new hEps and it would be appropriate to receive "create a new hEp" notification in such cases. Another participant (P2P1) stated that she forgot to click the complete hEp button and did not remember that there was such a field. Based on these sentences, it was thought that it would be appropriate to send notifications about both creating new hEps and completing the continuing hEps.

***Notifications were added after the 2nd cycle.***

### System Usefulness

*Error Tolerance*

In the current version, the most important drawback of system usefulness was that if users navigate to previous screens during hEp creation, all the information they had written was deleted. P2P2 stated that he had to rewrite the hEp he wanted to create 3-4 times due to an error in the system, but the error continued. He emphasized that he was bored with this process because his hEp was not saved. P2P1 stated that she did not experience such a situation, if she did, she would think that this error was the result of careless development and she would not want to use the system.

***In order to avoid such an error in the hEp application, the application developer has been requested to add the necessary feature.***

*Ease of Use*

As in the PPT Pilot, in the Web Pilot, the participants stated that it is easy to use the system.

### Experiences on hEp

**Perceived Effectiveness of hEp**

*Change on Internet use behavior*

P2P2 stated that after creating hEp, he paid more attention to his Internet usage behaviors while studying. However, P2P3 stated that she couldn't study regularly, she mostly looks at WhatsApp messages while studying, and creating hEp couldn't change this situation.

*Boost for goal achievement*

Both P2P1 and P2P3 emphasized that hEp had no effect on their academic goals, and that they could not study for the time they wrote in hEp.

*Controlling procrastination*

All participants in the Web pilot stated that using the application has no effect on their academic procrastination behavior. Considering the usability features of Web hEp and participants' reflections on hEp together, it was seen that the participants developed negative attitudes toward hEp due to the weakness of the interface quality and the system usefulness, and they thought it was not an effective program.

*hEp Related Tendencies*

P2P1 stated that her goal was to get high grades for all hEps, therefore the information she wrote in hEps was the same. She also stated that such planning tools are not suitable for her use. P2P2 stated that he could write the answers to the questions in the hEp in his mind and therefore he did not need any other tool. P2P3 stated that there are too many things to be improved in the current form of the application. She also stated that she would want to use it if it is improved, and that it is a well-thought-out application. Based on the WEB pilot results, following improvements, presented in Table 3.15, were made in the main cycles on the hEp app.

Table 3.15 Improvements in hEp Application in line with WEB Pilot Results

| |
|---|
| • More emphasis has been placed on the visual design of hEp app. |
| • hEp logo has been created for the hEp app. |
| • More emphasis has been placed on the font styles of hEp app. |
| • Notifications were added after the 2nd cycle. |
| • In order to avoid rewrite error in the hEp application, the application developer has been requested to add the necessary feature. |

When PPT hEp and Web hEp were taken together, it was observed that the perceptions of the users about the usability of the tool affect their perceptions on the effectiveness of and their attitudes toward it. Therefore, more attention was paid to usability in design of hEp app, and it was developed in line with the statements and suggestions of the participants in the pilot phases.

In both pilot studies, participants were selected among those with high PIU scores in accordance with their volunteerism. However, it was observed that these participants didn't see their Internet usage as problem. Besides, they set their academic goals as getting high grades and set their hEps accordingly. These observations showed that participants who were selected based on PIU scores and participated in the study on ask were not suitable participants for the main study to observe the effectiveness of hEp.

Participants in the main study should have been chosen from those who - according to their own perceptions- use the Internet problematically and see this situation as an obstacle to achieving their academic goals.

### 3.2.6.2 Procedures of Main Cycles

*Cycle 1*

In this first cycle it was aimed to reveal ideas of the participants on hEp app which aimed to regulate Internet use behaviors and decrease academic procrastination by enhancing self-regulation of university students.

Participants were four undergraduate female students (n=4) from a public university who involved in Pedagogical Formation Certificate Program (PFCP). The participants used hEp app for 14 days. Before this 14-day process, one of the PFCP courses was attended at the university, information about the current study was given, the scales used in the first stage were applied to volunteers and their contact information were obtained. Then, mobile hEp app was introduced. Its purpose and how to use it were explained face to face. After this face-to-face process, bulk message was sent to participants to initiate cycle 1. Then, hEps they created during the 14-day usage period were tracked from the database, and participants received individual feedback on their hEp creation. After the study process, their opinions about their Internet use behaviors, user experience with hEp, and experiences on hEp were obtained through semi-structured interviews. Accordingly, hEp updates have been made.

*Cycle 2*

As stated earlier, the second cycle coincided with the Covid-19 pandemic. For this reason, it was not possible to meet face to face -planned for the main cycles- with potential participants and invite them to study. Therefore, some participants who were students in the PFCP program were reached indirectly through the instructor of one of their lessons. Students who wanted to be participant were informed about the purpose of the study and directed to the researcher by the instructor. Accordingly, three PFCP students were included in the study. Moreover,

another participant who was not in PFCP but volunteered to participate in the study was also included in this cycle. This participant is studying at the Faculty of Health Sciences and is a 3rd grade student. Therefore, this cycle was conducted with 4 participants. Cycle 2 participants were followed through the hEp database for two weeks, and then their opinions were taken through semi-structured interview questions, which were updated after the 1st cycle. Accordingly, hEp updates have been made.

## Cycle 3

Only the Android version of hEp was available in the first two cycles. Therefore, only participants with an Android device could be included in these cycles. In the third cycle, the iOS version of hEp was also available. Five PFCP students who were interviewed face to face before the first cycle and had an iOS device were included in the study in this cycle. In addition, another undergraduate student volunteered to take part in this cycle. This participant is studying at the Faculty of Education and is a 3rd grade student. Therefore, this cycle was conducted with six participants. Participants' hEps were followed on the hEp database, and after two weeks of hEp usage period, they were interviewed. Interview questions were updated and asked to the participants after the second cycle, taking into account the newly added features and other questions that would be appropriate to ask. Accordingly, hEp updates have been made.

## Cycle 4 (Final Cycle)

In this cycle, hEp design was finalized (within the bounds of possibility), and all participants who participated in past cycles were informed and invited for the final cycle via WhatsApp. The information that participation is completely voluntary has been conveyed with the request of only those who want to participate to respond to this message. Eight participants from previous cycles continued to use hEp after

this message. However, only four of these gave feedback to the researcher that they wanted to be participants. Thus, four former participants took part in the final cycle. Apart from this, two more participants, one PFCP student and one preparatory class student, voluntarily participated in the final cycle. Six participants in this cycle used hEp for a month then they answered the semi-structured interview questions, which were updated in line with the improved hEp after the third cycle.

### 3.2.7    Researcher Role

Researcher can be seen as an instrument. While the researcher gets involved in the participants' life, it is important to include researcher's role in the research design section (Marshall & Rossman, 2014). Because ethical, personal and strategic issues accompany this involvement (Locke, Spirduso, & Silverman, 2000). According to Patton (2002), there are several dimensions that characterize researcher's role. First, participantness: It is about the degree to what extent the researcher participated in the research environment. There are varying degrees of participantness ranging from observer to full participant. Although the researcher is a university staff member, she is not at the same university as the students involved in the cycles of this study. Therefore, she has no ties to them other than studying with them. Due to the study, she is in a position that she can follow and examine the participants' hEps from the database and communicate with the participants on WhatsApp when necessary. In the intervention session she was a participant, she mostly observed the intervention session under its normalcy (hEp database). Therefore, researcher had some direct and immediate participation in the research environment that seen as a crucial issue for building and maintaining relationship (Patton, 2002). Second, revealedness: it's regarding the extent to which participants know that there is a research study take place (Patton, 2002). In the current study, participants were aware of the researcher and the study itself. Third, researcher's role intensiveness and role extensiveness: it is regarding how much time the researcher spent in the research environment daily, and how much time spent in total. As stated

103

before, in this study, the research environments were the hEp database and WhatsApp. Researcher was in the research environments throughout intervention process mostly as an observer. While the researcher was checking the hEp database about twice a day, when necessary (for example, once or twice during the two-week implementation period), she wrote to the participant via WhatsApp. Moreover, current study has a specific focus and research questions and appropriate data for answering these questions are defined elaborately. Therefore, with some flexibility the researcher has an implicit role (Patton, 2002).

### 3.2.8    Data Analysis Strategy

Content analysis was utilized in this stage (Strauss & Corbin, 1998). There were two types of data as interview data and database contents. Qualitative data analysis tool MAXQDA was utilized for the interview data. Data analysis was done after data managed properly. For interview data, transcriptions were made and researcher looked for codes. Then she did close reading. That is, she searched for codes in relation to research questions. Then she divided data into meaningful segments and assigned codes that represent the designated data. After creating codes, she put together the codes that create meaningful larger units, called themes. Then themes and codes were organized hierarchically. Then she attempted to develop understanding from the data and searched for alternative explanations that can be inferred from the data. She studied with her two colleagues to see alternative explanations, objectively. To make reliability check, two of the colleagues of researcher also did coding and they discussed challenges raised from these processes.

As mentioned in the data collection instruments and methods title, while the database content was examined to direct the participants, and observe their hEpping behavior when necessary, it was observed that some of the non-participant users displayed a common behavior. Accordingly, the contents related to the hEps of these participants were also subjected to content analysis.

### 3.2.9 Trustworthiness

In qualitative researches, subjectivity of the researcher is inevitable to some extent. Lincoln and Guba (1985) stated that the criteria used to ensure rigor in conventional scientific research are internal validity (truth value of the claim regarding cause-and-effect relationship), external validity (applicability of conclusions), reliability (consistency) and objectivity (neutrality). In naturalistic studies, these criteria have been replaced by credibility, transferability, dependability and confirmability.

### 3.2.9.1 Credibility

Lincoln and Guba (1985) defined a number of credibility techniques. Among those prolonged engagement, persistent observation, triangulation, and peer debriefing were utilized in the current study.

*Prolonged Engagement*

Prolonged engagement means that the researcher is in contact with the participants in the research field with a sufficient length and depth. In this way, the researcher has the opportunity to learn about the culture of the research field and establish trust with the participants. It also determines the possible sources of distortions and remarkable points by being available in the research field for a long time (Lincoln & Guba, 1985). The research area of this study is the hEp application. Before the use of hEp, the participants were informed that each content they wrote would fall into the database which is seen by the researcher. The aim is to ensure that the participants create the hEp in the most appropriate way, to determine remarkable things, and to contact with the participants for possible problems and solve them. First three hEp cycle lasted an average of 14 days. Albeit for a relatively short time, the researcher, who was in constant communication with the participants aimed to understand the culture developed by the participants and identify remarkable points in hEp environment and to find the source of distortions regarding the hEp

application. With prolonged engagement, throughout the pilot studies and main study, the researcher has always been in contact with the participants. Thus, she has mastered the culture related to hEp, for the next cycle, she has determined the remarkable points, and took measures for possible problem situations / took appropriate steps to solve the problems that experienced.

*Persistent Observation*

Persistent observation means in-depth observation of distortions and remarkable points. The purpose of this observation is to determine which details are more important and which are less important in the context of the study and continue to focus on important ones (Lincoln & Guba, 1985). Throughout the cycles, the researcher reflected on the significance of the various situations in the research, taking ever-changing steps as to what step should be taken under what condition.

*Triangulation*

Triangulation is the verification of findings in various ways. These ways are: 1- Referring to various sources including the literature, 2- Utilizing various data collection methods, 3- Including the observations of more than one researcher (Lincoln & Guba, 1985). In the present study, the responses of the participants to the survey questions, the hEp content they created, and the answers they gave to the interview questions were examined as a whole. In addition, interview questions were revised in line with the hEp content they created, and accordingly, the findings were validated. Besides, two other investigators apart from the researcher also analyzed the qualitative data. The findings have been clarified in this direction.

*Peer Debriefing*

In peer debriefing, the aim is to keep the researcher honest. Peer debriefing allows one or more peers, who have no connection with the study, to comment on the researcher's emerging findings, thus allowing the researcher to examine the whole research process from multiple perspectives (Lincoln & Guba, 1985). In this study, peer debriefing was used in both data collection and data analysis processes.

Two experts from the same field, who previously conducted qualitative studies, gave feedback to the researcher at both the data collection and data analysis processes. Moreover, in the Thesis Monitoring Committee meetings, each stage was explained to the members of the committee in its historical process, and the findings were shaped in line with the feedback from them.

### 3.2.9.2 Transferability

Meriam (2009) suggested that the applicability of the results of a qualitative study to other situations indicates whether it is transferable or not. Transferability corresponds to external validity in quantitative studies. For a study to be transferable, detailed descriptions of the time and context of the study must be made. The researcher must present the enough documents for their analysis and conclusion as evidence (Lincoln & Guba, 1985). In this study, information about the design and development processes of the hEp application and the context in which the research is carried out has been presented to ensure transferability.

### 3.2.9.3 Dependability

The counterpart of dependability in quantitative studies is reliability. Dependability means that the data collected and the results of the study are consistent with each other (Lincoln & Guba, 1985). There are several ways to ensure dependability in qualitative studies. Among these, audit trail and intercoder reliability are the techniques utilized in this study.

*Audit Trail*

Audit trail refers to the presentation of evidence for every decision and every step taken regarding the research. Therefore, everything in the research process should be auditable. To achieve this, in this study, the researcher recorded and

documented all the interventions she made, the hEp contents created by participants, and the interviews.

Intercoder Reliability

Intercoder reliability points out to the extent two or more coders agree upon the coding scheme (Creswell, 2007). To ensure consistency regarding codes and themes agreement of the coders is essential. In this study, after the codes and themes were created by the researcher, the codes and themes of two separate cases reviewed with two different coders in different times. The researcher explained to other coders for what purpose which code and theme she created. The codes and themes that the coders did not find suitable were discussed in the process until an agreement was reached. After the coding scheme was determined accordingly, coding contents of two more cases (one for each coder) were sent to coders without the coding contents. Then, the codes created by the researcher and the codes created by other coders were compared. Initially, there was a %68 agreement with one coder and a %61 agreement with the other coder. Then, codes and themes that were found to be incompatible were discussed again the codes and themes were finalized with complete agreement.

## 3.2.9.4 Confirmability

Confirmability, the counterpart of objectivity in quantitative studies, is about whether the results obtained in the study are derived from the data obtained, not from the researcher's subjective perspective. Beside triangulation and audit trail, researcher reflexivity is also a technique that can be utilized to ensure confirmability. The researchers should be aware of the values, biases that they bring to the research process (Lincoln & Guba, 1985). In this study, the researcher explained her role to the participants, and clearly presented all the statements that emerged in the interviews that were thought to contain bias in the findings.

### 3.2.10    Ethics

Ethical concerns are important in qualitative research, as in other types of research. In this study, the points stated by Fraenkel, Wallen, and Hyun (2012) were taken into consideration.

First of all, before the study started, approval was obtained from the Ethics Committee from Middle East Technical University (See Appendix B). Second, through the consent form, participants were informed about the purpose of the study, by whom it was conducted, what was expected from the participants, and the participants' approval was obtained. Third, participants' identity information was kept confidential, and code names were used. Fourth, before the interviews with the participants, it was stated that these interviews would be recorded and their approval was obtained. Fifth, the information that "all the text they wrote using hEp will be displayed in a database seen by the researcher" was given just before the study.

# CHAPTER 4

# RESULTS

## 4.1 STAGE 1

For the first stage, both descriptive and inferential analyses were conducted. Descriptive results shed light on demographics, academic information and Internet use patterns of participants. Means, standard deviations, frequencies, and percentages of these variables were calculated.

Participants were asked about the age at which they first started using the Internet. The lowest age to start using the Internet was three, while the highest was 18. The average age to start using the Internet is 10.01 ($SD$=2.75). While the minimum daily Internet usage time is 36 minutes, the maximum usage time is 960 minutes with a mean of 302.4 minutes ($SD$=160.82).

By selecting any that apply, the most preferred device of the participants to access the Internet was smartphone (97.5%), followed by laptop computer (84.3%), desktop computer (10.4%), tablet (10.2%), and smart television (6.5%). Moreover, most of the participants preferred campus environment for Internet connection (76.6%), followed by home (62.0%), no special place (57.2%), and dormitory (40.1%).

Participants were asked about their opinions about their Internet use. Most of the participants described their use of the Internet as excessive (37.8%, $n$= 181), then the ones who answered as "no" took the second order (31.9%, $n$= 153), and those who answered "I am indecisive" took the third order (30.3%, $n$= 145). However, the proportions of those who chose each answer are close to each other. Most of the participants stated that others did not describe their Internet use to be excessive (59.9%, $n$= 287).

Regarding Internet usage durations for each type, 81.4% ($n= 390$) of the participants stated that their use amount of the Internet for academic purposes has increased in the last year, 15.4% ($n= 74$) said that no change has occurred, and 3.1% ($n= 15$) said that it has decreased. As for social use, 34.2% ($n= 164$) of the participants said that amount of social use duration has increased, 38.8% ($n= 186$) stated it has remained same, and 26.9% ($n= 129$) stated that it has decreased, compared to last year. 39.7% ($n= 190$) of the participants stated that amount of Internet use duration for recreational purposes has increased, 37.0% ($n= 177$) of them said that it has remained same, and 23.4% ($n= 112$) of them stated it has decreased compared to last year. Table 4.1, 4.2, 4.3, 4.4 represent the descriptive information regarding Internet usage of participants. Table 4.5 present the participants' attitudes about the Internet use.

Table 4.1 Age at First Use of the Internet ($N= 479$)

| Min | Max | Mean | SD |
|-----|-----|------|-----|
| 3 | 18 | 10.01 | 2.75 |

Table 4.2 Daily Internet usage time (in minutes) ($N= 479$)

| Min | Max | Mean | SD |
|-----|-----|------|-----|
| 36 | 960 | 301.96 | 160.82 |

Table 4.3 Device Preferences of Undergraduate Students for Internet use (*N*= 479)

|  | f | % |
|---|---|---|
| Smart Phone | 467 | 97.5 |
| Laptop | 404 | 84.3 |
| Desktop | 50 | 10.4 |
| Tablet | 49 | 10.2 |
| Smart TV | 31 | 6.5 |

Table 4.4 Place Preferences of Undergraduate Students for Internet use (*N*= 479)

|  | f | % |
|---|---|---|
| Home | 297 | 62.0 |
| Dormitory | 192 | 40.1 |
| Campus | 367 | 76.6 |
| No special place | 274 | 57.2 |

Table 4.5 Attitudes about Internet Use (*N*= 479)

|  | Yes | | Neutral | | No | |
|---|---|---|---|---|---|---|
|  | f | % | f | % | f | % |
| Considering use of the Internet to be excessive by self. | 181 | 37.8 | 145 | 30.3 | 153 | 31.9 |
| Considering use of the Internet to be excessive by others. | 192 | 40.1 | - | - | 287 | 59.9 |

Table 4.5 (continued)

|  | Increased | | Same | | Decreased | |
|---|---|---|---|---|---|---|
|  | f | % | f | % | f | % |
| Perception on academic use of Internet over the last year | 390 | 81.4 | 74 | 15.4 | 15 | 3.1 |
| Perception on social use of Internet over the last year | 164 | 34.2 | 186 | 38.8 | 129 | 26.9 |
| Perception on recreational use of Internet over the last year | 190 | 39.7 | 177 | 37.0 | 112 | 23.4 |

## 4.1.1 Internet Use Patterns & Behaviors of the Undergraduate University Students (R.Q.1)

Findings about the participants' Internet use behaviors were presented under academic, social, and recreational subtitles. Frequency and percentages for each use sub-purpose and the relationship between these sub-purposes and gender were presented.

## 4.1.1.1 What are the academic Internet use behaviors of the undergraduate university students?

Five different uses are defined under academic uses. 91.6% of the participants stated that they use course management systems and this is the most frequently indicated use. Accessing information from online encyclopedias, search engines, MOOCs, or other educational resources ranked 2nd with 82.9%. 78.9% of them

stated that they reach academic information those of not directly related with courses. Sharing / reading information for academic / learning purposes through social media messaging services was stated as an academic use purpose by 63.5% of them. The least specified type of use by the users was creating informative academic web content with 34.7%. Table 4.6 presents academic sub-use purposes of participants.

Table 4.6 Academic Sub-use Purposes of Participants

| Use Type | f | % |
|---|---|---|
| Creating informative academic web content | 166 | 34,7 |
| Sharing / reading information for academic / learning purposes through social media messaging services | 304 | 63,5 |
| Accessing information from online encyclopedias, search engines, MOOCs, or other educational resources | 397 | 82,9 |
| Using university course management system (ODTUCLASS, LMS, CMS etc.) | 439 | 91,6 |
| Browsing for academic information that are not directly related with courses | 378 | 78,9 |

While some users stated that they do not use the Internet for academic purposes, the average academic Internet usage time was $M = 104.92$ minutes ($SD = 71.45$). Daily academic Internet use duration of participants presented in Table 4.7.

Table 4.7 Daily Academic Internet Use Duration (in minutes)

| Min | Max | Mean | SD |
|---|---|---|---|
| 0 | 480 | 104.92 | 71.45 |

115

To examine the relationship between demographic information and academic Internet use behaviors in more detail, several chi-square tests conducted whether there are links between gender and sub-use types of academic Internet use.

A chi-square test of independence was performed to examine the relationship between gender and creating informative web content. The relation between these variables was significant, $X^2$ (1, $N$= 431) = 8.7, $p$= .0032. The strength of this relationship is low, Cramer's V = 0,14 (Cohen, 1988). Female undergraduates create more informative web content than male ones (See Table 4.8).

Table 4.8 Frequency Distribution of Creation of Informative Web Content by Gender

| Group | Creating informative web content | | | |
|---|---|---|---|---|
| | No | % | Yes | % |
| Female | 159 | 55,40 | 101 | 70,14 |
| Male | 128 | 44,60 | 43 | 29,86 |
| Total | 287 | 100 | 144 | 100 |

$X^2$ (1, $N$= 431) = 8.7, $p$= .0032

## 4.1.1.2    What are the social Internet use behaviors of the undergraduate university students?

Six different types of use have been defined in social use. Table 4.9 presents social sub-use purposes of participants. 96% of the participants stated that they use Whatsapp for social purposes. Other usage types were preferred by relatively few of the participants. While 59.5% of them stated that they used the DM feature in their social media, 56.8% of them stated that they commented on others' social media posts. 34.9% of the participants stated that they shared on Internet forums for interaction purposes, and 19.8% stated that they used the comment section on the websites. The least preferred social use by the participants was communicating through dating applications with 5%.

116

Table 4.9 Social Sub-use Purposes of Participants

| Use Type | f | % |
|---|---|---|
| Direct messaging through social media (Facebook, Twitter, and Instagram etc.) | 285 | 59,5 |
| Communicating for socializing / chatting through Whatsapp. | 460 | 96 |
| Commenting on others' posts on social media to interact with other people. | 272 | 56,8 |
| Sharing posts to communicate with other people on Internet forums (Kadınlar Kulübü, Donanımhaber, etc.). | 167 | 34,9 |
| Sharing messages to communicate with other people on websites (Onedio, Listelist, etc.). | 95 | 19,8 |
| Communicating through dating applications (Tinder, Match, etc.) | 24 | 5 |

The shortest duration of social use was specified as 0 minutes, while the longest was 840 minutes. Participants stated that they use the Internet for social purposes for an average of $M= 134.64$ minutes (SD= 125.89). Daily social Internet use duration of participants presented in Table 4.10.

Table 4.10 Daily Social Internet Use Duration (in minutes)

| Min | Max | Mean | SD |
|---|---|---|---|
| 0 | 840 | 134.64 | 125.89 |

A chi-square test of independence was performed to examine the relationship between gender and posting for communicating with other people on interested Internet forums. The relation between these variables was significant, $X^2$ (1, $N= 431$) $= 3.9$, $p= .0484$. The strength of this relationship is low, Cramer's V $= 0,10$ (Cohen,

1988). Males post more in the interested Internet forums for communication aims than females (Table 4.11).

Table 4.11 Frequency Distribution of Posting for Communication Purposes in Internet Forums by Gender

| Group | Posting in interested Internet forums | | | |
|---|---|---|---|---|
| | No | % | Yes | % |
| Female | 182 | 63,64 | 78 | 53,79 |
| Male | 104 | 36,36 | 67 | 46,21 |
| Total | 286 | 100 | 145 | 100 |

$X^2$ (1, $N$= 431) = 3.9, $p$= .0484

A chi-square test of independence was performed to examine the relationship between gender and commenting on the posts to communicate with others in interested websites. The relation between these variables was significant, $X^2$ (1, $N$= 431) = 4.5, $p$= .0340. The strength of this relationship is low, Cramer's V = 0,10 (Cohen, 1988). Females comment more in the interested websites for communication aims than males (See Table 4.12).

Table 4.12 Commenting on the Posts for Communication Purposes in Websites by Gender

| Group | Commenting on the posts | | | |
|---|---|---|---|---|
| | No | % | Yes | % |
| Female | 204 | 57,95 | 56 | 70,89 |
| Male | 148 | 42,05 | 23 | 29,11 |
| Total | 352 | 100 | 79 | 100 |

$X^2$ (1, $N$= 431) = 4.5, $p$= .0340

A chi-square test of independence was performed to examine the relationship between gender and using the dating apps. The relation between these variables was significant, $X^2$ (1, $N$= 431) = 7.9, $p$= .0050. The strength of this relationship is low, Cramer's V = 0,14 (Cohen, 1988). Males use dating apps more than females (See Table 4.13).

118

Table 4.13 Use of Dating Apps by Gender

| Group | Using dating apps | | | |
| --- | --- | --- | --- | --- |
| | No | *%* | Yes | *%* |
| Female | 253 | 61,86 | 7 | 31,82 |
| Male | 156 | 38,14 | 15 | 68,18 |
| Total | 409 | 100 | 22 | 100 |

$X^2$ (1, $N$= 431) = 7.9, $p$= .0050

### 4.1.1.3 What are the recreational Internet use behaviors of the undergraduate university students?

Eight different recreational use types have been defined. The type of recreational use that the participants stated the most with 96.9% was listening to music, watching videos / movies. 76% of them stated that they look at the photos and watch the videos on social media. Searching / reading information on the Internet about news, health, fashion, etc. is a type of usage preferred by 66.6% of the participants. 59.5% read information from websites to their interests. 43% stated that they engage in online buying / selling activities, 23.8% play MMO games, and 18.6% play non-MMO games. 10.9% of them stated that they read books and publications with Kindle etc. Table 4.14 presents social sub-use purposes of participants.

Table 4.14 Recreational Sub-use Purposes of Participants

| Use Type | f | % |
| --- | --- | --- |
| Listening to music, watching videos / movies, (Youtube, Netflix, Spotify, Puhutv, other online movie sites etc.) | 464 | 96,9 |
| Searching / reading information on the Internet about news, health, fashion, etc. | 319 | 66,6 |

Table 4.14 (continued)

| | | |
|---|---|---|
| Reading information from websites to your interests (Onedio, Listelist, Bilimfili of Düşünbil etc.). | 285 | 59,5 |
| View photos / watch videos / share on social platforms like Instagram, Facebook | 364 | 76 |
| Non-MMO Gaming (Candycrush etc.) | 89 | 18,6 |
| MMO Gaming (WoW, Diablo etc.) | 114 | 23,8 |
| Online buying / selling (eBay, Gittigidiyor, Hepsiburada, Trendyol, etc..) | 206 | 43 |
| Reading books, publications on Kindle, etc. | 52 | 10,9 |

The shortest duration of social use was indicated as 0 minutes, while the longest was 720 minutes. Participants stated that they use the Internet for social purposes for an average of $M$= 134.55 minutes (SD= 102.32). Daily social Internet use duration of participants presented in Table 4.15.

Table 4.15 Daily Recreational Internet Use Duration (in minutes)

| Min | Max | Mean | SD |
|---|---|---|---|
| 0 | 720 | 134.55 | 102.32 |

A chi-square test of independence was performed to examine the relationship between gender and looking at photos / watching videos / sharing posts on social platforms like Instagram, Facebook. The relation between these variables was significant, $X^2$ (1, $N$= 431) = 19.85, $p$= .0000. The strength of this relationship is low, Cramer's V = 0,22 (Cohen, 1988). Females use social platforms for looking at photos, watching videos or sharing posts than males (See Table 4.16).

Table 4.16 Looking at Photos / Watching Videos / Sharing Posts on Social
Platforms by Gender

| Group | Looking at Photos / Watching Videos / Sharing Posts on Social Platforms | | | |
|---|---|---|---|---|
| | No | *%* | Yes | *%* |
| Female | 45 | 42,06 | 215 | 66,36 |
| Male | 62 | 57,94 | 109 | 33,64 |
| Total | 107 | 100 | 324 | 100 |

$X^2$ (1, *N*= 431) = 19.85, *p*= .0000

A chi-square test of independence was performed to examine the relationship
between gender and playing MMO games. The relation between these variables was
significant, $X^2$ (1, *N*= 431) = 68.06, *p*= .0000. The strength of this relationship is
moderate, Cramer's V = 0,40 (Cohen, 1988). Male undergraduates play more MMO
games than female undergraduates (See Table 4.17).

Table 4.17 Playing MMO Games by Gender

| Group | Playing MMO Games | | | |
|---|---|---|---|---|
| | No | *%* | Yes | *%* |
| Female | 236 | 70,87 | 24 | 24,49 |
| Male | 97 | 29,13 | 74 | 75,51 |
| Total | 333 | 100 | 98 | 100 |

$X^2$ (1, *N*= 431) = 68.06, *p*= .0000.

## 4.1.2 Relationship among Demographics, Problematic Internet Use (PIU), and Internet Use Patterns (IUP) (R.Q.2)

GPIUS2 was used as the problematic Internet usage scale. Turkish language
translation was carried out by the researcher of this study. Three factors that emerged
from the factor analyses results were: deficient self-regulation, preference for online
social interaction, and mood regulation. When the items with the highest and lowest

mean values in each factor were examined, in the deficient self-regulation factor, while the item "I have difficulty controlling the amount of time I spend online." ($M$=3.96, $SD$=2.19) had the highest mean value, "I have missed social engagements or activities because of my Internet use." item ($M$=1.99, $SD$=1.50) had the lowest mean value. In preference for online social interaction factor, the highest mean value belonged to "I have used the Internet to talk with others when I was feeling isolated." ($M$=3.51, $SD$=2.17) and the lowest mean value belonged to "I prefer communicating with people online rather than face-to-face." ($M$=2.25, $SD$=1.79). In the two-item mood regulation factor, although the mean values of both items were close to each other, the high average value belonged to "I have used the Internet to make myself feel better when I was down." ($M$=4.88, $SD$=2.08). Table 4.18 presents the mean and standard deviation values of the items of the Turkish version of GPIUS2.

Table 4.18 Mean and Standard Deviation Values of The Items of the Turkish Version of GPIUS2

| | Item | M | SD |
|---|---|---|---|
| | **DEFICIENT SELF-REGULATION** | | |
| GPIUS2-3 | I have difficulty controlling the amount of time I spend online. | 3,96 | 2,19 |
| GPIUS2-4 | My Internet use has made it difficult for me to manage my life. | 3,48 | 2,24 |
| GPIUS2-7 | I would feel lost if I was unable to go online. | 3,01 | 2,03 |
| GPIUS2-8 | I find it difficult to control my Internet use. | 3,42 | 2,15 |
| GPIUS2-9 | I have missed social engagements or activities because of my Internet use. | 1,99 | 1,50 |
| GPIUS2-12 | I think obsessively about going online when I am offline. | 2,55 | 1,93 |
| GPIUS2-13 | When offline, I have a hard time trying to resist the urge to go online. | 2,66 | 1,92 |

122

Table 4.18 (continued)

| | | | |
|---|---|---|---|
| GPIUS2-14 | My Internet use has created problems for me in my life. | 2,53 | 1,86 |
| | **PREFERENCE FOR ONLINE SOCIAL INTERACTION** | | |
| GPIUS2-1 | I prefer online social interaction over face-to-face communication. | 3,06 | 2,37 |
| GPIUS2-2 | I have used the Internet to talk with others when I was feeling isolated. | 3,51 | 2,17 |
| GPIUS2-5 | Online social interaction is more comfortable for me than face-to-face interaction. | 3,10 | 2,09 |
| GPIUS2-10 | I prefer communicating with people online rather than face-to-face. | 2,25 | 1,79 |
| | **MOOD REGULATION** | | |
| GPIUS2-6 | I have used the Internet to make myself feel better when I was down. | 4,88 | 2,08 |
| GPIUS2-11 | I have used the Internet to make myself feel better when I've felt upset. | 4,46 | 2,14 |

Several Correlation, Independent Samples T-Test, One-Way ANOVA, and Chi-square analyses were conducted to examine the relationship among sociodemographic information, PIU, and IUPs. Due to violation of several assumptions, 48 data were excluded from the analyses. Therefore, this part of the study continued with $n=$ 431 data. Descriptive statistics regarding the new data were as in the Table 4.19.

Table 4.19 Distribution of the Gender and Age Group (*N*=431)

| Gender | *f* | *%* |
|--------|-----|-----|
| Female | 260 | 60,3 |
| Male | 171 | 39,7 |
| **Age** | *f* | *%* |
| 17-18 | 21 | 4,9 |
| 19-20 | 205 | 47,6 |
| 21-22 | 112 | 26 |
| 23-24 | 74 | 17,2 |
| 25-37 | 19 | 4,4 |

IUPs of the participants were examined through Internet use durations (IUD) for each use type and Internet use purpose frequencies (IUPF) for each use type (academic, social, and recreational).

According to Independent Samples T-Tests analyses results, there were no significant gender differences in PIU and academic, social, and recreational IUD and IUPF. Besides, there were no significant relationship between age and PIU, age and recreational IUD. There was a positive low correlation between age and academic IUD, $r= .14$, $n= 431$, $p= .004$, a negative low correlation between age and social IUD, $r= -.12$, $n= 431$, $p= .012$. There was no significant relationship between age and academic, social, and recreational IUPF.

There was no significant relationship between GPA and PIU, GPA and academic, social, and recreational IUD and IUPF.

To examine the relationship among academic, social, and recreational IUD and PIU several correlation analyses were conducted. Results revealed a negative low correlation between academic Internet use and PIU $r= -.11$, $n= 431$, $p= .026$., positive low correlation between social Internet use and PIU $r= .28$, $n= 431$, $p= .000$., and recreational Internet use and PIU $r= .23$, $n= 431$, $p= .000$. Moreover, there were no significant relationship between academic, recreational IUPF and PIU.

However, total social Internet use frequency positively correlated with PIU with a low correlation $r= .24$, $n= 431$, $p < .001$.

### 4.1.3    Structural Equation Modeling Results (R.Q.3)

In this section, CFA and structural equation modeling (SEM) results were presented. To be more specific, assumptions of analyses, the measurement model and the hypothesized structural model were reported.

### 4.1.3.1    Data Screening

Firstly, data screening was conducted with the survey data. Missing values and unengaged responses were checked. Missing values were less than 5% of the total number of cases ($n= 479$). MCAR test was conducted and non-significant results were obtained for the factors that have missing values ($x^2_{posi}$ (3) = 7.83, p > .05; $x^2_{dsr}$ (35) = 32.25, p > .05; $x^2_{procrastination}$ (39) = 40.04, p > .05; $x^2_{self-regulation}$ (259) = 269.18, p > .05). That is, missing values were incomplete at random and ignorable. With the purpose of not to lose variation in the data, mean imputation technique was utilized. By using data imputation, a missing value of a certain variable is replaced with the mean of available values on that variable. Then, unengaged responses were checked through the standard deviation of each case. There were no cases with a standard deviation of 0.

### 4.1.3.2    Assumption Check

For SEM, several criteria for sample size adequacy were suggested in the literature. Ding, Velicer, and Harlow (1995) suggest a minimum 100 to 150 cases for Maximum Likelihood Estimation. However, Whittaker (2012) claims that large sample sizes are needed in SEM to reach more accurately estimated indicators. Otherwise, the failure of convergence and inappropriate solutions can emerge

(Loehlin, 1998). Considering possible drawbacks regarding small sample sizes, in this study, SEM is conducted with a sample size of 479 which is seen as a moderate to large sample size (Chen, Curran, Bollen, Kirby, & Paxton, 2008). Skewness and Kurtosis values were examined to check univariate normality. Tabachnick and Fidell (2012) suggest that these values should be between +3 and -3. Based on this criterion, the univariate normality assumption was satisfied with the parceled model (See Table 4.20). The multivariate normality assumption was checked with Mardia's Test. The result revealed a significant p-value; therefore, this assumption is violated (Tabachnick & Fidell, 2012). For this reason, the bootstrapping method was used for analyses with regard to the model. The linearity of the measured variables was checked through the scatter plot and there was no curvilinearity. Therefore, this assumption was also satisfied. Influential outliers were examined through Mahalonobis distance value. In this study number of variables were 19 and the critical value for chi-square distribution was 38.58 at .005 alpha level. Analysis results revealed that 21 cases were beyond this critical value. Validity analyzes were carried out both with outliers and by removing outliers. Validity analyzes conducted without outliers have yielded slightly better results. Therefore, 21 outliers beyond the critical value were excluded from the analyses and continued with 458 cases.

Table 4.20 Skewness and Kurtosis Values for Items of the Model.

|  | Skewness | SE | Kurtosis | SE |
|---|---|---|---|---|
| **POSI 1** | 1.004 | .114 | -.273 | .228 |
| **POSI 2** | .464 | .114 | -.972 | .228 |
| **POSI 3** | .749 | .114 | -.519 | .228 |
| **POSI 4** | 1.623 | .114 | 1.958 | .228 |
| **MREG 1** | -.294 | .114 | -.882 | .228 |
| **MREG 2** | -.137 | .114 | -1.045 | .228 |
| **DSRP 1** | .451 | .114 | -.871 | .228 |
| **DSRP 2** | .929 | .114 | .186 | .228 |
| **DSRP 3** | 1.102 | .114 | .595 | .228 |
| **DSRP 4** | .722 | .114 | -.307 | .228 |
| **PROCP 1** | .016 | .114 | -.845 | .228 |
| **PROCP 2** | .331 | .114 | -.573 | .228 |
| **PROCP 3** | .240 | .114 | -.557 | .228 |
| **PROCP 4** | .093 | .114 | -.678 | .228 |
| **SRP 1** | -.336 | .114 | -.076 | .228 |

Table 4.20 (continued)

| | | | | |
|---|---|---|---|---|
| **SRP 2** | -.308 | .114 | -.365 | .228 |
| **SRP 3** | -.349 | .114 | -.044 | .228 |
| **SRP 4** | -.396 | .114 | -.142 | .228 |

### 4.1.3.3    Measurement Model

To test measurement model, confirmatory factor analysis (CFA) was conducted and the relationships among observed and latent variables were examined. Results of the CFA showed good fit for the measurement model with $X^2/df$= 2.74, $p$= .00, TLI = .96, CFI = .96, RMSEA = .062, and SRM$R$= .046. Moreover, RMSEA is indicator of approximation error, that is, "it assesses the extent to which a model fits reasonably well in the population" (Brown, 2015, p.71). RMSEA values, smaller than .05, shows excellent fit and between .05 and .08 shows a good and acceptable fit. For this study this value is .062 and it shows a good fit. The measurement model with standardized estimates and latent correlations were presented in Figure 4.1. Table 4.21 represents the standardized estimates. Standardized estimates ranged from .49 to .93 with significant regression weights.

Table 4.21 Standardized Regression Weights of the Measurement Model

| Item Name — Factor Name | *Estimate* | *p* |
|---|---|---|
| DSRP-1 — Deficient Self-Regulation | .81 | .00 |
| DSRP-2 — Deficient Self-Regulation | .86 | .00 |
| DSRP-3 — Deficient Self-Regulation | .87 | .00 |
| DSRP-4 — Deficient Self-Regulation | .89 | .00 |
| MREG-1 — Mood Regulation | .93 | .00 |
| MREG-2 — Mood Regulation | .92 | .00 |
| POSI-1 — Preference for Online Social Interaction | .49 | .00 |
| POSI-2 — Preference for Online Social Interaction | .51 | .00 |
| POSI-3 — Preference for Online Social Interaction | .74 | .00 |
| POSI-4 — Preference for Online Social Interaction | .74 | .00 |

| | | |
|---|---|---|
| PROP-1 — Academic Procrastination | .88 | .00 |
| PROP-2 — Academic Procrastination | .86 | .00 |
| PROP-3 — Academic Procrastination | .86 | .00 |
| PROP-4 — Academic Procrastination | .88 | .00 |
| SRP-1 — Self-Regulation | .89 | .00 |
| SRP-2 — Self-Regulation | .92 | .00 |
| SRP-3 — Self-Regulation | .89 | .00 |
| SRP-4 — Self-Regulation | .86 | .00 |

Before testing the hypotheses, validity and reliability check analyses were conducted based on the Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), the maximum shared variance (MSV) values. Cronbach's alpha values ranged between .70 and .94 (See Table 4.22) which are equal to or higher than the lowest acceptable value .70. Convergent validity was satisfactory for all scales with AVEs > 0.50, except for *POSI* (AVE = 0.40). CR values ranged between .72 to .93, which are quite higher than the acceptable value .60 (Fornell & Lacker, 1981). Fornell and Larcker (1981) suggested that, in a measurement model, AVE is a conservative estimate of validity, for this reason if CR is sufficient, despite the low AVE value, the researcher may conclude that convergent validity is sufficient. Based on this reference, no changes were made about POSI, but this low AVE value was reported as a limitation. Considering the abovementioned results and the literature, it can be inferred that the scale has no validity and reliability concern.

Table 4.22 Cronbach's Alpha Coefficients of the Scales

| Scale Name | Number of Items | Cronbach's Alpha |
|---|---|---|
| Deficient Self-Regulation | 4 | .91 |
| Mood Regulation | 2 | .92 |
| Preference for Online Social Interaction | 4 | .70 |
| Academic Procrastination | 4 | .92 |
| Self-Regulation | 4 | .94 |
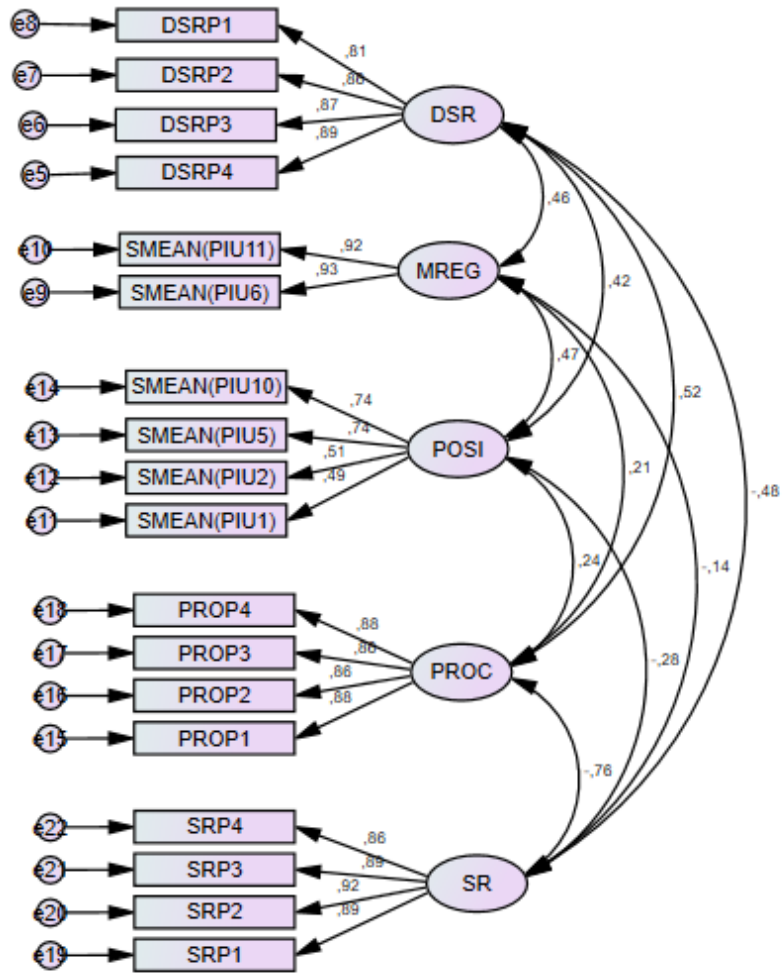
$(X^2/df = 2.74$, TLI $= .96$, CFI $= .96$, RMSEA $= .062$, SRM$R = .046$.)

Figure 4.1 Measurement Model with Standardized Estimates and Correlations.

Correlations among latent variables were estimated in the measurement model and ranged between .14 to .76. Table 4.23 shows these correlations.

Table 4.23 Correlations among Latent Variables

| Variables | Deficient Self-Regulation | Mood Regulation | Preference for Online Social Interaction | Academic Procrastination | Self-Regulation |
|---|---|---|---|---|---|
| Deficient Self-Regulation | - | | | | |
| Mood Regulation | .46 | - | | | |
| Preference for Online Social Interaction | .42 | .47 | - | | |
| Academic Procrastination | .52 | .21 | .24 | - | |
| Self-Regulation | -.48 | -.14 | -.28 | -.76 | - |

## 4.1.3.4 Structural Model

This study aimed to model the relationship among self-regulation, academic procrastination, academic performance, and problematic Internet use constructs, namely, preference for online social interaction (POSI), Internet use for mood regulation (MREG) and deficient self-regulation of Internet use (DSR). As the multivariate normality assumption was not satisfied, the structural model was tested by utilizing 2000 bootstrapped samples at 95% confidence interval. The hypothesized model and the SEM results were presented in Figure 4.3. Results of the SEM showed acceptable fit for the hypothesized model with $X^2/df$= 2.56, $p$= .00, TLI = .96, CFI = .96, RMSEA = .058, and SRM$R$= .044. Table 4.24 represents the indicator loadings.

Table 4.24 Standardized Regression Weights of the Structural Model

| Item Name — Factor Name | *Estimate* | *p* |
|---|---|---|
| DSRP-1 — Deficient Self-Regulation | .81 | .00 |
| DSRP-2 — Deficient Self-Regulation | .86 | .00 |
| DSRP-3 — Deficient Self-Regulation | .87 | .00 |
| DSRP-4 — Deficient Self-Regulation | .89 | .00 |
| MREG-1 — Mood Regulation | .93 | .00 |
| MREG-2 — Mood Regulation | .92 | .00 |
| POSI-1 — Preference for Online Social Interaction | .49 | .00 |
| POSI-2 — Preference for Online Social Interaction | .51 | .00 |
| POSI-3 — Preference for Online Social Interaction | .74 | .00 |
| POSI-4 — Preference for Online Social Interaction | .74 | .00 |
| PROP-1 — Academic Procrastination | .88 | .00 |
| PROP-2 — Academic Procrastination | .86 | .00 |
| PROP-3 — Academic Procrastination | .86 | .00 |
| PROP-4 — Academic Procrastination | .88 | .00 |
| SRP-1 — Self-Regulation | .89 | .00 |
| SRP-2 — Self-Regulation | .92 | .00 |
| SRP-3 — Self-Regulation | .89 | .00 |
| SRP-4 — Self-Regulation | .86 | .00 |

According to findings, self-regulation had a significant negative direct effect on academic procrastination ($\gamma$= -.77, p < .001) and positive direct effect on academic performance ($\gamma$= .19, p < .001). The direct effect of self-regulation on problematic use constructs were; for preference for online social interaction, it had a significant negative direct effect ($\gamma$= -.22, p < .05), for Internet use for mood regulation, it had a significant positive direct effect ($\gamma$= .16, p < .05) and for deficient self-regulation of Internet use, it had a significant negative direct effect ($\gamma$= -.19, p < .01). Based on the hypothesized model, the indirect effect of self-regulation on problematic Internet use constructs was mediated through academic-procrastination.

Findings revealed that self-regulation had a negative indirect effect on deficient self-regulation of Internet use ($\gamma = -.54$, p < .01) and Internet use for mood regulation ($\gamma = -.50$, p < .05) via academic procrastination. However, the indirect effect of self-regulation via academic procrastination on preference for online social interaction ($\gamma = -.12$, $p = .344$) was not significant.

Academic procrastination had a significant positive direct effect on deficient self-regulation of Internet use ($\beta = .27$, p < .01) and Internet use for mood regulation ($\beta = .21$, p < .01). However, it had no significant effect on preference for online social interaction ($\beta = .08$, $p = .370$). With regard to indirect effects, academic procrastination had significant positive indirect effect on deficient self-regulation of Internet use ($\beta = .11$, p < .01) via Internet use for mood regulation.

Direct effect of academic performance on problematic use constructs were not significant, namely, preference for online social interaction ($\beta = .05$, $p = .321$), Internet use for mood regulation ($\beta = -.06$, $p = .160$) and deficient self-regulation of Internet use ($\beta = .01$, $p = .893$).

Among problematic Internet use constructs, preference for online social interaction had a significant positive direct effect on Internet use for mood regulation ($\beta = .46$, p < .001) and on deficient self-regulation of Internet use ($\beta = .16$, p < .01). Internet use for mood regulation had a significant positive direct effect on deficient self-regulation of Internet use ($\beta = .30$, p < .001). As theorized before, the positive indirect effect of preference for online social interaction on deficient self-regulation of Internet use was mediated by Internet use for mood regulation ($\beta = .20$, p < .005). Table 4.25 shows the standardized direct, indirect, and total effects of the constructs.

Significant direct paths were displayed in the Figure 4.2 with significant explained variances.
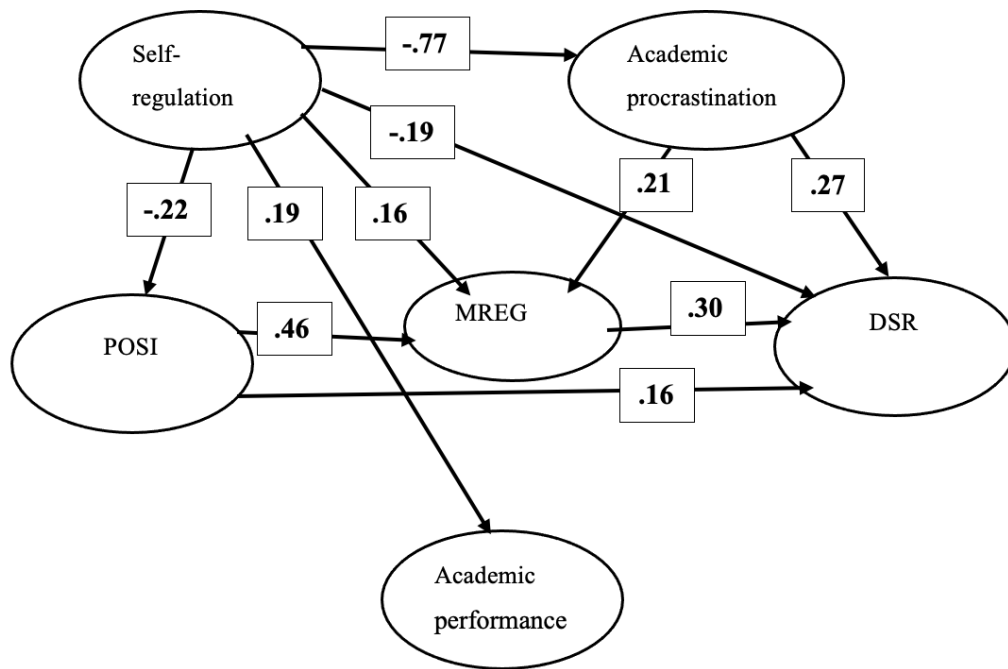
Figure 4.2 Significant Direct Paths with Significant Explained Variances.

Note: The explained variances of the direct effects are given in the number boxes above the respective arrows.

Table 4.25 Standardized Direct, Indirect, and Total Effects of The Constructs in Hypothesized Model

| Predictor | Criterion | Direct effect | Indirect effect | Total Effect |
|---|---|---|---|---|
| Self-regulation | Academic procrastination | -.77*** | - | -.77*** |
| | Academic performance | .19*** | - | .19*** |
| | Preference for online social interaction | -.22* | -.05 | -.28*** |
| | Internet use for mood regulation | .16* | -.30** | -.14** |
| | Deficient self-regulation of Internet use | -.19** | -.29** | -.49*** |
| Academic procrastination | Internet use for mood regulation | .21* | .04 | .25** |
| | Deficient self-regulation of Internet use | .27** | .09** | .36** |
| Preference for online social interaction | Internet use for mood regulation | .46*** | - | .46** |
| | Deficient self-regulation of Internet use | .16** | .14*** | .30*** |
| Internet use for mood regulation | Deficient self-regulation of Internet use | .30*** | - | .30*** |

*$p < .05$; ** $p < .01$; *** $p < .001$
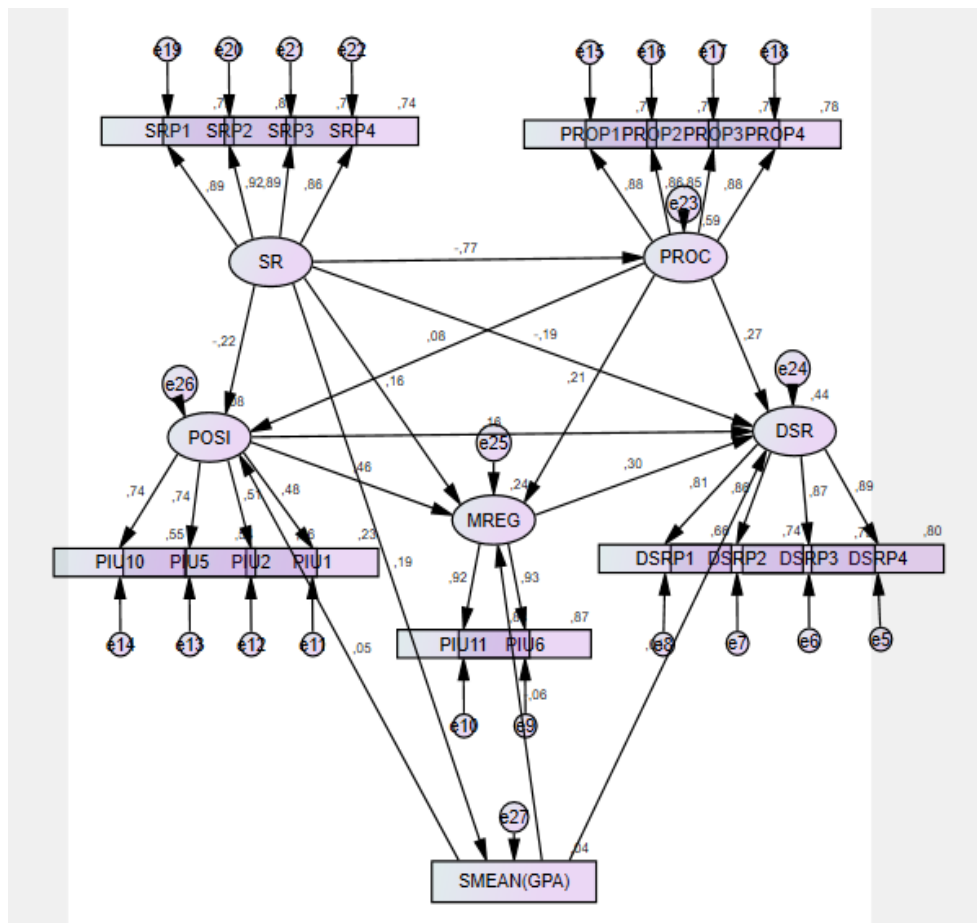
Figure 4.3 Structural Model with Standardized Estimates

The squared multiple correlations revealed that %59 of variance on academic procrastination, 44% of variance on deficient self-regulation of Internet use, 24% of variance on Internet use for mood regulation 8% of variance on preference of social interaction were explained by the model (See Table 4.26).

Table 4.26 Squared Multiple Correlations for the Hypothesized Structural Model

|  | Academic procrastination | Deficient self-regulation of Internet use | Internet use for mood regulation | Preference of social interaction |
|---|---|---|---|---|
| $R^2$ | .59 | .44 | .24 | .8 |

## 4.1.3.5    Summary of the Results

In this first stage of the study, Internet usage patterns with academic, social and recreational sub-dimensions and problematic Internet usage behaviors of undergraduate students were examined and described. Moreover, the effects of self-regulation, academic procrastination and academic performance, on problematic Internet use behaviors were examined. First of all, the Internet usage behaviors of the participants were described according to the demographic variables of gender, age, grade level, and faculty. The age when they first started using the Internet, how many minutes they use the Internet daily, the devices and places they prefer for Internet use and their attitudes about their use behaviors have been identified. Secondly, Internet usage patterns were examined in three sub-dimensions: academic, social and recreational. Findings regarding the daily time allocated for each sub-use and Internet use purpose frequencies for each sub-usage they prefer were presented. In addition, the relationship between Internet use patterns and problematic Internet use were revealed through Internet use durations and Internet use purpose frequencies. Finally, the relationship between problematic Internet use, self-regulation, academic procrastination, and academic performance was examined with Structural Equation Modeling. The results revealed acceptable-good fit between the hypothesized model and the data. Self-regulation was a significant direct predictor of academic procrastination, academic performance, preference of social interaction, Internet use for mood regulation, and deficient self-regulation of Internet use. Besides, self-regulation was a significant indirect predictor for Internet use for mood regulation, and deficient self-regulation of Internet use. Academic procrastination was a direct predictor of Internet use for mood regulation, and direct and indirect predictor of deficient self-regulation of Internet use. Direct effect of academic performance was not significant on problematic Internet se constructs. Moreover, the direct and indirect effects of problematic Internet use constructs were significant.

Preference of social interaction was a significant direct predictor of Internet use for mood regulation, and direct and indirect predictor of deficient self-regulation of Internet use. Internet use for mood regulation, was a significant direct predictor of deficient self-regulation of Internet use. 59 percent of variance on academic procrastination, 44 percent of variance on deficient self-regulation of Internet use, 24 percent of variance on Internet use for mood regulation 8 percent of variance on preference of social interaction were explained by the model.

## 4.2    STAGE 2

In this stage, user experiences on the intervention application hEp, -which aims to reduce the problematic Internet usage behavior and increase academic performance- were analyzed in terms of both usability features and experiences. In addition to these, the Internet usage behaviors of the participants of this stage were analyzed in-depth with qualitative data. Stage 2 research questions were examined in the order of Internet use behaviors and their effects, usability of hEp, experiences on hEp, and design principles of hEp. In Stage 2, the expressions C1 to C4 were used to describe each cycle while coding participants. C1 represents the first cycle of the study and C4 represents the fourth (final) cycle of the study. Also, if necessary, the findings are given in an order starting from cycle 1 to cycle 4. Participants in each cycle were also coded by merging the cycle number and participant number. For example: C1P1, C2P3, C3P5, C4P2, etc.

### 4.2.1    Participants' Internet use behaviors (R.Q.1)

The current study focused on the Internet usage behavior of university students. For this reason, in the 1st stage, quantitative information about the Internet usage behaviors was obtained through a questionnaire. However, in order to get more detailed information about this behavior, the participants in the 2nd stage were interviewed and deeper information was obtained. This information includes the participant descriptions on their Internet usage patterns, self-perceptions and awareness on this behavior, and academic, psychological, and physical effects of the behavior. Two categories were emerged regarding Internet use as *Internet use behaviors* and *effects of Internet use* (See Figure 4.4).

138

Internet Use Behaviors

Effects of Internet Use
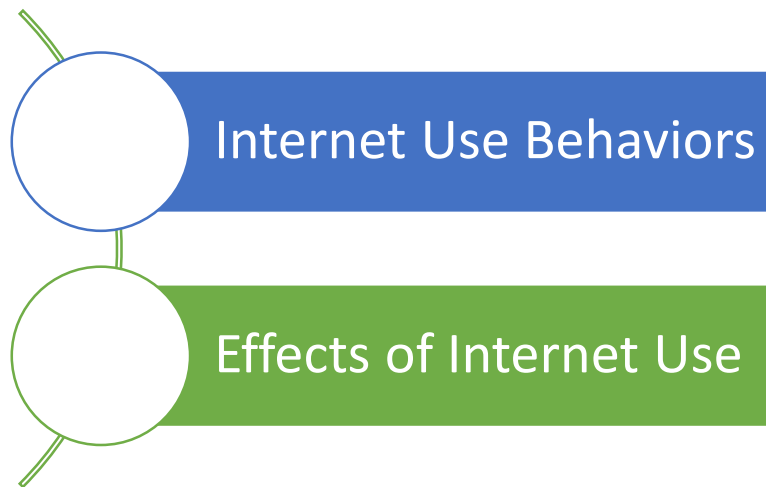
Figure 4.4 Categories regarding the Internet Use Behaviors

Table 4.27 represent the categories, themes and sub-themes with regard to Internet use behavior.

Table 4.27 Categories, Themes, and Sub-Themes Related with Internet Use Behavior.

| Themes & Sub-themes | Number of participants | Frequency of being uttered |
|---|---|---|
| *Internet Use Behaviors* | 15 | 118 |
| *Internet use purposes* | 13 | 41 |
| Non-Academic | 13 | 31 |
| *Social* | 4 | 13 |
| *Recreational* | 7 | 8 |
| Academic | 7 | 10 |
| *Time-spent online* | 15 | 41 |
| Change of behavior in use duration | 11 | 19 |
| *Covid-19 related* | 12 | 14 |
| *Expectations for the near future* | 2 | 3 |
| *Personal reasons* | 2 | 2 |
| Self-evaluation of time-spent online | 11 | 14 |

Table 4.27 (continued)

| | | |
|---|---|---|
| Daily time-spent online | 4 | 8 |
| *Metacognitive aspects of the use behavior* | 13 | 36 |
| Self-control / regulation of Internet use | 13 | 22 |
| *High self-control / regulation* | 3 | 8 |
| *Lack of self-control / regulation* | 6 | 7 |
| *Relative self-control / regulation* | 5 | 7 |
| Awareness on use behavior | 6 | 14 |
| **Effects of Internet Use** | 15 | 106 |
| *Psychological* | 14 | 54 |
| Negative | 11 | 42 |
| *Procrastination* | 9 | 15 |
| *Interpersonal relationships* | 8 | 12 |
| *Dependency* | 6 | 8 |
| *Feeling negative emotions* | 6 | 7 |
| Neutral | 6 | 6 |
| *Interpersonal relationships* | 3 | 3 |
| Positive | 5 | 6 |
| *Mood regulation* | 3 | 4 |
| *Academic* | 14 | 49 |
| Negative | 14 | 42 |
| *Studying inefficiently* | 2 | 3 |
| *Taking too much time* | 9 | 14 |
| *Academic procrastination* | 9 | 14 |
| *Task switching / divide attention* | 5 | 8 |
| *Cognitive preoccupation* | 3 | 3 |
| Positive | 3 | 5 |
| Neutral | 1 | 2 |
| *Physical* | 3 | 3 |

### 4.2.1.1    Category 1: Internet Use Behaviors

This category includes participants' opinions on their academic and non-academic Internet use, time-spent online, and their interpretations on metacognitive aspect of their use behavior. Internet use behaviors ($n_P$=15, $f$=118) are emerged in three themes as: ***Internet use purposes***, ***time-spent online***, and ***metacognitive aspect of use behavior*** (See Figure 4.5).
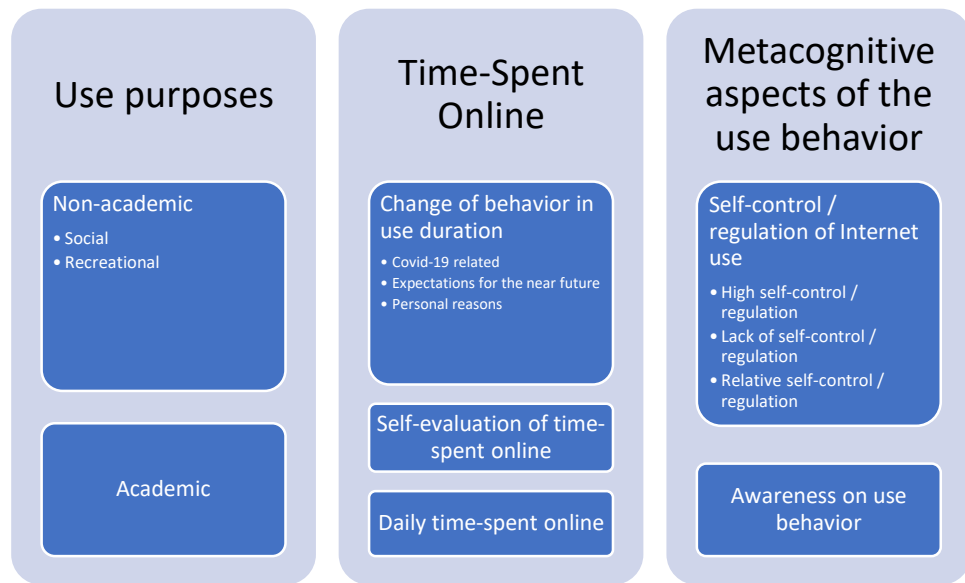


Figure 4.5 Themes and Sub-Themes regarding Internet Use Behaviors

***Internet use purposes*** ($n_P$=13, $f$=41), the first theme of Internet use behaviors, is consist of two sub-themes which are *non-academic purposes* and *academic purposes*.

*Non-academic purposes* ($n_P$=13, $f$=31) as the first sub-theme of Internet use purposes includes social and recreational uses. In Cycle 1, participants stated that they generally use the Internet to be up to date. Moreover, they also stated non-academic uses on digital platforms such as WhatsApp, Twitter, and YouTube for socializing, watching videos, and spending time. C1P4 stated that she uses YouTube, WhatsApp and Twitter too much and emphasized that she was obsessed with watching movies:

*"YouTube Twitter, WhatsApp that I use a lot, I don't use any other applications such as Instagram, Facebook or etc., moreover, I am very obsessed with movies and things like that."*

*"YouTube Twitter, fazla kullandığım, WhatsApp, başka Instagram Facebook falan kullanmıyorum zaten, işte film ve o tür şeylere çok takıntılıyım."*

Participants in Cycle 2 stated that they use the Internet for socializing and recreational purposes, while they mostly use WhatsApp and Instagram for socializing, they watch videos for recreational purposes mostly preferring Netflix. In Cycle 3, participants stated that they use the Internet to make video / audio calls with people, to spend time on social media applications such as Instagram, WhatsApp, Twitter, or to watch TV series or movies on online platforms such as Netflix. In Cycle 4, one new participant stated she uses the Internet for non-academic purposes such as watching videos and reading something. It was observed that the non-academic use of the participants was mostly in the direction of social media and video streaming platforms.

*Academic purposes* ($n_P=7, f=10$) emerged as the second sub-theme of Internet use purposes. In all cycles except the 4th cycle, participants gave various information on their academic Internet use. C1P1 stated that she uses social media for academic purposes:

*"I generally use Instagram to learn about the information in my field and to be aware of the agenda."*

*"Ben İnstagram'ı genellikle kendi alanımdaki bilgileri öğrenmek takip edebilmek ve gündemden haberdar olmak için kullanıyorum."*

Although Cycle 2 participants did not report specific academic use, they emphasized that their use of the Internet also includes academic purposes. Cycle 3 users stated that they have academic uses such as researching, doing homework, watching videos and listening to academic audio recordings. C3P3 used following utterance:

*"In general, I do researches and listen to videos to improve myself."*

> *"Genel olarak araştırmalar yapıyorum ve videolar dinliyorum kendimi geliştirme anlamında."*

However, 4th cycle participants who were not involved in previous cycles did not provide any information on their academic Internet use. Based on the statements, it was observed that seven of the participants used the Internet for academic purposes.

***Time spent online*** ($n_P$=15, $f$=41) consists of three sub-themes as daily time spent online, self-evaluation of time-spent online, and change of behavior in use duration.

*Change of behavior in use duration* ($n_P$=11, $f$=19) is the first sub-theme under which participants expressed the change or expected change of their usage duration or behavior for personal or Covid-19 pandemic related reasons (2nd, 3rd and 4th cycles of the study coincided with the Covid-19 pandemic). As personal reasons, while C1P3 stated that she has decreased the Internet usage duration as she started to study intensively, C2P2 stated that she started to spend more time on the Internet due to the smartphone she recently bought. As Covid-19 related reasons, ($n_P$=12, $f$=14) most of the participants emphasized that their social or recreational Internet usage changed in a negative way by spending more hours with these use types. C4P6's utterance is as follows:

> *"Before this pandemic, I did not have a problem with using the Internet a lot, but after the pandemic, 3 out of 4 of my day is on the Internet."*

> *"Bu salgından öncesinde, İnterneti çok kullanmakla ilgili bir sorun yaşamıyordum, fakat salgın sonrasında günümün 4'te 3 İnternette geçiyor."*

In cycle 1, two participants predicted possible changes in their Internet usage behavior in the near future. While C1P2 attributed this possible behavior change to the intense study conditions, C1P3 just stated her believe regarding terminating her negative Internet use behavior. C1P2 stated:

> *"... I think it will decrease because I am in a busy period… Currently, I am thinking of quitting more for PFCP and PPSE exams."*

> *"... azalacağını düşünüyorum çünkü hani yoğun bir dönemdeyim... Şu anda da pedagojik formasyon için, KPSS için daha çok bırakmayı düşünüyorum."*

Self-evaluation of time spent online ($n_P=11$, $f=14$) has emerged as the second sub-theme. In this sub-theme, it was revealed how the participants evaluated their Internet usage durations. Three of the four participants in the first cycle emphasized that their Internet use is excessive. When the PIU scores of the participants were examined, it was seen that the scores were consistent with participants' statements. C1P4 has the highest PIU score, and several times in the interview she highlighted that she used the Internet too much:

> *"I am actually someone who has a lot of interest in phone. I do not drop it, I take it even if I do nothing, it is like a habit."*

> *"Ya aslında çok fazla telefona ilgisi olan biriyim. Elimden düşürmüyorum, hiçbir şey yapmasam bile elime alıyorum, böyle alışkanlık gibi olmuş."*

C1P4 added that her mobile Internet use as a waste of time.

> *"But I do not use the Internet on the phone to do research or study, I study on the computer, but this is a waste of time, on the phone."*

> *"Ama araştırma yapmak için, ders çalışma amaçlı İnternet'i telefonda kullanmıyorum, bilgisayarda işimi hallediyorum hemen ama telefonda böyle vakit kaybı aslında."*

C1P3 stated that she had wasted too much time watching videos on YouTube. However, she emphasized that this usage has decreased since she has to study in these days:

> *"Now I have reduced Internet usage, especially because of the intensity of the lessons, but 2 weeks ago I had more Internet usage... Because I am a person who likes to watch a lot of videos on YouTube. That's why I was wasting too much time. "*

> *"Şu anda İnternet kullanımını azalttım özellikle ders yoğunluğu başladığı için, ama 2 hafta öncesinde daha fazla bir İnternet kullanımım vardı... Çünkü ben YouTube'da çok fazla video izlemeyi seven bir insanım. O yüzden çok fazla zamanım gidiyordu."*

C1P2, the participant with the third highest PIU score, stated that she doesn't have a desire to be online all the time, but she still cannot help herself from

connecting to the Internet in all environments with WI-FI, and she perceives her use of Internet as too much for a student.  C1P1, with the lowest PIU score, on the other hand, stated that she perceives her time spent online to be very low because of using the Internet intermittently during the day. Moreover, she added that from time to time, her will to use the Internet increases while studying.

> *"Hani gün içerisinde aralıklarla olduğu için bana çok azmış gibi geliyor. Ama işte bazen de bu ders çalışırken çok fazla olabiliyor."*

All participants in cycle 2 found their Internet usage durations as high due to various reasons. The reasons related with context are stated under change of use behavior in time theme. Regarding the self-evaluation of time spent online, C2P3 stated that she does not spend much time on the Internet, but this duration is not too short yet. C2P4 said that she actually uses the Internet too much. In cycle 3, C3P3 and C3P4, in Cycle 4, C4P6 stated that they spend a lot of time on the Internet. That is, considering all cycles, most of the participants evaluated their Internet usage as high or very high.

*Daily time spent online* ($n_P=4, f=8$) has emerged as the last sub-theme of time-spent online, in which participants expressed their perceived daily Internet usage duration in hours and minutes. In the first cycle, C1P1 stated that her daily Internet usage is about 4 hours in total and she did not have the opportunity to spend hours on the Internet, and that she used it for 10-15 minutes for each use. In the second cycle, C2P1 said her daily Internet use duration as 4-5 hours and C2P2 said this time as 3.5-4 hours. Moreover, C3P3 emphasized that 3-4 hours duration changed due to Covid-19, and she spent about twice as much time on the Internet:

> *"I use the Internet a lot, the time passes 7-8 hours a day ... So, I was surfing in the Internet for 3 or 4 hours like that, but after the Covid-19 pandemic, I spend all day on the Internet."*

> *"İnternet kullanımım çok fazla, günde 7-8 saati geçiyor... Yani o şekilde 3 saat 4 saat geziyordum ama Covid'den sonra bütün günüm İnternet'te geçiyor."*

It was stated that the participants used the Internet for an average of 4 hours a day under normal conditions, but it was emphasized that this duration increased due to the Covid-19 pandemic.

***Metacognitive Aspect of Internet Use*** ($n_P$=13, $f$=36) is the sub-theme under which the participants explained their awareness on their Internet usage behaviors and their ability to control / regulate this behavior.

*Self-Control and Regulation of Internet Use* ($n_P$=13, $f$=22) It is the sub-theme in which participants express whether they can control or regulate their Internet usage behavior. Although three participants stated that they could show high self-control / regulation towards negative behavior, two of them also stated that they had difficulty in providing this in some specific conditions. For example, C1P2 stated:

> *"I was studying my midterm and final exams. I was using the Internet less during that period... I reduce it even more, you know, as much as I can of course, it is not easy, sometimes we can use much."*

> *"Vize ve final çalışmalarım oluyordu. O süreçte daha az kullanıyordum İnternet'i… daha da azaltıyorum, hani elimden geldiği kadar tabii ki, kolay olmuyor, çok bağlanabiliyoruz bazen."*

Five participants from all cycles stated that controlling / regulating negative Internet use is context-related, therefore, sometimes they could succeed and sometimes they could fail. C2P3 said that when she motivated to the lesson, she can control her Internet usage. Apart from that, she stated that she could not provide this control for some situations:

> *"So, for example, although I may postpone some other things, when I receive a notification on my phone, when a friend writes or sends something on WhatsApp, I want to look at it. Upon looking it, I want to surf the Internet. After a while, I can't get out of it."*

> *"Yani mesela telefonuma bir bildirim geldiği zaman, bazı şeyleri erteleyebilsem de, bir arkadaşım WhatsApp'tan bir şey yazdığı zaman ya da bir şey gönderdiği zaman ona bakmak istiyorum. ona bakınca da İnternette gezmek istiyorum. Bayağı da sonra işin içinden çıkamıyorum."*

A total of 4 participants from all cycles stated that they were not successful in controlling / regulating Internet usage behavior.

Participants in different cycles stated their *awareness on use behavior* ($n_P$=6, $f$=14). Three participants in Cycle 1 shared their awareness on their Internet use behavior. C1P1 stated that she was aware of a possible negative usage behavior, therefore she has not created accounts on several social media. C1P2 has expressed her awareness that she cannot prevent her desire to be online in environments with free Internet access. C1P4 on the other hand, emphasized that she is aware that she is not using the Internet for useful tasks and using the Internet in this way is a waste of time:

> *"Yes, so I know I'm wasting time, I'm not doing anything useful anyway."*

> *"Evet, yani boşa zaman kaybettiğimi biliyorum, faydalı çok bir şey yapmıyorum zaten."*

In Cycle 2, C2P2 said that she is aware that the Internet could distract her while studying, so she muted the phone and left it in a remote location. C3P2 in Cycle 3, emphasized that she spends a lot of time on the smartphone and this is the obstacle to her academic studies and she must overcome it. C4P2, on the other hand, stated that she felt like an addict, she forgot other things that she needed to do but could not prevent herself.

Based on participants statements, four participants stated that although they were aware of their negative Internet usage behaviors, they could not help themselves to behave in this way. However, two participants stated that they were aware of possible negativities and took measures beforehand against them.

### 4.2.1.2    Category 2: Effects of Internet Use Behavior

Effects of Internet Use Behavior category ($n_P$=15, $f$=106) emerged in three themes as: ***psychological effects***, ***academic effects***, and ***physical effects.*** Figure 4.6 represents the categories regarding the effects of Internet use behavior.
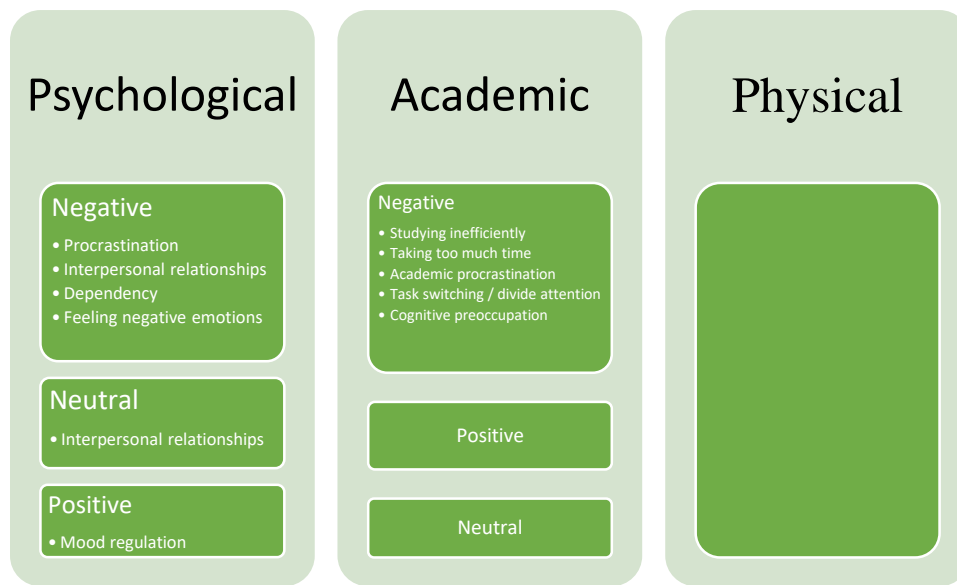
Figure 4.6 Themes and Sub-Themes regarding Effects of Internet Use Behaviors

***Psychological effects of the Internet use behavior*** ($n_P$=14, $f$=54) theme included sub-themes, named *negative, positive, and neutral & relative effects of the Internet use behavior.* Under this theme, the participants expressed how their Internet usage behaviors are reflected in their mood, emotions, interpersonal relationships, and general life situations.

The most frequently expressed effects of the Internet use were negative ones and these expressions gathered under *negative effects of the Internet use behavior* ($n_P$=11, $f$=42). Three of the participants who used neutral or relative expressions about the effects of Internet usage behavior on their psychology also used negative expressions for some specific aspects. C1P2, for example, although she stated that her Internet usage behavior had no effect on her psychology, she also emphasized that her relationship with her friends was one step behind the Internet.

Two participants emphasized that they postponed their non-academic tasks due to the use behavior. Therefore, by including academic procrastination under *procrastination* ($n_P$=9, $f$=15) sub-theme, nine of the participants stated that they experienced procrastination effect due to their Internet usage behavior.

Including C1P2, a total of eight participants stated that their *interpersonal relationships* ($n_P$=8, *f*=12) were negatively affected by their Internet use.

Some of the participants described their Internet use behavior as addiction. Moreover, the expressions used by some others were thought to be indicators of addiction. These expressions are examined in the sub-theme of *dependency* ($n_P$=6, *f*=8). C3P4's excerpt is as follows:

> *"For example, right now, my first job is to look at Instagram on the phone, before I wake up. I mean, I open my TV series right away without getting up in bed. I'm starting to watch them. I mean, I always listen to music, watch movies or go to Instagram during the day. Apart from meal breaks, sometimes even at meals."*

> *"Mesela şu an, hani ilk işim telefona Instagram'a bakmak oluyor, daha uyanmadan. Yani yatakta kalkmadan hemen dizi açıyorum, İnternet'te dizilerim var. Onları izlemeye başlıyorum. Yani gün içinde zaten devamlı ya müzik dinliyorum ya film izliyorum ya da Instagram'a giriyorum. Yemek araları dışında, bazen yemeklerde bile devam ediyor."*

Six participants stated that they experienced *feeling negative emotions* ($n_P$=6, *f*=7) such as anger, uneasiness, sadness, and regret as a result of their Internet usage behavior. C2P3's excerpt was as follows:

> *"I think I can say annoyance, because I feel a little annoyed and delayed for not doing what I have to do, my homework, or my social activities, since I have spent hours viewing things that are not very important. As such, I feel both a little uneasy and uncomfortable, like that."*

> *"Sanırım huzursuzluk diyebilirim, çünkü çok önemli olmayan bir şeyleri saatlerce incelediğim için, yapmam gereken işlerimi, ödevlerimi ya da sosyal aktivitelerimi yapmamaktan kendimi biraz huzursuz, ertelemiş hissediyorum. Öyle olunca böyle hem biraz huzursuz hem de rahatsız hissediyorum."*

While talking about the effects of Internet use behavior on their psychology, the participants mostly talked about the negative effects. A small number of participants mentioned the positive effects, and some of them emphasized that these positive effects are short-term and show themselves as unhappiness and regret in the

long term. In cycle 1, only C1P1 stated a positive psychological effect that she uses the Internet deliberately for mood regulation:

> "Sometimes I consciously motivate myself to just hang out (on the Internet) and relax."

> "Bazen bilinçli bir şekilde kendimi ya işte bak biraz rahatla diye kendimi motive ediyorum."

Moreover, two participants stated that they felt happy while they were online, even though the long-term results were negative. C2P1 stated that although during her use of the Internet she perceives this use positively, if she does not use the Internet for something meaningful, this situation turns to a regret:

> "That way, during the time period I use it, it feels it is a positive thing, but then if I didn't use it as something that will contribute to me, then it turns back as a regret. I wish I could make use of this time differently, so it happens like this. "

> "Bu şekilde, yani kullandığım vakit süresince böyle olumluymuş gibi geliyor ve geçiyor ama sonrasında eğer artı bir şey katacak bir şey olarak kullanmadıysam eğer, sonrasında bir pişmanlık olarak dönüyor. Hani keşke farklı değerlendirseyim, falan diye bu şekilde oluyor yani."

Apart from that, two participants stated that they use the Internet in order to have fun and get rid of boredom without mentioning any long-term results.

A few participants used neutral & relative statements regarding the psychological effects of the Internet use. Three of them said that their Internet use behaviors do not have negative psychological effects. Moreover, while two participants stated that their Internet usage behaviors did not affect their interpersonal relationships negatively, C4P2 stated that this situation was present in the past and she reduced it in the current situation:

> "I'm trying to balance it a little bit in my social life. In the past, it was like this, I was picking up (phone) when I was with my friends, I was engaging in the phone. Now I'm trying not to do."

> "Sosyal hayatımda birazcık dengelemeye çalışıyorum. Eskiden daha hani böyle şeydi, arkadaş ortamlarında arada elime alıyordum (telefonu), uğraşıyordum. Şimdi hiç almamaya çalışıyorum."

***Academic effects of the Internet use behavior*** ($n_P$=14, $f$=49) theme includes *negative, positive*, and *neutral* statements of participants' regarding the academic effects of their Internet use. All students, including those who stated that Internet use has positive academic effects, also mentioned *negative effects* ($n_P$=14, $f$=42). The most prominent of the negative effects were: academic procrastination, taking too much time, and causing divide attention due to task switching. Apart from these, several participants stated that they could not focus on the lessons adequately, they strung out their studies, and their minds were preoccupied with the thought of going online while studying.

C1P4 emphasized that due to her Internet usage behavior, she was procrastinating her academic tasks. She expressed the effect of Internet use behavior on her academic life with the following sentences:

> *"I think I postponed my success, my school life. It is my last year already, I applied for exams... Although I have a lot of work, I am still procrastinating. "*

> *"Ben başarımı, okul hayatımı ertelediğimi düşünüyorum. Son yılım zaten, formasyona başvurdum zaten, KPSS... Çok işim olmasına rağmen ben hala erteliyorum."*

Similarly, C2P3 stated that she spent a lot of time on the Internet. She used following utterance:

> *"But it has a bigger impact, a negative effect, academically. Because it is something that takes a lot of time, that is, it takes my time too much."*

> *"Ama akademik anlamda daha büyük bir etkisi negatif bir etkisi var. Çünkü zamanını insanın çok fazla alan bir şey olduğu için yani benim zamanımı çok fazla çalan bir şey."*

C4P6 stated that her attention fluctuated between studying and the Internet because of the pressure she felt when the submission of assignment was approaching:

> *"If the delivery of the assignment was very close, there was pressure on me. I was skipping here (studying) and there (the Internet)."*

> *"Ödev teslimi çok yaklaştıysa orada bana bir baskı oluşuyordu. Bir oraya bir oraya yapıyordum."*

Under *positive effects* ($n_P$=3, $f$=5), three participants stated that their Internet use supports them academically. One of them also stated that when she was bored and wanted to relax, she spends time on the Internet and this situation was good for her. In Cycle 2, C2P2, stated that Internet use had no positive or negative effect on her academic life as a *neutral effect* ($n_P$=1, $f$=2). However, she stated that she started to read less books than before due to the use of the Internet.

***Physical effects of the Internet use behavior*** ($n_P$=3, $f$=3) is the theme that includes the physical effects of the participants' Internet usage behavior. Three participants mentioned these effects, two of them stated that they experience computer eye fatigue, the other one said she experience physical fatigue.

### 4.2.2    Usability features of the *hEp* (R.Q.2)

It was aimed to understand how participants find the usability features of the hEp with the second research question of stage 2. In this section, participants' development suggestions regarding the hEp, and the design principles emerged in line with these suggestions were presented. For these reasons, when required, explanations regarding the themes and sub-themes were presented in the chronological order of the cycles. The design principles were also given under the title of the relevant theme / sub-theme.

While creating the categories and themes, the researcher was guided by three different sources (Erdinç & Lewis, 2013; Komninos, 2020; Nielsen, 2005) regarding usability. Five main categories have emerged to clarify usability features of hEp. These are: *Information quality, interface system usefulness, user satisfaction,* and *personalization.* Figure 4.7 represent the categories regarding usability features of hEp.
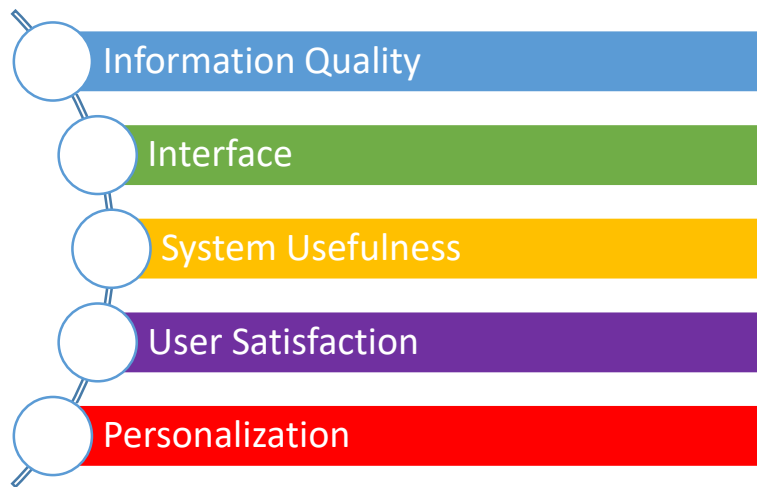
Figure 4.7 Categories regarding the Usability Features of hEp

Table 4.28 represents categories, themes and sub-themes related with usability features of hEp.

Table 4.28 Categories, Themes and Sub-Themes about Usability Features of hEp with Frequencies.

| Themes & Sub-themes | Number of participants | Frequency of being uttered |
|---|---|---|
| *Information Quality* | 19 | 239 |
| *Content* | 18 | 99 |
| Time | 8 | 22 |
| *Time screen* | 5 | 12 |
| *Imagine things fully screen* | 3 | 4 |
| *Main goal – sub-goals* | 1 | 3 |
| *Finishing time of ongoing hEp* | 2 | 2 |
| *Remaining time display* | 1 | 1 |
| Ongoing hEps | 12 | 18 |
| *Ongoing hEps detail screen* | 8 | 13 |
| *Ongoing hEps main screen* | 5 | 5 |
| Confetti rain animation | 6 | 10 |

Table 4.28 (continued)

| | | |
|---|---|---|
| Emotion | 4 | 9 |
| Save draft hEp | 3 | 9 |
| Completion delay field | 4 | 8 |
| Awareness screen | 4 | 6 |
| Main texts | 4 | 5 |
| Complete hEp | 2 | 4 |
| Obstacle-plan screens | 2 | 4 |
| Outcome screen | 1 | 4 |
| *Guidance* | 14 | 59 |
| hEp guide | 12 | 18 |
| hEp samples | 10 | 18 |
| Introduction screens | 11 | 13 |
| Sequencing screens | 4 | 4 |
| hEp video | 3 | 3 |
| Face to face training | 2 | 2 |
| *Notifications* | 14 | 47 |
| Time is running out notification | 9 | 17 |
| *Technical errors* | 1 | 1 |
| Start a new hEp notification | 7 | 11 |
| *Technical errors* | 2 | 5 |
| Complete the hEp notification | 7 | 10 |
| Motivational notifications & messages | 4 | 7 |
| *Preventing errorneous use* | 15 | 32 |
| Time criterion | 15 | 28 |
| Character criterion | 4 | 4 |
| **System Usefulness** | 15 | 90 |
| *Ease of learning & use* | 10 | 54 |
| Installation | 10 | 13 |
| Sign up / in | 9 | 11 |

Table 4.28 (continued)

| | | |
|---|---|---|
| Start-pause-continue feature | 4 | 10 |
| *Error experience* | 13 | 36 |
| Experienced | 7 | 20 |
| Not or just once experienced | 13 | 16 |
| ***Interface*** | 15 | 80 |
| *Buttons* | 13 | 31 |
| Plus buttons | 6 | 6 |
| Menu button | 3 | 6 |
| Complete hEp button | 1 | 2 |
| Delete button | 1 | 1 |
| *General visual features* | 13 | 20 |
| Screen design | 1 | 2 |
| *Fonts* | 9 | 11 |
| Warning messages | 7 | 7 |
| Cases of texts | 1 | 1 |
| Main texts | 1 | 1 |
| *Colors* | 6 | 10 |
| *Logo* | 3 | 4 |
| hEp logo | 2 | 3 |
| Goal screen logo | 1 | 1 |
| *Filing* | 1 | 4 |
| Menu-sub menu use | 1 | 3 |
| ***User satisfaction*** | 14 | 18 |
| ***Personalization*** | 2 | 4 |

### 4.2.2.1    Category 1: Information Quality

The quality of contents included in the hEp and the content that the participants expect or request to be included in the hEp were considered under *information quality* ($n_P$=19, $f$=239) category. In all cycles, participants evaluated existing content in hEp. They evaluated the existence of some of the contents clear and coherent, however, described some other as insufficient / confusing. They also stated that some content that does not exist in the current form of hEp can / should be added. 4 main themes emerged in the information quality category. These are: *Content, guidance, notifications*, and *preventing erroneous use* (See Figure 4.8).
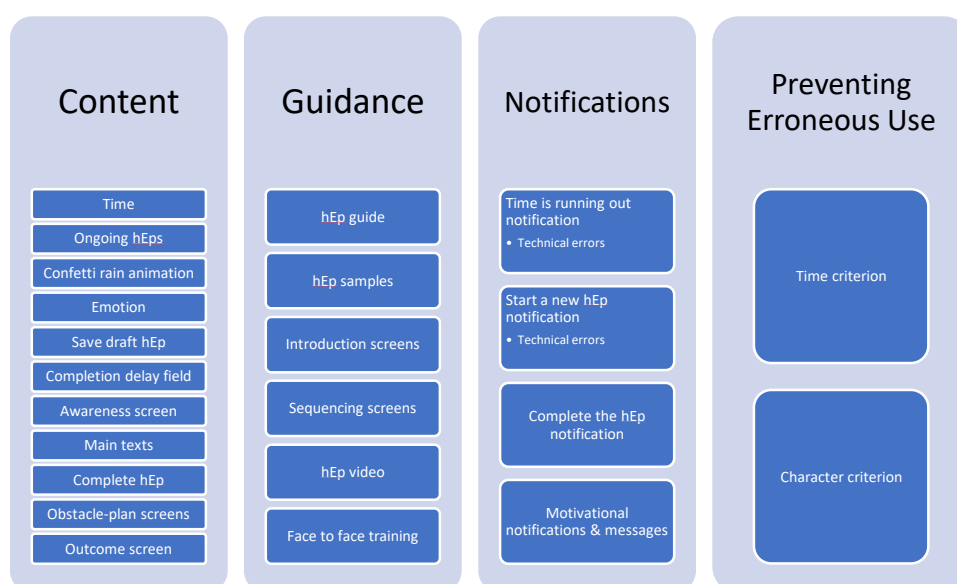


Figure 4.8 Themes and Sub-Themes regarding Information Quality.

*Content* ($n_P$=18, $f$=99) theme has emerged in line with the opinions of the participants about all the content in hEp. The suitability, clarity, deficiency, etc. of information contained in these contents, etc. was evaluated by the participants. In this direction, various sub-themes have emerged.

Eight participants expressed their opinions on the *time* ($n_P$=8, $f$=22) sub-theme. It is a theme that a wide variety of ideas, criticisms and suggestions came from the participants. Two participants stated that there is uncertainty regarding the

time to complete the hEps. C1P4 stated that she thinks she will receive a warning message when the time is up. ***After this statement researcher demanded notifications from the app developer and the notification updates were completed before Cycle 3.***

C1P3, on the other hand, stated that she was not sure whether she would be able to complete the hEps she had completed before the specified time. ***Therefore, before cycle two, a sentence, to remove this ambiguity, has been added to Ongoing hEps Detail page.*** A screenshot of ongoing hEps detail page is presented in Figure 4.9.

Figure 4.9 Screenshot of Ongoing hEps Detail Page

Regarding the "Imagine things fully" screen -one of the sequential screens in the hEp- three participants stated that they were uneasy because they had to wait for 5 seconds despite the absence of any input on this screen, and they thought there was an error related with this screen. ***Despite the negative comments of three participants, no changes have been made regarding the waiting time on this***

*screen. Because the participant is expected to stop and think about the goal and the process leading to that goal for a while.*

Various criticisms came from the participants regarding the time screen. One participant described the need to consider breaks while determining the studying time as a problem. Because she stated that this situation would make a period of non-studying time look like a studying period. A participant from the last cycle emphasized that she was a prep school student, the hEp she determined was 25-30 minutes long, but the shortest duration she could create in hEp was 45 minutes. She said that this situation negatively affected her motivation to use hEp.

Some participants stated that they had misperceptions regarding the time screen when they first used hEp. Two participants stated that they thought there would be a start button to start hEp after determining the time in hEp, and they were surprised that the countdown started immediately. Besides, in cycle 2, C2P2 stated that she misunderstood the information she should write in the time field when she created her first hEp:

> *"I had a problem with the first one. I thought about the time like this: you know it is written there, hour, minute, and day, I thought that way, I got it wrong. I will study for 4 days, for example, I wrote there 4 days. I will study 2 hours a day, for 8 hours in total. I wrote there 8 hours to the hour field. The minute field, I left it blank. That's how I understood. Later, after I created the hEp, when the countdown started, I realized that I had misunderstood. It was such a problem. "*

> *"İlkinde şöyle bir sıkıntı yaşadım. Ben zamanı şöyle düşündüm: hani orada yazıyor ya gün saat dakika, Şöyle düşünmüştüm yanlış anlamışım. 4 gün çalışacağım mesela oraya 4 gün yazdım. Her gün 2 saat çalışacağım toplam 8 saat ediyor. Oraya saat yerine 8 saat yazdım. Dakika yeri işte orayı da boş bırakmıştım. Öyle anlamıştım. Sonradan, hEp'i oluşturduktan sonra, geri sayım başladığında fark ettim yanlış anladığımı. Öyle bir sıkıntı oldu."*

**No change was made regarding this situation, as the other participants did not experience any uncertainty about this situation in cycles.**

The created hEps fall into the Ongoing hEps page. All fields here are intended to have editable properties. However, based on user statements, it was understood

159

that the time field cannot be edited. C1P1 said that when she wanted to change the time, the system did not allow it, as a result she had to delete all of the hEp content and rewrite it. ***This error was fixed before the second cycle.*** The same participant stated that if she does not enter hEp, she cannot see how much time is left and this is a deficiency and she emphasized that it would be good to see a statement such as "you have … minutes left". ***In line with this recommendation, before the second cycle, how much time the user has left for the relevant hEp was added to the ongoing hEps main and detail screens.***

Although some participants said that seeing the remaining time made them more motivated and focused on the study, others stated that they were uncomfortable with this countdown and their motivation decreased. ***Based on this finding, in the design of hEp, participants might be able to decide for themselves whether they will see the remaining time or not.***

One of the participants said that it might be good to orient the users differently when setting their goals, depending on whether the goal is a main goal or sub-goal. She proposed the creation of an interface and content in which users could write one main goal and its smaller sub-goals.

*Ongoing hEps* ($n_P$=12, $f$=18) sub-theme contains the comments of the participants on the contents of the screens that display in progress hEps. Ongoing hEps has two different screens, one main screen and one detail. On the main screen, users display their ongoing hEp/s in summary lines with the goal name and remaining time information as well as create new hEp option. This screen is also the first screen displayed when the hEp application is started. Five participants shared their opinion on ongoing hEps main screen. Most of the comments on this screen were related to new hEp creation field. When a participant from the 1st cycle saw this screen, she was not sure what to write, but stated that she got an idea as the screens progressed and did not have any problems as a result. hEp samples and the hEp guide were sent to the participants in line with the feedback from the 1st cycle. One participant from each of the second and the third cycles stated that this area is

160

quite clear and directive. Another participant from the third cycle liked having such a screen. On the other hand, another one from the third cycle stated that she found this screen complicated because of its colors, and she stated that she was uncomfortable seeing the phrase "You have …. minutes left" on this screen.

On the ongoing hEps detail screen, all the details of the relevant hEp can be both viewed and edited. The researcher thought that because there was too much content on this screen, the information on this screen was complicated, the participants might find it difficult to understand. Therefore, the researcher asked the participants how they found it. Participants expressed various ideas about ongoing hEps. Three participants stated that it is clear and understandable that these fields are editable. C3P2 said that the presence of this screen is necessary and sensible and she revised one of the hEps she created when necessary. Her utterance as follows:

> *"It's good, because you can change the duration - you take a break, something happens, or you feel that the outcomes are different. I think it makes sense that we can change, edit that way."*

> *"O iyi, çünkü süreyi, -yeri geliyor ara veriyorsun şey oluyor oluyor, ya da kazanımların farklı olduğunu hissediyorsun- değiştirebiliyorsun. O şekilde değiştirebilmemiz, düzenleyebilmemiz bence mantıklı."*

Two participants stated that they did not look the ongoing hEps detail screen. Two other participants emphasized that they did not notice the existence of such a field and one of them, C3P3 said that this was because she did not read the instructions in hEp sufficiently. Moreover, she added that, when the user opens that screen, a pop-up notification may appear stating that the fields on the screen are editable. ***Since the time between the end of the 3rd cycle and the beginning of the 4th cycle was limited, this change has not been made yet. However, it has been noted for use in future releases.***

In the *emotion screen* ($n_P$=4, $f$=9), the participants choose or write the feelings they will experience if they achieve their goals. While two participants stated that they liked the emojis on this screen, another stated that she chose the same feelings each time and this was a problem. She also stated that it is easier for her to choose

emojis rather than write down feelings. Another participant suggested that more emojis could be added, without mentioning specific emojis. Figure 4.10 presents the emotion screen.
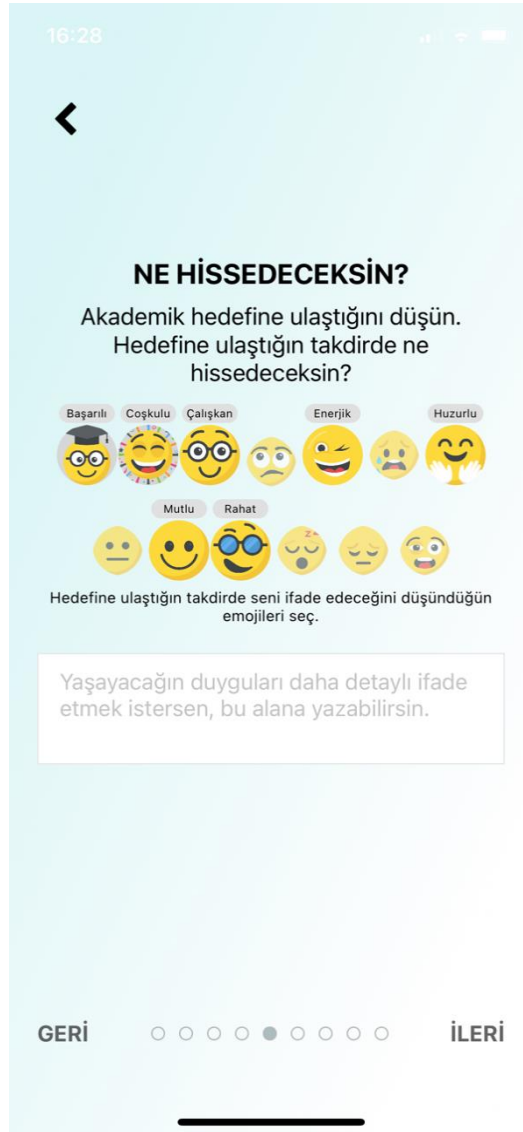


Figure 4.10 Emotion Screen.

Participants from the first, second, and third cycles stated that when they clicked the complete hEp button, they expect something on the next screen that will make them feel appreciated and accomplished. Accordingly, when clicking the complete hEp button, the *confetti rain animation* ($n_P$=6, $f$=10) was added to the

awareness screen before the fourth cycle. Four participants stated that they liked this animation and felt appreciated. On the other hand, one participant emphasized that it did not have any positive or negative effect, while C4P6 emphasized that it was a feature that other users could like, even though it was not essential for her:

> *"Confetti is not essential for me ... But for many users, confetti can be incentive."*

> *"Benim için konfeti çok şart değil... Ama konfeti teşvik edici olabilir birçok kullanıcı için."*

*Save draft hEp* ($n_P$=3, $f$=9) is the feature that asks whether the users want to save the draft hEp if they interrupt creating the hEp halfway. Two participants interpreted the addition of this feature as a positive development. One found it useful to be able to save the hEp as a draft, as she always creates similar hEps. The other stated that she liked the saving of the hEp she wrote in case of a problem, related with the Internet, system, etc. C4P5, on the other hand, stated that she did not use the draft hEp feature, and she would not be comfortable if she interrupted creating hEp, so she preferred to start from scratch.

*Completion delay field* ($n_P$=4, $f$=8) was added before fourth cycle. On the Ongoing hEps main page, the color of due hEps turns red. Two participants stated that they perceived the message given in colors, and one of them liked this situation. Another stated that if she could not complete it, she might feel sad when she saw the color red. On the other hand, C4P4 said that she was afraid, thinking that the hEp she created would be deleted when she saw it turn red.

The *awareness screen* ($n_P$=4, $f$=6) is the screen where the users were asked if they have noticed anything about the process and result after the hEp is completed. Four participants shared their opinions about the content on this screen. Although a participant from the first cycle expressed her various awareness during the interview, she used awareness screen only once. When asked about this situation, she stated that there is nothing unclear in hEp and she could not do this because she was a novice in hEp. Two participants suggested that emotion-emphasizing changes could be made on this screen. C2P1 stated that she might want to see a motivating,

meaningful quote or emoji on the awareness screen after completing the hEp which remind her what she succeeded. Similarly, C3P6 said that it might be good to see emojis selected on the emotion screen to appear on the awareness screen after completing the hEp, for comparing the user's pre / post feelings:

> *"On the awareness screen, like," What are you feeling right now? " To compare with the emoji, you felt before."*

> *"Farkındalık ekranında, daha önce hissettiğin emoji ile karşılaştırabilmek için, "Şu anda ne hissediyorsun?" gibi..."*

**Two participants from two different cycles made similar suggestions about emotions on the awareness screen. However, since the researcher could not obtain enough data on how to use emotions effectively on this screen, it was reported to be reconsidered when more data are obtained.**

A participant from the 3rd cycle said that after completing the hEp, she came to the awareness screen but did not know that she should write something here. ***This situation made the researcher think, but since the other participants used the awareness screen properly, no changes were made yet.***

*Main texts* ($n_P$=4, $f$=5) wording was used to describe the contents written on each of the sequential screens of the hEp, prompting the user to write the appropriate information. The participants were asked whether the main guiding questions / statement were clear and appropriate in the hEp creation process. Three participants labeled these texts as necessary. However, another one had the perception that she should create long-term hEps that would last for years after reading these main texts. This perception has been observed in other users who do not participate in hEp cycles but use the hEp application (without reading the guide or sample content, or without any training).

After the participants have finished the hEp they are aiming to finish, they need to click on the button named "complete the hEp". After clicking this button, the hEps are moved from ongoing hEps to the *completed hEps* ($n_P$=2, $f$=4) screen. Although expected from them, 2 participants did not click the "complete hEp" button

for the hEps they actually completed. They were asked about this situation and they both said that they were already relieved that they had actually finished hEps, they did not need to go back to the application and click the complete button.

One participant made two criticisms about the *outcome screen* ($n_P$=1, $f$=4). As she studied at the faculty of education, she said that the statement of outcome reminded her of the term learning outcomes, which was difficult to write for her. She stated that due to this connotation, she perceived the outcome as if she could not write it down properly and received a negative note and as a result, she felt unhappy about this screen. She also stated that she divides each goal into parts that she can study at one time, so those parts are elements that contribute to the outcome. However, she stated that these parts separately did not fully meet the outcome. ***No change has yet been made regarding this situation. If main goal and sub-goals feature is added, this situation will be considered again.***

Regarding the *obstacle / plan screens* ($n_P$=2, $f$=4), two participants stated that their obstacles were the same every time and that it was a problem to rewrite these obstacles each time. They suggested that these obstacles be recorded and chosen from the obstacle list. ***Despite this recommendation, no changes have been made to the obstacle screen. Because on this screen, the participants are expected to think and write about their obstacles each time.***

*Guidance* ($n_P$=14, $f$=59) theme involved the participants' opinions on the various information they received on how to use hEp, as well as how the design of the hEp has an influence on user guidance. Participants from different cycles received different types of guidance due to Covid-19 pandemic. Before the pandemic, it was planned to meet with the candidate participants before each cycle and represent the hEp face to face. However, this was only possible before the 1st cycle. For the other cycles, the guidance provided online. Therefore, some participants were able to get face to face training before using hEp, while others benefited from WhatsApp messages, e-mail and several documents explaining the

165

use of hEp. Guidance provided before each cycle for the participants is shown in the Table 4.29.

Table 4.29 Guidance Provided Before Each Cycle for the Participants

| Cycle | Guidance Method |
| --- | --- |
| Cycle 1 | Face to face |
| Cycle 2 | WhatsApp messages, e-mails |
| Cycle 3 | WhatsApp messages, e-mails |
| Cycle 4 | WhatsApp messages |

*hEp guide* ($n_P$=12, *f*=18*)* is a document, prepared by the researcher based on her observations, questions of pilot study participants, and expert suggestions. hEp guide, prepared in a question-answer format, was sent to the 1$^{st}$ and 2$^{nd}$ cycle participants via e-mail and was added to the hEp application before the 3rd cycle. Participants have expressed various opinions about the hEp guide. Before the first cycle, the participants who received face to face training on the use of hEp, stated that they did not need to review the hEp guide which was sent via e-mail.

At the second cycle, all participants received hEp guide via e-mail. Two of them stated that they read the hEp guide and C2P1 stated I would read if I needed. C2P1 who had waited too long before first hEp use, was informed on the phone for motivating her to use hEp. All details regarding hEp was explained her by the researcher. C2P2, who read the hEp guide, said she read it out of curiosity, but her peers would not read a text that long. For this reason, she suggested that it might be shorter. Besides, C2P3 said that she benefitted from the hEp samples, not the hEp guide. In the 3rd cycle where the hEp guide was added to the application, one of the participants stated that she found the hEp guide unnecessary, two of them said they did not need to read it, and C3P1 said it was confusing and it might be shorter:

> *"I think you gave something in parentheses. I remember that. Those parentheses seem to make it a little more difficult. Having shorter and clearer sentences makes it more understandable for me."*

*"Parantez içinde sanırım bir şeyler vermiştiniz. Öyle hatırlıyorum. O parantez içleri biraz daha olayı zorlaştırıyor gibi. Daha kısa ve net cümleler olması daha anlaşılır olmasını sağlar benim açımdan."*

Two participants from the 4th cycle stated that they did not benefit from the hEp guide. To sum up, only two of the participants stated that they liked the hEp guide. Nine participants stated that they did not benefit from, remember or find it necessary. ***Despite the negative comments about the hEp guide, no changes were made to it, as both of the participants who read it completely liked this guide and the vast majority of the participants did not read the it completely.***

*hEp samples ($n_P$=10, $f$=18)* contain sample contents about how to create hEp in various fields, including various goals and outcomes, and in different durations. The sample contents consist of hypothetical hEps created by the researcher. Although they were hypothetical, hEp samples (See Appendix G) was a document that some of the participants found very useful. These contents were not offered to the 1st cycle participants. However, C1P3 stated that, although she received face to face training, she did not know what to write while creating hEps. Therefore, it was important to present sample contents for the participants. Based on cycle 1, in the cycle 2, the sample hEp contents were presented to the participants via e-mail, and it was stated that they could get help from the sample contents while creating hEps. After cycle 2, three participants stated that hEp samples were very helpful for creating especially the first hEp. Therefore, before cycle 3, it was added to hEp app. In the 3rd and 4th cycles, hEp samples were present in the hEp application. A total of 10 participants expressed their opinions about the hEp sample contents, two of them stated that they did not look at the sample contents, C3P3 found it confusing when she first read the sample contents, because she thought that any hEp she chose from there would turn into a hEp she created. ***However, since this feature is not suitable for the purpose of hEp -to make the users think about their goals and what they have to do to achieve them- this feature has not been added.*** Seven participants stated that they benefited from the hEp sample contents and thus they understood

better how to create hEp. C3P1 stated that she utilized hEp samples not only as example but also to set criteria for goals. Her excerpt was as follows:

> *"For example, it gave me information about how to use the app. I mean, how much study time was added from which course, how were the starting times, how long the completion time was, these helped me."*

> *"Bu mesela, uygulamayı nasıl kullanacağım hakkında bana bilgi verdi. Yani, hangi dersten ne kadar çalışma süreleri eklenmiş, başlama süreler nasıl, tamamlama süresi ne kadar, bunlar bana yardımcı oldu."*

On the other hand, C3P6 stated that she saw a subject in the content of one of the hEp samples and remembered that she had to study on that subject.

The fact that C3P1 and C3P6 utilize hEp samples in this way led to the idea that these sample contents could be selected according to the participant's possible goals. ***That is, hEp can present different sample contents depending on the user's field of study.***

*Introduction screens ($n_P$=11, $f$=13)* are three ordered screens that only appear once after hEp is installed for the first time (See Appendix E for introduction screens). There was only one suggestion that the expressions on these screens should be more detailed. ***Since such a suggestion was only received from one participant and the introduction was intended as simple as possible on these screens, no changes were made to these screens during the cycles.***

Out of the recommendation, three of the participants said that they did not remember these screens, one other found them unnecessary. On the other hand, after the reminders were made to the relevant participants, four participants emphasized that these screens help them understand hEp better, and three others stated that the presence of the screens made sense. Different from the others, one participant stated that she was focused and motivated by the statement "you will reach your goals" on one of these screens.

*Sequencing screens ($n_P$=4, $f$=4)* are the screens that start with the goal screen and end with the plan screen, that contain each of the hEp creation steps. The fact

that these screens asked the goal - time - outcome - emotion - obstacle - plan steps in order, it made participants think these stages as a guide. C2P4 stated that the screens that progress sequentially during the hEp creation are organized very well:

> "The pages are arranged in such order I think they are well arranged."

> "Sayfalar böyle sıra olarak, bence gayet iyi bir şekilde düzenlenmiş."

*hEp Video* ($n_P$=3, $f$=3) was intended to be a short guide video that briefly explaining the hEp, with one example of how to create it. When this was presented as a suggestion to the participants in the first cycle, C1P3 and C1P4 stated that a video about hEp can be prepared and presented to the users as a guide. C1P4 emphasized that the duration of the video should be shorter than 1 minute. After the first cycle, there was not enough data about how the video should be, it was necessary to take the opinions of the participants in the 2nd cycle. In Cycle 2, only C2P2 suggested a video guide that needs to be shorter than three minutes and the video content can be as if someone is using hEp on the phone. In the 3rd and 4th cycles, there was no suggestion / demand regarding the video. ***The participants found hEp sample contents sufficient and they were able to create the hEps properly. For this reason, the video was suspended due to the lack of suggestions / demands from the participants.***

Two students from cycle1 stated that they found *face to face training* ($n_P$=2, $f$=2) useful in terms of guidance. C1P3 stated:

> "It made it easier for me to install as I got the information beforehand. So, it made it easier for me to proceed."

> "... öncesinde bilgisini aldığım için benim için daha kolay yüklememi sağladı. Yani daha kolay ilerlememi sağladı."

*Notifications* ($n_P$=12, $f$=48) is the theme in which participants indicate the notifications they expect to be in hEp and evaluate existing notifications that exist in hEp. There are three notifications in hEp since cycle three. These are: start a new

hEp, time is running out, and complete the hEp notifications. One participant stated that hEp is a reminder and a guide with the notifications it sends.

*Time is running out* ($n_P$=9, $f$=17) notification has been added by considering both the data from pilot studies and the features of applications similar to hEp. It shows the user a notification as "You have ... minutes /hours / days left." when 9/10 of the time they have chosen has passed. Some of the participants liked this statement and emphasized that it was a reminder. Others said that it created a stressful situation for them. The participants of the 2nd cycle were told that in the 3rd cycle, "..... minutes left to complete hEp" notification will be added to hEp. One participant stated that it would be good and another said it would create a more stressful situation for her. Two participants from the 3rd cycle stated that they liked this feature, another emphasized that it was stressful. Another participant revised the duration of the hEp she created in order not to experience stress. In the 4th cycle, two participants commented on this notification and stated that it was a good feature. C4P1 said that if this notification comes halfway through, it may be more motivating for her to complete the study on time. As mentioned above, some of the participants stated that they were pleased to see this notification, while others stated that they entered in a stressful situation. ***Therefore, in future versions of hEp this notification may be optional and the participant can decide when to receive this notification.***

In addition, in cycle 3, one participant mentioned a technical error she experienced, she said that hEp sent time is running out notification for the last 1 minute. ***This situation has been shared with the software developer and the necessary revisions have been provided before cycle 4.***

*Start a new hEp notification* ($n_P$=7, $f$=11) thought to be added by the researcher was also suggested by C1P1 to encourage users to use hEp. In cycle three, this notification was added sent to users every 24 hours when they are not using hEp. In cycles three and four, two participants stated that this notification did not encourage them to use hEp. On the other hand, two others encouraged by this notification. Unlike the other participants, C4P4 stated that start a new hEp statement

170

made her want to do something, but she could not find anything to do and as a result she felt bad:

> *"You know, every day you get a notification like make your goal, this time I feel bad, I have nothing to do except reading a book, this time I feel bad when I do nothing"*

> *"Hani her gün hedefini yap gibi bildirim geliyor ya, bu sefer de kendimi kötü hissediyorum, kitap okumak dışında yapacak bir şeyim yok bu defa kendimi kötü hissediyorum bir şey yapmayınca."*

Regarding this sub-theme, it was thought that there may have been a technical error from the statements of the two participants. One participant said that she did not receive this notification even though she had not entered hEp for five days. Another one stated, when she already had a hEp, she was notified to create a new hEp and she felt disturbed. ***In line with this information, a code will be written that will prevent the users from receiving the start a new hEp notification regarding the creation of a new hEp if they have an ongoing hEp.***

*Complete the hEp* ($n_P$=7, $f$=10) is the notification sent when the created hEp expired. It was presented to the participants as of the 3rd cycle. One participant from the 1st cycle said that she expected to receive such a notification when the hEp expired, another said that such a notification would be a good reminder. One participant from cycle 2 said that receiving such a notification would make her feel bad. One participant of the cycle 3 emphasized that the time is running out and compete the hEp notifications overlapped, and suggested that when one came, the other should go. ***This situation was discussed with the software developer, and it was said that this would not be possible technically.*** Two participants stated that they completed their hEp before the deadline, so they did not see this notification. Another one stated that she saw this notification, completed her hEp immediately after and felt happy regarding it. As in time is running out notification, the hEp users, expressed different opinions about complete the hEp notification. ***Therefore, in future versions of hEp this notification may also be optional.***

*Motivational notifications and messages* ($n_P$=4, $f$=7) sub-theme emerged from the notification demands that participants wanted to receive when they did not

create hEp, when they were creating hEp, while hEp was running, or when they finished hEp. As seen, different motivational notifications were requested in a wide variety of situations. For example, C2P1 suggested positive notification for incomplete hEps that could not be completed in time, users can receive positive prompting notifications:

> "As we said a warning message, a motivational message, if I cannot finish in the time I specified, there may be something positive about it, for example."

> "Bir uyarı mesajı, bir motivasyon mesajı demiştik ya, ben belirttiğim sürede bitiremezsem, hani bunda da belki olumlu anlamda bir yöneltici bir şeyler olabilir mesela."

***Notifications requested under this theme have not been added yet. Because the researcher needs more data on how to add a what kind of notification at what stage. In addition, the risk of boring the participants due to notifications was also considered. For these reasons, it has been noted among the issues to be considered in the future.***

***Preventing errorneous use*** ($n_P$=15, $f$=32) theme includes user opinions on the time and character limits for participants to use hEp properly. Participants are expected to wait at least 5 seconds on each of the sequencing screens and enter at least 5 characters of information.

*Time criterion* ($n_P$=15, $f$=28), has been an preventing errorneous use feature that almost all participants commented on. In cycle 1, except for C1P3, three other participants stated that they noticed time criterion. C1P1 and C1P4 emphasized that this situation caused them to slow down and to think in more detail, while C1P2 emphasized that receiving such a warning from the application increased her perception regarding the quality of the application. In cycle 2, all participants stated that they stopped and thought twice thanks to this feature - in line with the purpose of the hEp. 4 participants from the 3rd cycle stated that they had to stop and think on the screen they were trying to get through quickly thanks to the time criterion and that this was a good thing for them. Another participant stated that since she created a large number of hEps, she is now very fast and does not want to wait that long

while creating new hEps. Another participant said that it should not be prevented when she wanted to go through the fast. A participant from the final cycle said that she had to wait unnecessarily on the emotion screen, choose the same feelings each time, and that she should not wait that long on this screen. However, the other pointed out that time criterion is a logical factor that makes the user think.

*Character criterion* ($n_P$=4, $f$=4) was asked to four participants in cycle 1 and 2 and they stated that they deliberately wrote long and detailed while creating their hEps, therefore they could not notice the character criterion in the application. When the hEp contents created by the participants were also examined, it was seen that they typed more than 5 characters on each screen and therefore the other participants were not asked anything about it.

### 4.2.2.2    Category 2: Interface

***Interface*** ($n_P$=15, $f$=80) is the category that examines how the current features of hEp regarding appearance, layout, navigation etc. are perceived by the user. ***Buttons, general visual features, fonts, colors, logo*** and ***filing*** were the emerged themes (See Figure 4.11). The users not only evaluated the current interface of hEp, but also requested some new visual features to be added to hEp. Although these requests are mostly related to the interface, some of them also present clues about information quality. However, these requests are only evaluated under the interface category. Because the contents were not clear in the requests which described by the participants.

| Buttons | General Visual Features | Fonts | Colors | Logo | Filing |
|---|---|---|---|---|---|
| Plus buttons | | Warning messages | | hEp logo | |
| Menu button | Screen design | Cases of texts | | | Goal-subgoal use |
| Complete hEp button | | | | Goal screen logo | |
| Delete button | | Main texts | | | |
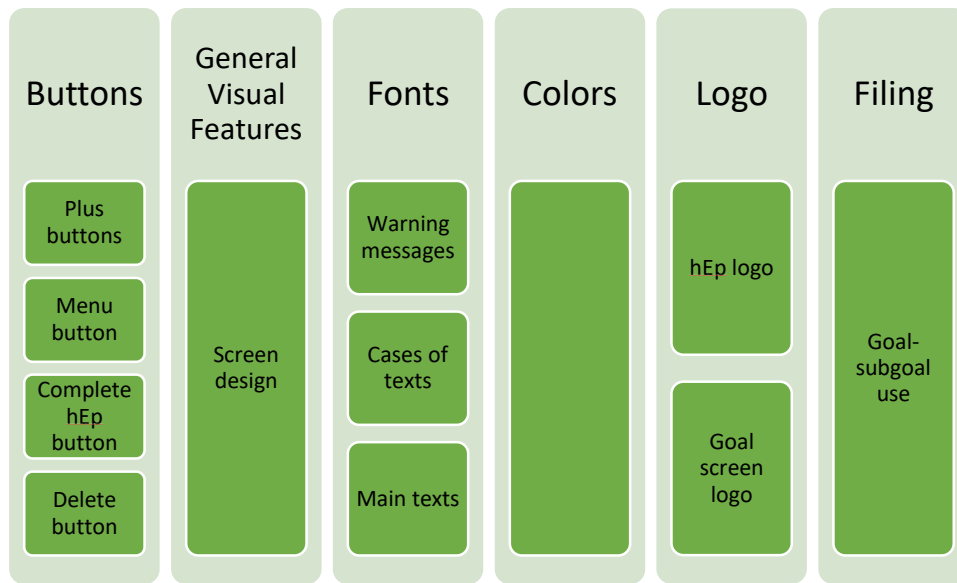
Figure 4.11 Themes and Sub-Themes regarding Interface

***Buttons*** ($n_P$=13, *f*=31) theme has emerged related with the functions of the buttons, the understandability of their names, and whether they make the appropriate direction in the hEp. All of the participants who expressed their opinions on the buttons stated that the buttons are appropriate and understandable and they did not experience any problems with the buttons. Participants also expressed their opinions on some specific buttons. C3P1 suggested using a vibrant color like orange on the *Completed hEps Main Page* that could create the perception that she has successfully completed the hEps.

***The color tone requested by the participant does not match the current design of the hEp. Therefore, when the selectable themes feature is added, this feature has also been noted to be added considering the color harmony.***

3 participants commented on the *menu button* and stated that the content and navigation of this button are appropriate. In addition, C1P4 described the presence of the *delete button* as a positive feature and it is easier to delete the uncompleted hEps than making explanations. She used the following statement regarding it:

*"For example, it's nice to have a delete button, I think it was too long to go and explain why I didn't do a hEp that I couldn't do. I found*

174

*it more logical to delete it instead. I directly deleted the hEps I could not do, I deleted two so far. It's easier to delete"*

*"Mesela silme butonu olması güzel bir şey bence, yapamadığım bir hEp'i gidip orada neden yapmadığımı açıklamak çok uzun geldi. Onun yerine silmeyi daha mantıklı buldum. Yapamadığım hEpleri direkt sildim, 2 tane sildim şimdiye kadar. Silmek daha kolay."*

The plus button is used for two different purposes in different places. The plus button on the main screens (ongoing hEps and completed hEps) is for creating a new hEp. On the obstacle / plan screens, it allows adding a new obstacle / plan. Regarding the plus button on the main screens, 3 participants of cycle 1 stated that the *plus button* reminds them to create a new hEp. In this sense, they stated that they found this button similar to the versions of other applications and had no difficulty in understanding. One participant in cycle 2 emphasized that she liked the plus button and using an arrow pointing to it is a good idea. On the other hand, regarding the plus button on the obstacle and plan screens, a participant from cycle 3 emphasized that she was unable to understand that the plus button should be clicked to add new obstacle / plan. Another participant said that she had trouble because she did not see the "next" statement on these screens.

***In the obstacle and plan screens, the purpose of the plus button should be written in a description text.***

***General Visual Features*** ($n_P$=13, $f$=20) theme emerged in line with the opinions of the participants on the general visual features of hEp. Participants' excerpts about a specific part of a specific screen were presented under the relevant theme / sub-theme. The current theme consists of expressions in which the participants evaluate the visual features of hEp in general. Three participants stated that the visual features of hEp could be improved, one other stated that arrangements could be made which aimed at subconscious for changing the perceptions of the users. Remaining nine users used positive statements regarding general visual features of hEp. General thoughts of users regarding the visual features from cycle to cycle are as follows:

Two participants in Cycle 1 stated that the visual features of the hEp are generally suitable. C1P2 stated that the purpose is more important to her than the tool itself and that the visual features of hEp are normal. C1P4 emphasized that hEp has a simple and clear interface. C1P3, on the other hand, suggested selectable theme use as she prefers more colorful theme.

Two participants in the Cycle 2 (C2P2, C2P4) stated that the design of hEp is simple and pleasant. On the other hand, C2P1 stated that she did not see negativity on hEp because it is a new application. However, she added that, some developments can be made in line with psychological theories which aimed at subconscious for changing the perceptions of the users and eventually increase the effectiveness of hEp:

> *"I mean, how visual things affect psychology or the subconscious, since I don't know the details of these, several things can be done that affect perception, on the screen of the application."*

> *"Yani, görsel şeyler psikolojiyi ya da bilinçaltını nasıl etkiler, bunun detayını bilmediğim için, böyle algıyı etkileyen şeyler yapılabilir, uygulamanın ekranında yani."*

Moreover, C2P3 stated several visual improvements can be made on hEp to make it more attractive for users:

> *"So, more appealing things can be used to attract the user. Because it's a straight thing. I think it can be improved. For example, themes can be used. More visual things can be used because such things attract my attention while working or planning. I think it will attract others too. "*

> *"Yani, böyle daha hitap eden, kullanıcıyı çekecek şeyler kullanılabilir. Çünkü düz bir şey yani. Hani geliştirilebilir bence. Mesela tema kullanılabilir. Daha çok görsel şeyler kullanılabilir Çünkü böyle şeyler benim çok dikkatimi çekiyor çalışırken ya da plan yaparken. Başkalarını da çekecektir diye düşünüyorum."*

Three participants from the 3rd cycle described the general visual features of hEp as simple and clear, pleasant and not eye-straining. One participant, in addition, stated that there was no problem with the general visual characteristics of hEp.

In the 4th cycle, two participants found the features of hEp pleasant. C4P6 stated:

*"It was fine. I would say if I saw something disturbing. "*

*"Gayet iyiydi. Rahatsız edici bir şey görsem söylerdim."*

Participants generally liked the visual features of hEp, but emphasized that it would be appropriate to have visual themes depending on the user's choice. Based on this*, it is necessary to add selectable visual themes to the design of the hEp.*

*Screen Design* ($n_P$=1, $f$=2) sub-theme that include one participant's suggestions for filling the empty spaces on the relax screen because of thinking that both the person who will use the hEp may be a visually impaired person and the presence of empty spaces on the screen is unsightly.

*Fonts* ($n_P$=9, $f$=11) theme included participant's thoughts on the font style of the all of the text contents (main texts, description texts, warning messages) in hEp. Nine participants expressed their opinion, eight of them stated that they liked the font style in general. However, C1P1 from Cycle 1 emphasized that although she liked the font style, the size of the warning messages was small.

*In line with her request, warning texts' type size was increased by 2 points to increase readability before the second cycle.*

In cycle 3, C3P6 stated that readability may be difficult for visually impaired individuals in the current situation therefore, the type size can be increased. Moreover, she added that while the initial letter of each new word is capital in some menu items, sentence case is used in some. This inconsistency needs to be corrected.

*With her suggestions, case consistency has been provided on the menu items.*

Six participants commented on the *colors* ($n_P$=6, $f$=10*)* of hEp. Three of them stated that the colors were appropriate and cool tones were used in accordance with

the purpose of the hEp, while the other three stated that the colors could be better, more vivid colors could be preferred, as the current colors are pale. C2P3 stated:

> "Blue is nice but I think it could be another color instead of blue. It can be a more vivid color."

> "Mavi güzel ama bence mavi yerine başka bir renk olabilir. Daha canlı bir renk olabilir."

**Cool colors are particularly used in the design of the hEp. However, some of the participants requested the colors to be more vivid. Based on the theoretical information about colors and colors used in similar applications, no changes have been made. This issue has been noted for consideration in later versions of hEp.**

Another theme emerged under the interface category is the **logo** ($n_P$=3, $f$=4). Both the hEp logo and a requested logo for the goal screen are included under this theme. The hEp logo is the small icon on the smartphone screen that symbolizes the hEp. From different cycles, one of the 2 participants stated that she found the logo of hEp very attractive and that it was very convenient for the purposes of hEp to create an academic impression as well as being simple, on the other hand, the other emphasized that it evoked governmental agencies. Besides, another participant suggested that a vibrant colored logo could be used on the goal screen. **No changes have been made to hEp in line with the criticism and suggestions about the logos.**

**Filing** ($n_P$=1, $f$=4) theme has emerged with the suggestion of C3P6 that the elements on the completed hEps screen can be filed. The participant stated that she wants to be able to see all the details of the hEps which she has created and successfully completed in the past. Because in the current screen layout, she stated that she could not see the days when she did not generate hEp. In the current version of hEp, she perceives as she is studying regularly, but it does not reflect the truth:

> "If this appears in two different ways in my "Completed hEps"; in a calendar and on a list. ... now, when I look at it, there is such a list and you perceive like "I did very well etc.", but it does not display that the four days there are actually empty."

> "Bu, "Tamamladığım hEp'lerim"de iki farklı yöntemle gözükse; bir takvimin içinde, bir de listede. ... şimdi baktığımda böyle bir liste var

*ve çok iyi yapmışım diye görüyorsun falan ama aslında oradaki 4 günün boş olduğunu göstermiyor burası.''*

She also emphasized that some sub-menus under the menu button can also be grouped, this is not necessary in the current situation, but this needs to be done if the hEp is further developed.

### 4.2.2.3 Category 3: System Usefulness

***System usefulness*** ($n_P$=15, $f$=90) is a category that includes user opinions and suggestions on the ease of learn and ease of use. Moreover, participants' error experiences also reviewed under this category. Figure 4.12 represent the themes and sub-themes regarding system usefulness category.
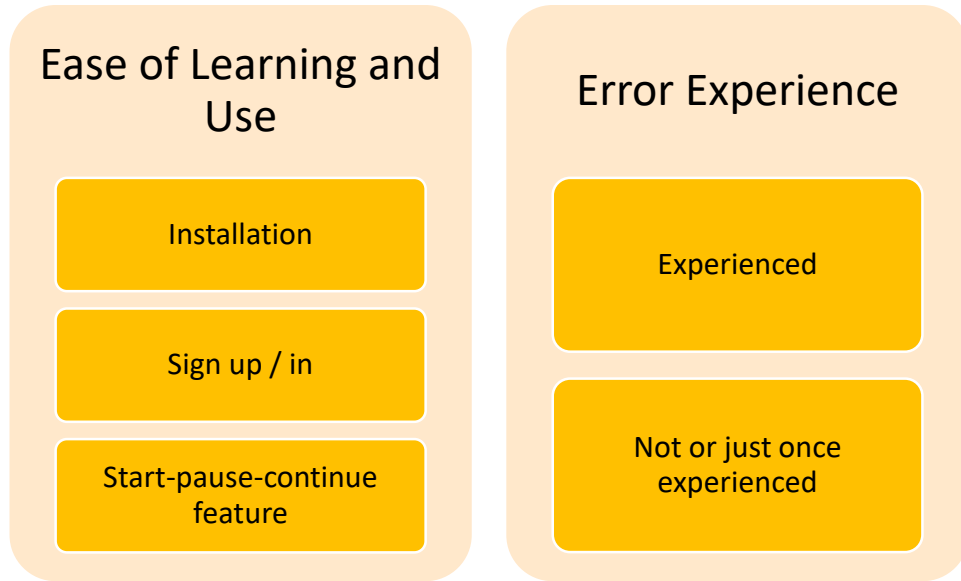


Figure 4.12 Themes and Sub-Themes regarding System Usefulness

*Ease of learning and use* ($n_P$=15, $f$=54) emerged from the participants' views on the learning and ease of use of hEp. 14 participants stated that it is easy to learn and use hEp, four of them emphasized that learning hEp is possible by creating a single hEp, another stated that she learned hEp easily by clicking all the buttons and making trials. Two participants who stated that they found hEp easy in general, pointed out that they had difficulties in the beginning and then stated that they

adapted. Based on the experience of the participants, it was observed that it was easy to learn and use hEp, after creating the first hEp, some participants understood hEp better and a small number of participants understood it better as they used it. C2P4 used following utterance regarding ease of learn and use of hEp:

> "I think the rest is coming after you do the first hEp. You grasp the hEp. "

> "Bence ilk hEp'i yaptıktan sonra gerisi geliyor zaten. Kavramış oluyorsunuz hEp'i."

In addition to the general ease of learn / use of the system, ease of use was also asked about installation and signing up. In this direction, installation and sign up / in sub-themes have emerged. Participants stated that *installation* ($n_P$=10, $f$=13) of hEp was easy and understandable. C1P4 stated:

> "No, it was easy for me. Downloading the application was also easy, downloading and installing such stages were very easy for me. "

> "Yok kolay oldu benim için. Uygulamayı indirmek de kolaydı, indirme, yükleme o tür aşamalar çok kolay geçti benim için."

Nine participants stated that it is easy to *sign-up / in* ($n_P$=9, $f$=11) to hEp and they do not have any difficulties. Only one participant stated that she felt anxious about security due to entering her information into the system.

Besides the *installation* and *sign up / in* sub-themes, another emerging theme is the *start-pause-continue feature*. In addition to the evaluations about ease of use, four participants requested a new feature that they thought could contribute to ease of use. *Start-pause-continue feature* ($n_P$=4, $f$=10) was requested by four participants, one from the first cycle and three from the third cycle. C1P1 from the first cycle said that while setting the time in hEp, she considered not only the goal but also the breaks she will take during that day, and other expected / unexpected tasks. She also stated that sometimes she could not set this time correctly. Similarly, in the 3rd cycle, C3P6 emphasized that she did an unexpected task for 20 minutes during the implementation process of hEp, and as hEp does not have a pause feature, she lost

time which made her feel failure. She also pointed out that due to the lack of pause feature, she could not see how much time she actually spent on an assignment:

> "The water bottle we ordered arrived, I opened the door, then I wanted to pause the hEp. At that time, I spent 20 minutes and forgot that the application was continuing and the time was running out. It was demoralizing that it stole from the studying time. It feels like I have failed. But if there was something like pause there, or if I could add the time I spent for unexpected situations, we would have seen something. In how many hours do I finish my homework, for example, in an hour. I would have been able to see that. My time to finish assignment X has increased to one and a half hours."

> "Sipariş ettiğimiz su damacanası geldi kapıyı ben açtım, o sırada hEp'i durdurmak istedim. O sırada 20 dakika vakit harcamışım, uygulamanın devam ettiğini, sürenin azaldığını unutmuşum. Bunun ders saatinden çalması moral bozucu bir şey. Sanki başarısız olmuşum gibi bir hisse sebep oluyor. Ama orada pause gibi bir şey olsaydı, ya da ben beklenmedik durumlar için ayırdığım süreyi ekleyebiliyor olsaydım bir şey görebilmiş olurduk. Ben ödevimi kaç saatte bitiriyorum, mesela bir saatte bitiriyorum. Bunu görebilmiş olurdum. Benim X ödevi bitirme sürem bir buçuk saate çıktı."

C3P6 also suggested that the implementation should not start immediately after creating the hEp, but leave it up to the user's choice with a start button. Two more participants from the third cycle made this suggestion. One of them stated that she was uncomfortable that her hEp started as soon as it was formed, the other said that she did not expect hEp to start as soon as it was created, and this situation surprised her. She also emphasized that it would be better for her if she could choose the time to start her hEp.

After the second cycle, the information about how much time do they have to complete the hEp was given on the main page of the hEp. Previously, this feature was still present, but it was not on the main page at where participants could easily see. They had to open the detail page to see the remaining time. Participants were uncomfortable because of this feature being made visible. ***Even so, the addition of the start-pause-continue feature has been an important request from participants. Although it has not yet been implemented due to time constraints, it has been noted for inclusion in future versions of the hEp.***

181

Another theme discussed under system usefulness was *error experience* ($n_P=13, f=36$). Although six participants stated that they did not encounter any errors while using hEp, seven participants stated that they experienced only one error. 3 participants from the second and third cycles stated that they experienced errors, and considering the statements of these six participants, it was understood that they all talked about the same error. In the second cycle, the participants said that they experienced an error and they tried to explain how this experience took place, but the researcher could not determine what the issue needed to be corrected because the researcher could not observe the same error by following the steps they uttered. In line with the similar error statements of the participants from the third cycle, researcher asked more detailed questions regarding this error experience. Based on third cycle participants' statements she tried to experience the same error. This time, she experienced the error and the software developer was asked to fix the error. It was understood that while updating the second version of hEp for the cycle 2, a technical error was made. After this error, it was observed that when switching to another application while using hEp, all the changes made in hEp were lost. ***This error and its source were fixed as soon as it was understood which coincides with the fourth cycle.***

A participant from the fourth cycle stated that she experienced two errors. The first happened during hEp installation. The installation has failed. The participant was suggested to uninstall and reinstall the hEp, and this error has been resolved. The second problem is that the forward button is not visible on the obstacle and plan screens. Therefore, the participant had difficulty in passing to the next screens. This problem is thought to have been experienced related with the smartphone model.

### 4.2.2.4    Category 4: User Satisfaction

The interaction experiences of the participants with hEp (installation, sign up / in, use process, etc.), whether it meets the user expectations or not have emerged as

the *user satisfaction* ($n_P$=14, $f$=18) category. All participants from cycle 1 stated that they were very satisfied with using hEp.

In cycle 2, all users were satisfied with the hEp use. C2P2 said the hEp was satisfactory and encouraging. Besides, C2P3 stated that she did not experience any dissatisfaction other than the error she experienced in the application. In the 3rd cycle, four participants stated that hEp created a sense of satisfaction. One participant from the 4th cycle said that she was very satisfied, while another said she did not experience any dissatisfaction. That is, two participants who shared their opinion on satisfaction emphasized that they did not experience dissatisfaction, while the remaining twelve participants stated that they were satisfied or very satisfied with hEp.

### 4.2.2.5    Category 5: Personalization

*Personalization* ($n_P$=2, $f$=4) category emerged as a result of participants' additional feature requests that were not available in hEp. Participants' requests regarding the features were presented under various themes, in line with their relevance. Under the personalization theme, features requested by a small number of participants in line with their special requests were included. Two participants suggested new features which were important to them. While a participant from cycle 2 said that hEp could be customized according to the personal information such as department, area of interest, subject of study, etc., one participant from the cycle 3 emphasized that personalization can be done in a way that hEp can be set for reading books. Since the aim of hEp is to regulate the use of the Internet for academic purposes, the demand to read books is not convenient for the purpose of hEp. However, it is still necessary to consider hEp to be a customizable application, in accordance with its purpose, that can be used in line with participants' own preferences.

183

**4.2.3      Experiences on hEp (R.Q.3)**

Under the heading of experiences on hEp, the participants' hEp usage behaviors were described, their thoughts on the effectiveness of hEp were examined, their pre- and post-use tendencies about hEp were reviewed and some other variables were investigated. In this direction, four categories have emerged. These are: ***Perceived effectiveness of hEp, other variables affecting the hEp use, hEp related tendencies,*** and ***hEp creation process***. Figure 4.13 represent categories under experiences on hEp.

Perceived Effectiveness of hEp

Other Variables Affecting the hEp Use

hEp Related Tendencies

hEp Creation Process
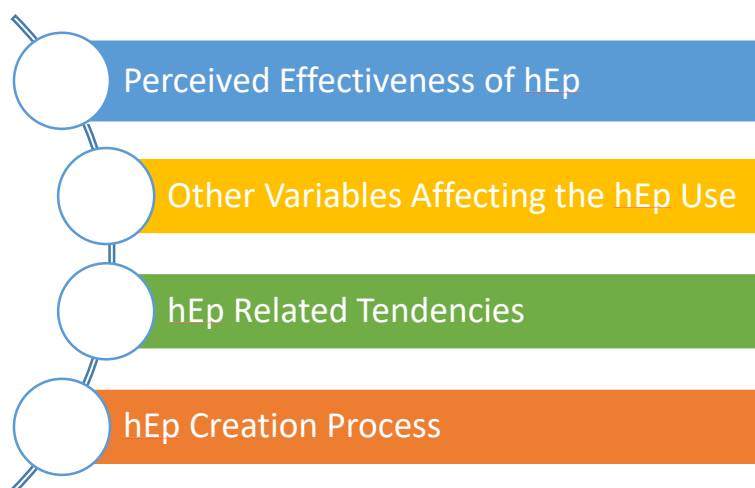
Figure 4.13 Categories regarding Experiences on hEp

Table 4.30 represents categories, themes and sub-themes related with the experiences on hEp.

Table 4.30 Categories, Themes and Sub-Themes about Usability Features of hEp with Frequencies.

| Themes & Sub-themes | Number of participants | Frequency of being uttered |
|---|---|---|
| *Perceived Effectiveness of hEp* | 19 | 368 |
| *Academic Effectiveness* | 19 | 133 |

Table 4.30 (continued)

| | | |
|---|---|---|
| Boost for goal achievement | 17 | 39 |
| *Boost for being strong-minded* | 10 | 18 |
| *Short-term goals* | 2 | 2 |
| Change in studying plans and behaviors | 13 | 27 |
| *Embodying the process* | 6 | 8 |
| Change in Internet use behavior | 12 | 24 |
| *Controlling task switching* | 4 | 4 |
| Controlling academic procrastination | 11 | 17 |
| Providing support & guide | 9 | 16 |
| Boost for academic self-efficacy | 4 | 5 |
| *Effectiveness of hEp Elements* | 19 | 116 |
| Time screen | 14 | 29 |
| *Positive* | 11 | 18 |
| *Negative* | 4 | 6 |
| *Relative* | 5 | 5 |
| Obstacle-plan screens | 13 | 26 |
| *Plan screen* | 9 | 12 |
| *Obstacle screen* | 8 | 8 |
| Emotion screen | 11 | 17 |
| Goal screen | 10 | 13 |
| Awareness screen | 10 | 12 |
| Completion delay field | 5 | 10 |
| *Pushing* | 3 | 7 |
| *Worrying* | 1 | 2 |
| *Neutral* | 1 | 1 |
| Outcome screen | 7 | 7 |
| Ongoing hEps main screen | 2 | 2 |
| *Change on affects* | 14 | 56 |
| Feeling positive & peaceful | 9 | 16 |

Table 4.30 (continued)

| | | |
|---|---|---|
| Feeling relief | 8 | 14 |
| Feeling succeed | 9 | 10 |
| Feeling motivated | 5 | 6 |
| Feeling bad & upset | 4 | 4 |
| Feeling appreciated after completing hEp | 3 | 3 |
| Gaining self-confidence | 3 | 3 |
| *Obtained Awareness* | 13 | 27 |
| *User Satisfaction* | 9 | 13 |
| *Efficiency* | 8 | 10 |
| *Mind hEpping* | 4 | 6 |
| *Simplicity* | 4 | 5 |
| *Benefits on Physical Health* | 2 | 2 |
| **Other Variables Affecting the hEp Use** | 15 | 57 |
| *Academic Habits of Students* | 12 | 20 |
| Effects of Covid-19 Pandemic | 6 | 7 |
| *Unexpected Events* | 9 | 20 |
| Covid-19 Pandemic | 8 | 16 |
| *Effects on Internet use behavior* | 8 | 8 |
| *Effects on academic behavior* | 6 | 7 |
| *Effects on interpersonal relationships* | 1 | 1 |
| Earthquake | 1 | 4 |
| *Researcher Factor* | 6 | 12 |
| Researcher's seeing users' hEps | 4 | 9 |
| Researcher credibility | 2 | 3 |
| *Novelty Effect* | 4 | 5 |
| **hEp Related Tendencies** | 18 | 56 |
| *Intention to use* | 12 | 15 |
| Willing to use | 11 | 14 |

186

Table 4.30(continued)

| | | |
|---|---|---|
| Uncertain to use | 1 | 1 |
| *Expectations on hEp* | 9 | 15 |
| Pre-use expectations | 4 | 6 |
| Post-use expectations | 7 | 9 |
| *Target Group* | 8 | 12 |
| *Suggesting to Others* | 9 | 11 |
| *Push Factors for Re-use of hEp* | 2 | 3 |
| **hEp Creation Process** | 15 | 46 |
| *hEp Creation Duration* | 14 | 19 |
| *hEp Implementation Duration* | 9 | 11 |
| *Mind hEpping* | 4 | 6 |
| *Getting familiar with hEp* | 5 | 5 |
| *Goal Formation* | 3 | 5 |

### 4.2.3.1 Category 1: Perceived Effectiveness of hEp

Under ***Perceived Effectiveness of hEp*** ($n_P$=19, $f$=368) category, direct or indirect positive or negative statements of the participants about the effectiveness of hEp are reviewed. Participants compared hEp with other applications. They emphasized that they found hEp both easier and more efficient. In addition, they shared their thoughts on its effectiveness in various dimensions academically. They stated that hEp also caused some changes in their emotions and emphasized that they developed some awareness thanks to hEp. Some participants said that hEp also beneficial for their physical health, and they talked about their satisfaction about the effectiveness of hEp. Accordingly, the main themes under the perceived effectiveness category were emerged as: ***Academic Effectiveness, Effectiveness of hEp Elements, Change on Affects, Obtained Awareness, User Satisfaction,***

***Efficiency, Mind hEpping, Simplicity,*** and ***Benefits on Physical Health*** (See Figure 4.14).



| Academic Effectiveness | Effectiveness of hEp Elements | Change on affects | Other Themes |
|---|---|---|---|
| Boost for goal achievement | Time screen | Feeling positive & peaceful | Obtained Awareness |
| Change in studying plans and behaviors | Obstacle-plan screens | Feeling relief | User Satisfaction |
| Change in Internet use behavior | Emotion screen | Feeling succeed | Efficiency |
| Controlling academic procrastination | Goal screen | Feeling motivated | Mind hEpping |
| Providing support & guide | Awareness screen | Feeling bad & upset | Simplicity |
| Boost for academic self-efficacy | Completion delay field | Gaining self-confidence | Benefits on Physical Health |
| | Outcome screen | | |
| | Ongoing hEps main screen | | |

Figure 4.14 Themes and Sub-Themes regarding Perceived Effectiveness of hEp

*Academic effectiveness* ($n_P$=18, $f$=133) theme refers to the participants' evaluation of hEp based on various features with regard to its academic effectiveness. In the most general sense, three participants evaluated hEp academically, while two of them described hEp as a beneficial application, one said it was not beneficial for her. Apart from this general statement, various sub-themes have emerged under this theme. These are: Boost for goal achievement, change in studying plans and behaviors, change in Internet use behavior, controlling academic procrastination, providing support and guide, and boost for academic self-efficacy.

*Boost for goal achievement* ($n_P$=17, $f$=39) refers to the attribution of hEp to support participants in achieving their goals. Thirteen participants stated that after creating hEp, they felt obliged to focus on the relevant goal, they prioritize

completing the goal in their minds, and felt that hEp assigns responsibility to them in this sense. In this way, they stated that they remained loyal to their goals and achieved these goals efficiently. C3P4 stated following sentence:

> "It was a good contribution. I finished my never-ending books, I read an extra book. I read my article, I gained new knowledge. As I said, when I was a person looking at the Internet even while studying on exam, this time I turned off the Internet and focused only on my lesson. Indeed, this reflects very very nicely on my grades."

> "İyi bir katkısı oldu. Bitmeyen kitaplarımı bitirdim, extra başka kitap okudum. Makalemi okudum, yeni bilgiler kazandım. Dediğim gibi, sınav zamanında çalışırken bile İnternet'e bakan bir insanken, bu sefer İnternet'i kapatıp sadece dersime odaklandım. Hakikaten bu puanlarıma çok çok güzel yansıyor."

Eleven participants stated that thanks to hEp, they studied in a more disciplined and strong-minded way on the way to their goals. They emphasized that they studied in a more planned and programmed way, they were able to take their steps more clearly and determinedly, they could study without leaving the table (without engaging in other things), and they were able to display a more willed attitude against the situations that prevent them. C3P3 stated the following sentences regarding this sub-theme:

> "I can advance my steps more clearly. After finishing my plan, it helps me apply how I will feel and what I want, in a more strong-willed way."

> "Adımlarımı daha net ilerletebiliyorum. Planımı bitirdikten sonra, nasıl hissedeceğimi ve neleri istediğimi, daha iradeli bir şekilde uygulamama yardımcı oluyor."

Regarding hEp's ability to make the user to boost achieving the goal, two participants pointed out the long-short term goals. One participant said that in her one-hour goals, hEp supported her to be strong-minded and disciplined. She emphasized that she did not see this motivation in herself for longer-term goals, so she always set short-term goals. Another participant stated that she had written a very long-term and very general goal and then realized that it was not real to achieve it, and wrote shorter-term and specific goals.

189

*Change in studying plans and behaviors* ($n_P$=12, $f$=27) sub-theme refers to the statements of the participants about the changes that occur in their study plans and behaviors after using hEp. The most common change statement from the participants is breaking the resistance. Five participants stated that they had some negative habits towards studying before using hEp, but it was possible for them to overcome with hEp. One of the participants said that she was constantly in the home environment due to the Covid-19 pandemic, being in the home environment was a variable in her non-studying behavior, and she could change this behavior through hEp. Another participant stated that she was complacent due to the pandemic, she thought not to study, but she started studying again thanks to hEp and did not show the behavior of frequently getting up from the table that she had shown before. C4P4, on the other hand, stated that she did not enjoy reading articles at all, therefore she could not read articles and she succeeded in reading articles after creating a hEp. She used following excerpt:

> *"One of my hEp was related to articles. I don't like to read articles, I never read articles, I get bored. But I set myself that goal and pushed myself and read the article. For example, this is a very big thing for me."*

> *"Benim bir hEp'im makalelerle alakalıydı. Makale okumaktan hoşlanmam, makale okumam hani hiç, sıkılırım. Ama, kendime o hedefi koydum ve kendimi zorladım ve makale okudum. Mesela bu benim için çok büyük bir şey aslında."*

Three participants stated that they studied in a more focused way for their goals by creating hEp. Two participants stated that they studied irregularly before hEp and they started to be more regular students with the use of hEp. C3P3 used following utterance:

> *"Before hEp, I was always on the table. I used to study very disorganized, and then I had a tremendous headache. But after hEp I got a nice schedule."*

> *"Ben, hEp'den önce, hep masanın üzerinde idim. Çok dağınık bir şekilde ders çalışırdım, sonrasında muazzam baş ağrısı yaşıyordum. Ama hEp'ten sonra güzel bir programım oldu."*

Two other participants emphasized that it is possible for them to proceed in a more planned way thanks to hEp. Another stated that she always left all her tasks to the last minute and progressed more gradually and efficiently with hEp. From the statements of the participants, it was understood that the hEp feature that contributes to the change of the participants' studying plans and behaviors may be the embodying the process. Because six participants who stated that they changed their work plans and behaviors thanks to hEp in a positive way, said that hEp made the process more concrete and clearer in the occurrence of this change. C2P3 used following utterance while describing hEp's feature of embodying the process:

> "Since I knew it was planned and I knew the steps to do, the working phase was not a big deal. You know, I had a plan now, as long as I can go through the steps, I thought I could do it, and I did. I was going to write an article. As I said, first I did my research and then it was easy to start writing my article."

> "Planlı olduğunu bildiğim için, yapacağım aşamaları bildiğim için, çalışma aşaması çok da gözümde büyümedi. Hani bir planım vardı artık, basamakları geçebildiğim sürece yapabileceğimi düşündüm ve yaptım da zaten. Makale yazacaktım bir tane. İşte dediğim gibi, önce araştırmalarımı yaptım, sonra da makalemi yazmaya başlamak kolay oldu."

*Change in Internet use behavior* ($n_P$=12, $f$=24) sub-theme refers to the change in the Internet usage behavior of the participants after using hEp. Twelve participants emphasized that they reduce the duration of Internet usage in line with their hEp usage. One of the participants stated that the feeling that she will experience when she completes the hEp suppresses her desire to surf the Internet, another stated that she did not take her phone for 10 hours after creating a hEp, while she could never do it under normal conditions, and the majority of the participants stated that they focused on their goals and did not focus on the Internet when they created hEps. C3P4 (C4P4), who participated in both the third and fourth cycles, gave more information about the change in her Internet usage behaviors in line with the longer-term hEp usage. In the third cycle, C3P4 stated that she was aware of the problematic use of the Internet before, and said that she faced this situation more thanks to hEp and understood what she had to do. Before using hEp, she stated that she never

postponed watching the series, as it was her highest priority. She emphasized that she closed the tabs related with series after she started using hEp, and she felt responsible for her studies due to hEp. She emphasized that she reduced this usage very much in the third cycle, she no longer watched any series after the fourth cycle:

> *"I have never used the Internet except to look at the study related things. TV series etc., I left"*

> *"İnternet'i derslere bakmak dışında hiç kullanmadım. Diziler falan hepsini bıraktım."*

Another situation that emerged under the change in Internet use behavior sub-theme was that four participants reduced task-switching behavior by means of hEp. C4P5 uttered following sentence regarding preventing her task-switching behavior by means of hEp:

> *"Because in our system, they record the lecture videos, I can watch them later. So sometimes I could stop and get busy with something else. So I was conditioning myself, in how many minutes I could finish through hEp."*

> *"Çünkü bizim sistemde ders videolarını kaydediyorlar, sonradan izleyebiliyorum. O yüzden bazen durdurup başka bir işle meşgul olabiliyordum. Bu yüzden kendimi şartlandırıyordum, hEp aracılığıyla kaç dakikada bitirebilirim diye."*

Another sub-theme of academic effectiveness was *controlling academic procrastination* ($n_P$=11, $f$=17). Eleven of the participants who expressed their opinion about hEp's effect on academic procrastination stated that they reduced their academic procrastination behavior. One of these participants said that she no longer made any academic procrastination, another said that she read the exam papers she had been waiting for a long time and she studied for midterm exams even though there was still time, and another said that procrastination was the biggest problem for her and she started to overcome this thanks to hEp. C1P3 has expressed the tasks that she postponed for a long time but can complete by means of hEp as follows:

> *"Of course, for example, I was able to complete my previous notes related to all lessons. I had not read the exam papers of the students, I was going to call their parents for example. I was constantly putting them off. I was able to do these. Midterm week is approaching.*

192

*On the one hand, I had to do lesson repetitions because I was leaving them to the last minute. I was able to do all of them. I think these will also provide an advantage."*

*"Tabii şöyle ki, mesela daha önceki notlarımı tamamlayabildim bütün derslerle alakalı. Öğrencilerin sınav kağıtlarını okumamıştım, işte onların velilerini arayacaktım mesela. Onları sürekli erteliyordum. Bunları yapabildim. Zaten vize haftası yaklaşıyor. Bir taraftan ders tekrarları yapmak zorundaydım çünkü son dakikaya kalıyordu derslerim. Onların hepsini yapabildim. Bunların da avantaj sağlayacağını düşünüyorum."*

Similarly, C3P3's statement on the change in academic procrastination is as follows:

*"Previously, something happened when I started studying, I would quit and postpone it. But thanks to hEp, I gave up the habit of procrastinating. Let's say I postponed the procrastination rather than giving up."*

*"Önceden, ders çalışmaya başladığımda bir şeyler olurdu, bırakırdım ve ertelerdim. Ama hEp sayesinde erteleme alışkanlığından vazgeçtim. Hatta vazgeçmek değil de ertelemeyi erteledim diyelim."*

On the other hand, one participant said that hEp did not have any effect on this issue, she had completed her goals as usual.

*Providing support and guide* ($n_P$=8, $f$=16) is a sub-theme that emerged as a result of some users point out that hEp supports them, helps them, guides them, and assists them. While describing the providing support and assistance dimension of hEp, the adjective mostly used by the participants was "reminder". They emphasized that hEp reminds them to complete this task before the time is up, either through its notifications or due to its features, while they are studying. C4P2 uttered following sentences about the hEp's being a reminder:

*"So I think it was a reminder as I said. So, it is in the corner of your mind, it allows you to study like a teacher. You don't always say it, it'll be in a corner of your mind."*

*"Yani bence dediğim gibi hatırlatıcı oldu. Yani şu şekilde, aklının bir köşesinde bulunur, bir hoca gibi, ders çalışmanı sağlar. Sürekli söylemezsin, aklının bir köşesinde olur."*

193

Two participants emphasized that hEp helped them. One stated that she was thinking about how to improve her academic life and how to get the social media out of her life, through hEp, while another said that the use of hEp helped her because hEp use came across to the exam period and this process was efficient. Two participants described hEp as a guide. They stated that it is easier for them to achieve their goals thanks to hEp because they know better how to follow the path. One participant each described hEp as assistant and tracer. C1P2, said the following in her sentence, where she stated that she saw hEp as a tracer:

> "Yes, it is like that for me, so when I think there is something following me, I can study more enthusiastically like this because it is efficient."

> "Evet benim için öyle oldu, yani bu şekilde beni takip eden bir şey olduğunu düşündüğüm zaman böyle daha şevkle çalışabiliyorum, verimli olduğu için."

*Boost for academic self-efficacy* ($n_P$=4, $f$=5) sub-theme emerged in line with the "I saw that I can do" perception that hEp creates in the participants. When the participants tried to achieve their academic goals through hEp, they realized that they were able to achieve, they followed their plans, and the process worked in the way they planned in their minds. Regarding this subtheme, C2P3 used the following utterance:

> "It brought contribution. Because I realized I could actually do it. I realized that there was nothing very difficult, nothing that couldn't be done. I realized that it was not something to overestimate. I realized that I could work very well with just planning and a good process, or I could complete my homework that I could write on hEp."

> "Katkı getirdi. Çünkü aslında yapabileceğimi fark ettim. Çok zor bir şey olmadığını, yapılamayacak bir şey olmadığını fark ettim. Hani öyle gözümde büyütmem gereken bir şey olmadığını fark ettim. Sadece planlama ve güzel bir süreç ile çok da güzel çalışabileceğinin ya da hEp'e yazabileceğim ödevlerimi tamamlayabileceğimin farkına vardım."

According to the fantasy realization model that forms the basis of this study, the basis of mental contrasting and implementation intentions self-regulation strategies are goal & outcome and obstacle & plan pairs. In hEp, four of the six

screens where participants are expected to make information input are consist of these pairs. According to the fantasy realization model, these pairs have different contributions to goal achievement. Apart from goal & outcome and obstacle & plan, there are time and emotion screens in hEp. It has been stated in the literature that determination of these factors also contributes to goal accomplishment. Based on this information, participants were asked how the factors on each screen of hEp contribute to goal accomplishment. Participants had different explanations and interpretations on different factors. Accordingly, the theme of ***effectiveness of hEp elements*** ($n_P$=19, $f$=117) emerged. In the process, apart from the factors mentioned above, participants' comments were received regarding the effectiveness of some other elements in hEp. Therefore, under this theme, all the hEp elements that the participants commented on their effectiveness emerged as sub-themes. These are: Time screen, obstacle-plan screens, emotion screen, goal screen, awareness screen, completion delay field, outcome screen, and ongoing hEps main screen.

The *time screen* ($n_P$=14, $f$=29) sub-theme refers to the participants' interpretations about the time screen, where they specify the amount of time necessary for related goal accomplishment. Although eleven of the participants stated that the presence of the time screen contributed to the goal accomplishment, some of these participants stated that the effect of this screen on goal accomplishment may change depending on the situation. On the other hand, although four participants emphasized that the determination of time period and the start of the countdown were negative features, for two of them, these features contributed to goal accomplishment. Participants who think that setting time restriction is a positive feature in hEp stated that they realized what they could do in how long, they were target-oriented, and they followed their plans. C1P4 used following utterance on the existence of time restriction and countdown:

> *"Time actually provides a great benefit in terms of not delaying.*
> *You are completely committed to making it happen as soon as possible.*
> *Having time is much better, I think."*

> *"Süre aslında ertelememek gerektiği konusunda büyük fayda sağlıyor, Bir an önce onu gerçekleştirmeye tamamen kendinizi vermişsiniz . Sürenin olması bence çok çok daha iyi."*

From the fourth cycle, C4P2, expressed the awareness formed by the presence of the time screen in the following sentences:

> *"As I said, I never said before that I would do it in such a day. But like this, I got a chance to think more realistically. For example, I said I could do it in two days, then I said I can do it in three days. So I actually weighed myself there."*

> *"Dediğim gibi, ben önceden hiç demiyordum şu kadar günde yaparım diye. Ama böyle, daha gerçekçi düşünme şansım oldu an. Hani mesela iki günde yaparım demiştim mesela, sonra demiştim ki üç günde yapabilirim. Yani orada aslında kendimi tartmış oldum."*

C2P3 emphasized that the user should think about how long she will achieve her goal just before the goal setting and determine the time in this way. She claimed that thereby the time screen could be useful. Another participant said that she studied harder due to time limitation, but she would not prefer it anyway, because she had difficulty. Similarly, another participant stated that time limitation creates pressure on her, so the time she gave herself for goal accomplishment was half an hour longer than usual. Participants made various comments about the time screen, more precisely, time limitation feature. Some stated that this attribute contributed to goal accomplishment, while others said it would contribute under certain conditions. Some participants, on the other hand, said that this attribute is a feature that withdraw them although it contributes to goal accomplishment.

*Obstacle-plan screens* ($n_P$=13, $f$=26) refers to the consideration of factors that prevent the goal achievement and the making of plans to overcome them in hEp. In accordance with the research subject of this study, obstacles are related to the Internet usage behavior of the participants. Therefore, the plans made by the participants were also aimed at changing the Internet usage behavior. With some statements, the participants evaluated the effectiveness of obstacle-plan screens together, with some others they emphasized the contribution of each screen separately. A total of six participants evaluated the effectiveness of obstacle-plan screens together. One

participant said that making plans for her obstacles was more motivating in the process of goal achievement, another said that the information she wrote on these screens contributed to the confrontation with herself and four participants emphasized that by embodying their obstacles, they were able to make their plans more clearly to overcome them. Regarding the effectiveness of the obstacle screen, eight participants shared their opinions. Seven of the eight participants stated that writing down their obstacles raised their awareness in the goal achievement process. Three of these participants stated that by writing them, they concretized the obstacles they already knew, so they had to face these obstacles. C2P2 used following excerpt while stating the effectiveness of obstacle screen:

> *"... I knew that it was constantly preventing me and making it difficult for me to do things, but when I write there, I have more concrete data; when I write it like this or know it is somewhere, I have more concrete data because I see it on the screen. Yes, it was really distracting me, I realized when I posted this here and resisted that obstacle."*

> *"...beni zaten sürekli engellediğini, bir şeyleri yapmamı zorlaştırdığını biliyordum ama, oraya yazdığım zaman daha somut bir veri, hani böyle yazıp görünce veya bir yerde olduğunu bildiğim zaman, ekranda görmüş olduğum için daha somut bir veri oluyor elimde. Evet beni gerçekten oyalıyormuş, bunu buraya yazıp, o engele karşı koyduğum zaman fark ettim."*

Another participant stated that because she now knows her obstacles, she sits at her desk more strong-minded and focused on her lesson.

Nine participants expressed their opinions regarding the contribution of the plan screen to the goal achievement process. In line with the plan, they formed in hEp, the participants stated that they focused on not surfing the Internet, drew a roadmap, gave priority to achieving the goal, stuck on the plan, and used time more effectively. In addition, one participant stated that the most important screen for her in the goal accomplishment process is the plan screen.

*Emotion screen* ($n_P$=11, $f$=17) is the screen on which participants choose among existing emojis or write how they will feel when they complete the hEp. All but one of the participants used positive expressions for this screen. They said that

this screen was the most enjoyable part of creating hEp and emphasized that it was motivating. In addition, some participants stated that they considered that they will reach the emotion represented by the emoji they choose on this screen, and that they make more effort towards their goals. Participants also emphasized that this screen is motivating. C1P1 used the following expressions for this screen:

> "...and I will feel happier and more successful. I think it is motivating in this way."

> "...ve daha mutlu, daha kendimi başarılı hissedeceğim. Bu yönden motive edici olduğunu düşünüyorum."

Stating that this screen represents the feeling she will experience when she reaches her goal, C2P2 used the following utterance:

> "I think both that emojis make it more fun and I imagine the moment when I really finish it, and it also provides a separate motivation."

> "Hem daha eğlenceli hale getiriyor o emojiler işi hem de gerçekten bitirdiğim anı hayal ediyorum o da ayrı bir motivasyon sağlıyor bence."

*Goal screen* ($n_P$=10, $f$=13) sub-theme refers to participants' interpretations on the goal screen, where they clarify and write their goals. Participants stated that clearly defining and writing the goals on the goal screen embodies the process in their minds, triggers them, and provides more focused attention and motivation. C1P2 pointed out that setting the goal is the most important step for her:

> "So the important step for me is to set goals. Because you cannot progress to anything without setting goals. After that, the stages have already gone in order. The only thing, right now the only thing is to achieve my goal."

> "Yani benim için önemli aşama hedef oluşturmaktır. Çünkü hedef oluşturmadan hiçbir şeye ilerleyemiyorsun. Ondan sonra aşamalar zaten sırası ile gitti. Tek şey şu anda tek şey amacıma ulaşmak."

The *awareness screen* ($n_P$=10, $f$=12) is the screen to which the participants are directed after completing the hEps they have created, and aim to make them evaluate the process. During the interview, two participants stated that thanks to hEp,

they created various awareness, but they never used this screen. When asked why they did not use this screen, they said they did not see it necessary. Nine participants stated that they used this screen at least once, and the remaining participant stated that although they wanted to use it, they did not know how to do it. Participants using this screen stated that they could evaluate the whole process, express the changes in themselves, and write down the negativities of the process thanks to this screen. C4P2 uttered following sentences regarding awareness screen:

> *"I think it's very good, we evaluate the process. We see our achievements, what prevents us, did we overcome them, I think it is nice, we evaluate ourselves in a way."*

> *"Bence çok güzel, süreci değerlendirmiş oluyoruz hani. Başarılarımızı görmüş oluyoruz bize ne engel oluyor, onları aşabildik mi, güzel oluyor bence, kendimizi değerlendiriyoruz bir nevi."*

*Completion delay field* ($n_P$=5, $f$=10) is the area added in the last cycle, where hEps that were not completed on time appear with a red background on the ongoing hEps main page. Three participants stated that turning this area red would be a pushing factor in completing hEp, it would make them ambitious. On the other hand, one participant stated that this area did not have any positive or negative effect, while another stated that she was worried, felt that did something wrong, and thought that the hEp she created would be deleted. While this area has had a positive effect for most users, it has had a negative effect for one.

*Outcome screen* ($n_P$=7, $f$=7) is the screen where the participants write the gains they will achieve if the goal accomplishment occurs. Seven participants said that identifying and writing their outcomes contributes to the goal accomplishment process, by providing motivation, increasing focus, and providing awareness of what they can achieve. One of these participants pointed out that the most beneficial factor for her in hEp is the outcome screen on the way to goal accomplishment.

*Ongoing hEps main screen* ($n_P$=2, $f$=2) is the first screen that participants see their continuing hEps when they open the hEp app. Two participants from the 1st cylce stated that seeing their continuing hEps on the ongoing hEps main screen creates a feeling of completion necessity of those hEps.

***Change on affects*** ($n_P$=14, $f$=57) is another theme of perceived effectiveness of hEp. Users stated that using hEp caused some emotions in them. Although the majority of these were positive emotions, a small number of participants stated that they experienced unhappiness when they felt they failed due to the countdown feature of hEp. The sub-themes related with change on affects theme are: Feeling positive & peaceful, feeling relief, feeling succeed, feeling motivated, feeling bad & upset, gaining self-confidence, and feeling appreciated.

A feeling that participants said they felt most after using hEp was *feeling positive & peaceful* ($n_P$=9, $f$=16). As in the other affects, the participants pointed out a positive & peaceful feeling both about the entire hEp use process and after they click on complete hEp button. Five participants stated that they felt happier, more positive and peaceful in the whole process. Six participants stated that they experienced these positive and peaceful feelings by clicking the complete hEp button. C4P2 expressed the positive affect she experienced after clicking the complete hEp button with the following sentences:

> *"Clicking this button is a lot, very peaceful. I've finished and I've also completed my hEp. "I completed it" it gave me a happiness; it gives a nice feeling."*

> *"Bu butona basmak çok şey, çok huzurlu. Bitirdim ve hEp'imi de tamamladım. "Tamamladım" bana bir mutluluk veriyordu, güzel bir duygu veriyor."*

*Feeling relief* ($n_P$=7, $f$=14) refers to the relaxation experienced by the participants with their use of hEp. Four participants stated that as a whole process, focusing on their academic goals by creating hEp reveals a sense of relief for them. In addition, five participants stated that they felt a substantial relief when they completed their goals and clicked the complete hEp button. Regarding the feeling relief after hEp completion, C2P4 stated:

> *"But after I finished, as I stated there, I was happy and relieved, no matter how tiring it was for me."*

> *"Ama bitirdikten sonra, orada belirttiğim gibi, benim için ne kadar yorucu olsa da mutluydum ve rahatlamıştım."*

*Feeling succeed* ($n_P$=8, $f$=10) refers to the sense of success experienced by the participants by completing their goals in line with the hEps they create. Eight participants stated that they experienced a sense of accomplishment after clicking the complete hEp button. C4P2 used following excerpt regarding the feeling succeed:

> *"For me, that subject was finished and shelved, and I was done. It came back as a good feeling. Because I succeeded in this job, like I did."*

> *"Benim için o konu bitmiş ve rafa kaldırılmış oldu ve tamamlamış oldum. Bu iyi bir his olarak geri döndü. Çünkü ben bu işi başarmış oldum, yaptım gibi."*

In addition, two participants stated that, when they look back, they have a sense of accomplishment when they consider the hEp use process as a whole. C4P2 used following utterance on the feeling succeed after the whole process:

> *"It remained a success there. It also feels like an academic achievement to me, as I am happy looking at the hEps I have completed."*

> *"Orada bir başarı olarak kaldı. Tamamladığım hEp'lerime baktıkça mutlu olduğum için, o da bana akademik bir başarı gibi geliyor."*

*Feeling motivated* ($n_P$=5, $f$=6) is about how participants' use of hEp changes their academic motivation. Four participants stated that they were more motivated to study thanks to hEp, and their motivation increased because they realized better what and how they studied in line with the information inputs in the hEp. One of these participants and C1P1 said that from time to time they were still looking at their completed hEps for motivation. C1P1's utterance is as follows:

> *"Completed hEps was also motivating. Look, I was able to achieve this much, that is, I was able to do this, it made me think motivating."*

> *"Tamamladığım hEp'lerim" de motive edici idi. İşte bak şu kadarını başarabilmişim, yani bunu yapabilmişim, motive edici düşünmemi sağlıyordu."*

*Feeling bad & upset* ($n_P$=4, $f$=4) sub-theme emerged as a result of countdown feature of hEp. Participants give themselves a certain amount of time to achieve their goals in the hEp they create and attempt to achieve their goals before this period

ends. Four participants stated that they experienced a feeling of failure and felt upset because they exceeded this period, and one participant described the existence of such a countdown as annoying. Therefore;

*When users cannot complete their hEps in time, they should encounter a prompting question that they can better understand why they could not complete.*

Three participants stated that hEp contributes to the users in terms of *gaining self-confidence* ($n_P$=3, *f*=3). Two participants stated that after completing their hEps, they felt that they can achieve their goals, and one participant emphasized that she experienced this feeling while she was creating her hEps.

*Feeling appreciated after completing hEps* ($n_P$=2, *f*=2) refers to the participants' feeling of appreciation after completing the hEp. Two participants stated that they received appreciation, even if digitally, and their achievements became concrete.

***Obtained awareness*** ($n_P$=13, *f*=27) is another theme, that emerged as a result of participant explanations regarding the awareness they obtained by means of hEp. Participants said that thanks to hEp, they got to know themselves better, saw that they could achieve their goals and overcome their obstacles when they made an effort, developed various awareness about timing, and faced their mistakes. C1P1 stated that before hEp, she always kept her goals high, she was burdened with studying, and that she studied both for a shorter time and more efficiently after she started using hEp. On the other hand, before hEp use, C2P4 said that she had always competed with others and after she started using hEp she realized that she was her competitor. She stated that another awareness is to stop procrastinating. C1P4 said that when she creates hEps that will last for days, she fails, but realizes that she must create hEps that will take hours. On the other hand, C3P2 said that thanks to hEp, she noticed that she was slow in her academic studies. C3P4 stated that, thanks to hEp, she faced her academic mistakes and realized that she had to reduce these mistakes. She used following sentences:

*"Even to herself, sometimes one cannot admit it. Maybe what I did is wrong, but once you start hEp, you are expressing your thoughts this time. You can say that, yes this was the mistake I made, you say reduce it."*

*"Kendine bile insan bazen itiraf edemiyor. Yaptığım şey yanlış belki, ama hEp'e başladıktan sonra bu sefer dışa vuruyorsun düşüncelerini dışa vuruyorsun. Bunu söyleyebiliyorsun, evet bu yaptığım hataydı bunu azalt diyorsun."*

**User satisfaction** ($n_P$=9, $f$=13) theme emerged as a result of participants' explanations on the satisfaction they have experienced throguh the effectiveness of hEp. 9 participants emphasized that hEp is effective for them and they are satisfied with hEp.

**Efficieny** ($n_P$=8, $f$=10) is the other aspect that users compared hEp with other apps or methods. Three participants stated that they had previously written their goals and plans on paper and studied by trying to comply with these plans they had written. Comparing the use of hEp with this method, they stated that hEp helps to focus more on the goal by taking into account other variables that will mediate goal accomplishment. Another participant, in support of these views, stated that she embodied the process by entering various information on each screen in hEp, and more importantly, clicking the "complete hEp" button when the goal was completed proved that she has achieved something, more precisely, she obtained an indication that she has succeeded. C1P3, on the other hand, emphasized that every application promises something, but hEp is the most reasonable application for herself, and it is more appropriate to set goals with the support of hEp rather than deciding alone. Other participants emphasized that hEp is unique, it allows the user to gain control in the process of goal accomplishment, and it does not have any deficiencies compared to other applications. Only one participant stated that after living an isolated life due to Covid-19 pandemic for a long time, hEp was replaced by friends. She said that she had tried to study with the support of hEp before, but continued to study by meeting with her friends after the isolation was softened.

**Mind hEpping** ($n_P$=4, $f$=6) refers to the situation in which the participants think and form each input field (from goal to plan) of hEp in their minds. Three

participants stated that they designed all the stages in their minds before creating hEp in the app. So they have created the same hEp twice. Considering the possibility that this may increase the effectiveness of hEp, it is presented under the category of perceived effectiveness of hEp. Also, one participant stated that she is now starting to form her hEps from her mind. In other words, it is thought that this participant can make the goal realization process more effective by doing mind hEpping.

*Simplicity* ($n_P$=4, $f$=5) theme refers to what the participants think of the simplicity of hEp compared to other similar applications. hEp has been found to be more simple, understandable and clear compared to other programs by four participants. C1P4 uttered following sentence regarding this simplicity:

> *"As I said, I downloaded a few apps (I don't remember their names) before that. Very long and complicated applications. This was very clear to me. I could easily do it."*

> *"Dediğim gibi ben bundan önce birkaç tane uygulama (isimlerini hatırlamıyorum ama) indirdim. Çok uzun ve karışık uygulamalar. Bu benim için çok açık ve netti. Kolaylıkla yapabildim yani."*

Two participants stated that hEp had **benefits on the physical health** ($n_P$=2, $f$=2). One of them said that she was nice in terms of her health because she spent less time on the phone, another emphasized that she had no headache after studying because she stopped working in a messy way.

### 4.2.3.2 Category 2: Other Variables Affecting the Use of hEp

During the study, it was observed that there were some other variables that could affect the use of hEp and its perceived effectiveness. Based on this inference, *other variables affecting the use of hEp* ($n_P$=15, $f$=58) category has emerged. These variables are ***academic habits of students, novelty effect, researcher factor, and unexpected events***. Figure 4.15 represents themes and sub-themes regarding other variables affecting the use of hEp.
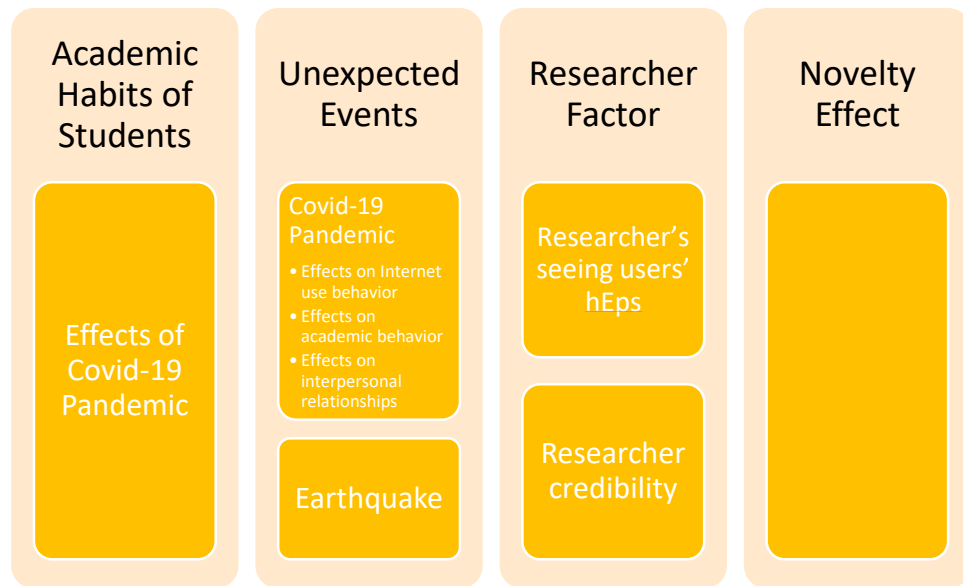
Figure 4.15 Themes and Sub-Themes regarding Other Factors Affecting the Use of hEp

*Academic habits of students* ($n_P$=12, $f$=20) refers to the periodic or general academic habits of the participants. As general academic habits, two participants stated that studying in line with time constraints was not suitable for them, while one participant said that they definitely studied in line with time constraints and she added that she must do everything on time, otherwise she is not satisfied with the study she has done. Besides, two participants stated that the only purpose of their studying is to get high grades and to feel successful. One participant said that she lacked concentration however, studied for pleasure. Another participant emphasized that she constantly made plans and did not comply with these plans. One participant stated that she was very inclined to procrastination, while another stated that she was worried that she would not be successful in her lessons.

As for periodical academic habits, six participants said their academic habits changed negatively due to the Covid-19 pandemic. One of them pointed out her concern about health as the cause of this change. The other five participants stated that switching to online education in this new situation, continuing their education in an unfamiliar system and being in a home environment all the time caused

academic reluctance. Therefore, their academic habits have changed negatively. C3P4 used following utterance regarding this change:

> "I was more organized. As soon as I came from school, I was repeating a topic. I was not spreading this out for a long time. I was doing the topic repetition again after coming from school."

> "Daha daha düzenliydim. Okuldan gelir gelmez bir konu tekrarı yapıyordum. Bunu uzun bir süreye yaymıyordum.  Okuldan geldikten sonra hani konu tekrar yapıyordum."

Two different **unexpected events** ($n_P$=9, $f$=20) occurred while this study was being conducted. The 6.8 magnitude earthquake that occurred during the first cycle and the Covid-19 pandemic that has been included in our lives since the second cycle. *Earthquake* ($n_P$=1, $f$=4) is an event that C1P4 is very affected by. She stated that her psychology was negatively affected due to this disaster and therefore she had difficulty in fulfilling her academic duties. *Covid-19 pandemic* ($n_P$=8, $f$=16), on the other hand, negatively affected the participants' academic behavior, Internet usage behavior and interpersonal relationships. 6 participants stated that their academic behavior changed negatively due to Covid-19 pandemic. One participant stated that she could not focus on her academic studies due to her fear of this pandemic, one participant had difficulty studying from home, two participants stated that their academic procrastination increased a lot, two participants started to study more irregularly and one participant stopped studying on her own will. All eight participants stated that their social and recreational Internet usage durations increased too much because they were at home all the time due to the Covid-19 pandemic. One of these participants added that because of long Internet usage time, interpersonal relationships have come to the point of deterioration.

Participants stated that **researcher related factors** ($n_P$=6, $f$=12) affected their hEp usage. *Researcher's seeing users hEp* ($n_P$=4, $f$=9) was the most important factor that affected participants' hEp use behaviors under researcher related factors. Four participants stated that the as researcher was able to see and follow the created hEps from the system, they were more attentive and did not procrastinated. The other factor affecting participants' hEp usage was *researcher credibility* ($n_P$=2, $f$=3). Two

participants developed a positive attitude towards hEp because of the researcher's institution. Moreover, participants stated that taking part in this study creates a sense of responsibility.

Several comments made by all of the first cycle participants on hEp emerged because the application was new or they were new to using this application. Accordingly, the ***novelty effect*** ($n_P$=4, $f$=5) theme has emerged. Two participants stated that it was their fault that they could not use the awareness screen, and it occurred due to inexperience. Another said that she overestimated the duration of the first hEp, while the other said that she thought she made hEp wrong and deleted it and rewrote it.

### 4.2.3.3    Category 3: hEp Related Tendencies

***hEp related tendencies*** ($n_P$=18, $f$=71) category includes participants' interpretations of the expectations they experienced before and after the use of hEp, their willingness to use it, attempts to re-use behavior, their preferences to recommend hEp to others, and who the target audience for hEp is. Figure 4.16 represent the themes and sub-themes under hEp related tendencies category.
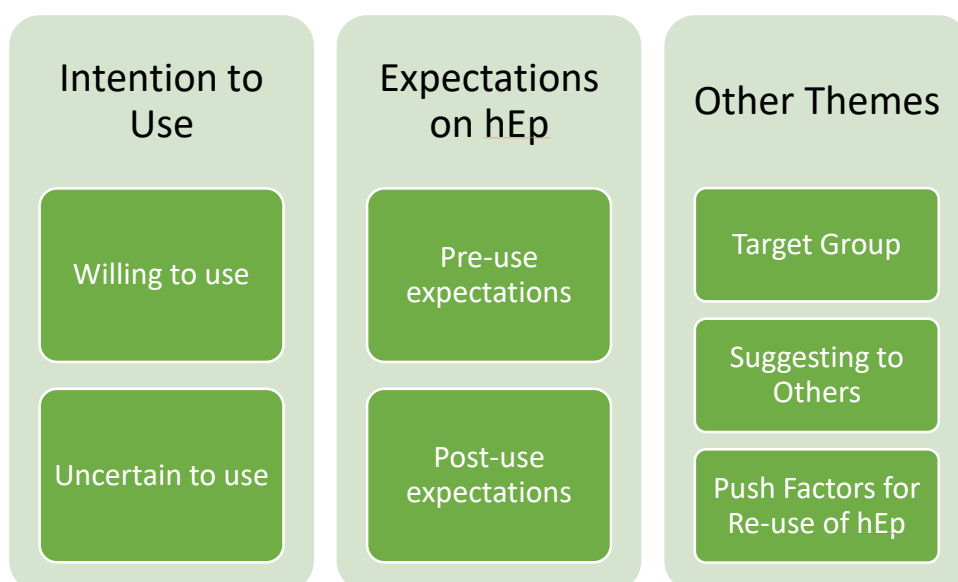
Figure 4.16 Themes and Sub-Themes regarding hEp Related Tendencies

***Expectations on hEp*** ($n_P$=9, $f$=15), refers to the expectations which participants had before and after using hEp. *Pre-use expectations* ($n_P$=4, $f$=6), the first sub-theme of this theme, addresses participants' expectations of hEp in line with the information provided by the researcher, before they start using hEp. One participant stated that she thought that hEp would be useful when she saw its aims, another said that she thought she could achieve many things thanks to hEp, another said that she was excited and C3P2 thought she would follow her lessons in a more organized way. *Post-use expectations* ($n_P$=7, $f$=9), the second sub-theme of expectations on hEp theme, refers to the participant expectations after the hEp use. Participants stated that they would like to use hEp for various tasks in the near future, emphasized that they could obtain better results in future hEps, and stated that they could use hEp more effectively if some conditions changed. One of these conditions was the introduction of the start-pause-continue feature to hEp, a hEp-related expectation, while the other was the go away of the Covid-19 pandemic, an environmental expectation.

Participants were asked whether to use hEp after the study or not, and the ***intention to use*** ($n_P$=12, $f$=15) theme emerged in line with the answers received. Eleven participants stated that they were willing to use hEp, and one said that they could use it even if they are not sure.

8 participants made various comments regarding which ***target group*** ($n_P$=8, $f$=12) hEp is suitable for. It has been emphasized that it may be suitable for individuals with a high workload, shows academic procrastination, in a more flexible education phase, in graduate education, and poor time management skills.

Participants were asked whether they would recommend hEp to other people and the theme of ***suggesting to others*** ($n_P$=9, $f$=11) emerged based on the answers received. Five participants stated that they currently have recommended hEp to others, and four participants stated that they plan to make this recommendation.

***Push factors for re-use of hEp*** ($n_P$=2, $f$=3) theme refers to what pushed participants who were in past cycles and wanted to be in the last cycle voluntarily. A participant from the 1st cycle became a re-participant in the 4th cycle voluntarily. When asked about this situation, she stated that she wanted to do a trial immediately because of the notification feature to hEp, she needed a support to study due to the Covid-19 pandemic and she was very pleased to use this current version of hEp. Besides, a participant from the 3rd cycle stated that she chose to be a re-participant in the 4th cycle because it coincided with the exam period.

### 4.2.3.4    Category 4: hEp Creation Process

It is deemed appropriate to report the following researcher interventions, which may have directly / indirectly affected the hEp creation process examined under this category. Before the 1st cycle, participants were both informed face to face about the use of hEp, and their questions were answered, but this was not possible in other cycles due to Covid-19 pandemic. In other cycles, the hEp guide and hEp samples were shared with the participants, and they were asked to review them before they started using hEp.

***hEp Creation Process*** ($n_P$=15, $f$=46) is a category that aimed to reveal how participants prefer to interact with this new application, what methods they prefer to learn and use hEp, what strategies they follow when creating hEp, how long it takes for them to create hEp, how they determine the length of time, and what do they pay attention to when setting goals. Emerged themes were: ***hEp creation duration, hEp implementation duration, mind hEpping, getting familiar with hEp, goal formation,*** and ***hEpping behaviors of non-participant users*** (See Figure 4.17). In this category, the hEpping behaviors of non-participant users theme came from hEp database content analysis, not from interviews. Presenting this theme was deemed important because individuals trying to create hEp without being exposed to any knowledge regarding hEp have a common feature: writing long-term, major goals, but expressing obstacles and plans for them superficially. This situation has been

deemed important, because it can lead the necessary developments to ensure efficient use of hEp by users.
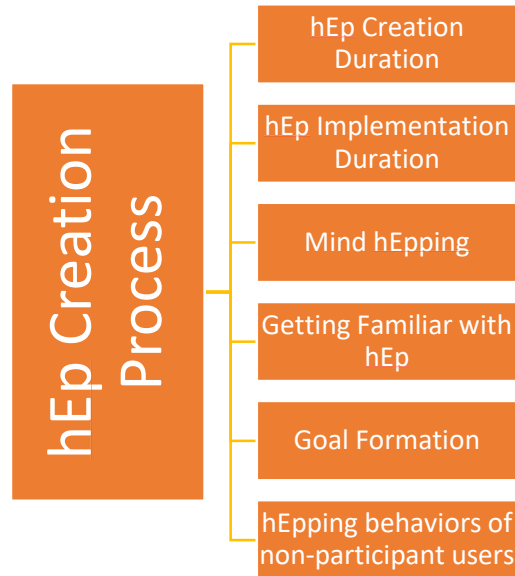


Figure 4.17 Themes regarding hEp Creation Process

***hEp creation duration*** ($n_P$=14, $f$=19) is the theme under which participants expressed how much time they spend to create each hEp. Participants spent more time creating their first hEps than later on. Participants' allocated time to create the first hEp varied between 60 minutes and two minutes. In the following hEps, this time ranged from 30 minutes to two minutes. Four participants stated that it took 1-4 minutes to create their hEp, and eight participants stated that it took 5-10 minutes. In addition, one participant stated that she allocated 10-15 minutes, another stated that she allocated 30-60 minutes. The hEp creation duration of the majority of the participants was in the range of 5-10 minutes. They noted that the hEp creation duration was not long for them, including the participants who generated hEp in a shorter or longer time.

***hEp implementation duration*** ($n_P$=9, $f$=11) is the theme that reviewed what factors participants pay attention to while determining the implementation duration of the hEps they create. While determining the duration, four participants thought that they could lose time due to unexpected situations, breaks, etc. they kept the

duration of their hEps longer than they intended. One of the participants, who gave information about the implementation duration of the hEps she created, stated that she created hEps of 45 minutes on average, and another stated that she created hEps of approximately 1 day each. Another participant emphasized that the individual should have self-awareness in determining this duration, and another stated that she determined this duration appropriately. C1P3, on the other hand, said that since she was a beginner in hEp, she kept this time for the first hEp as short as possible and she stated that she arranged more time for the next ones:

> "In the first hEp I set it to the least amount of time. Because I didn't know how to use it, so I tried to choose it at least. Then I chose for my latest hEp, more days. But I finished earlier than the day I chose."

> "Ilk hEp de en az süreye ayarlamıştım. Çünkü kullanmayı bilmiyordum, o sebeple en az seçmeye çalıştım. Sonra, en son hEp'imi daha fazla gün seçtim. Ama seçtiğim günden daha erken bitirdim."

Over all cycles, the shortest duration hEp created was 45 minutes, the longest duration hEp was 20 days. In addition, the participant with the highest number of hEp created 17 hEps and the lowest created 3 hEps.

***Mind hEpping*** ($n_P$=4, $f$=6) is the situation under which the participants think and form each input field (from goal to plan) of hEp in their minds. Three participants stated that they thought each input field thoroughly before creating hEp and formed hEp after filling these fields in their minds. However, C3P5 she stated that, in line with the habit she acquired thanks to the hEp, she was trying to achieve her goals by creating hEps in her mind, without using the application:

> "hEp was good for me, it gave me a habit, occasionally I go in again for motivation. But now I create hEp in my mind and move in that direction."

> "hEp benim için iyiydi, bir alışkanlık kazandırdı, ara ara motivasyon için yine giriyorum. Ama artık zihnimde de hEp oluşturarak, o doğrultuda ilerliyorum."

The other emerged theme was ***getting familiar with hEp*** ($n_P$=5, $f$=5) theme. Under this theme the participants expressed what they did when they first started using hEp and what methods they have tried to learn hEp. Three participants stated

that, in the beginning, they have played around with hEp in order to understand it more clearly. Apart from that, a participant stated that she misunderstood hEp creation, later realized that she got it wrong, and deleted and recreated the hEp. When the hEp deleted by the participant is analyzed, it was seen that she created a hEp for the goal of doing a master degree in a certain program.  Soon after, she realized that she was expected to use hEp app for 2 weeks within the scope of this study and realized that she did not create a hEp suitable for the purpose of this study and formed shorter term hEps. Another participant, C3P3, stated that she did not know how to start hEp at the beginning:

*"I didn't know how to start hEp first."*

*"hEp'e, önce nasıl başlayacağımı bilemedim."*

***Goal formation*** ($n_P$=3, $f$=5) theme has emerged in line with the expressions used by the participants in determining the goals to be created in hEp. Two participants stated that they formed hEps related to their exams due to their participation coincide with the exam period. Therefore, their goals were determined beforehand and against their will. One of these participants stated that she planned to create hEps for other goals if it was not the exam period. Another participant stated that she preferred to use hEp for homework that she thought would be difficult.

**hEpping Behaviors of Non-participant Users** Since hEp is offered to users free of charge on digital distribution platforms, it has been used not only by the participants of this study but also by other, non-participant users. When the hEps formed by these non-participants were examined, it was observed that they formed their hEps with very general or vague expressions. One participant wrote her desire to study a new university, both as a goal and an outcome. She stated that she saw her husband as an obstacle, and stated her plan as persuading her husband. Another non-participant user stated her goal as "To reach a good position in my profession". Here, too, it is seen that the goal is stated in a very general expression. This situation was also observed in other examined hEps. It has been observed that general goals such as being a good nurse, getting a master's degree, completing the doctoral thesis by

the end of a certain month, etc. were written. When these statements are examined, it is concluded that non-participant users might not examined the guiding content.

Therefore;

***When users start using hEp for the first time, they should see tips that direct them to the hEp guide and hEp samples.***

### 4.2.4        Design characteristics of *hEp* (R.Q.4)

The design principles regarding hEp were created in line with the literature, interviews conducted with the participants (two pilot studies and four cycles), the content analysis of the information in the hEp database, and researcher observations. In the first of the pilot studies, the hEp was presented to the participants through the PowerPoint program, and in the second, it was presented as a website. In the main cycles, hEp was presented to users as a mobile application. In line with these data sources, design principles consist of four main headings. These are; content, visual design, interaction, and technical features. Figure 4.18 represent the main and sub-headings regarding design characteristics of hEp.
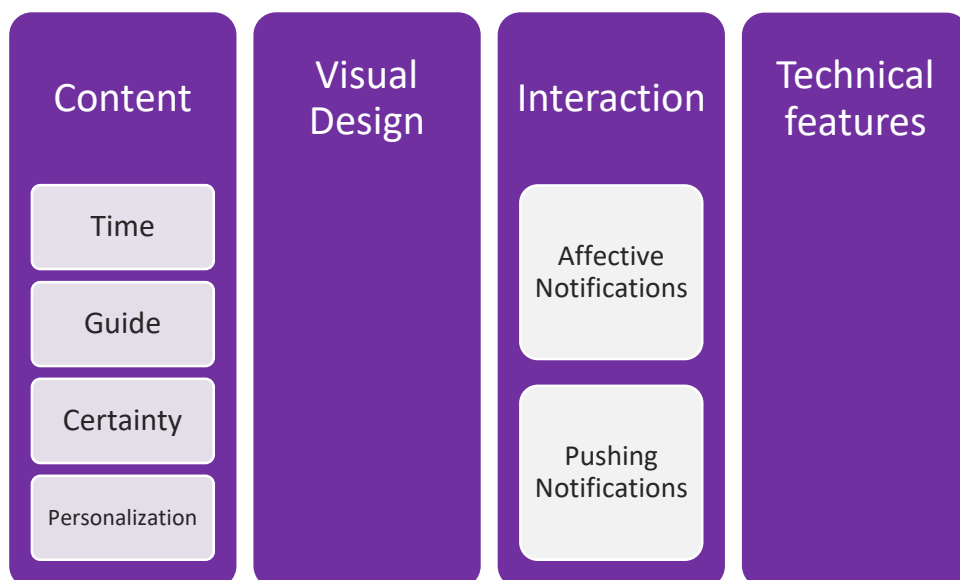


Figure 4.18 Main and Sub-Headings regarding Design Characteristics of hEp

### 4.2.4.1    Content

In addition to the feedback on how the contents in hEp should be, the principles considered by the researcher in the process were also examined under the title of content.

*Time*

In the 1ˢᵗ cycle, the participants emphasized that they could not see how much time was left in the hEp homepage even though there was time restriction in the hEp. They stated that it should be possible to see how much time the user has left. In line with the demands from the first cycle, the remaining time feature added in the second cycle was found to be motivation-lowering and disturbing by some second and third cycle participants. On the other hand, some participants found this feature motivating and increasing goal striving. For this reason, it is considered appropriate to leave the use of this feature to the user's preference: Therefore:

*Cycle 3: hEp should customize the time-related contents according to the users' preferences.*

*Guide*

In the pilot stages, it was observed that the undergraduate students wrote performance goals (passing an exam, getting a high grade, etc.) and did not find hEp successful in the goal achievement process. When the characteristics of performance goals are examined, the focus is to achieve outcome, to be found successful or not found unsuccessful by external sources (Elliott & Dweck, 2005). hEp, on the other hand, aims to enable users to learn from their mistakes and engage in more effective strategies while achieving their goals. For this reason, users should be encouraged to create mastery-oriented goals rather than performance goals in hEp.

Therefore;

*Pilot cycles: hEp should enable users to set goals such as "to learn …", "to understand …" rather than to "get high marks" or "pass the exam".*

Although the participants in cycle 1 received face-to-face training on the use of hEp, one participant stated that she was not sure what to write when creating the first hEp. Therefore, guideline and sample content should be provided to the participants before creating the first hEp. Although the hEp guide and hEp sample contents were sent to the cycle 1 participants via e-mail, they did not feel the need to open and read both documents. Therefore;

*Cycle 1: hEp guide and hEp sample contents should be presented in the application itself in an area that users can easily notice them.*

Although the hEp guide and sample contents are provided in the application under the menu, since the second cycle, some participants in the third cycle stated that they did not see the hEp guide or sample contents. Therefore, they emphasized that they had difficulties during the first hEp creation. In order to overcome this situation:

*Cycle 3: When users start using hEp for the first time, they should see tips that direct them to the hEp guide and hEp samples.*

Participants used the sample contents to learn how to create hEp towards their goals. However, it was seen that two participants from the third cycle used them for different purposes. One participant sampled the time interval given in the example hEp in order to set realistic critiques of her goal. Another participant reminded that she had to study on a content given as an example in hEp. Based on these positive contributions of hEp sample contents:

*Cycle 3: hEp should customize the guiding contents according to the users' field of study.*

In the third cycle, a participant stated that she did not understand the function of the plus button on the obstacle-plan screens, so she had difficulty adding obstacle and plan. Therefore:

*Cycle 3: Usage tips regarding the buttons in the hEp should be provided to the user.*

It is not understood by some participants that the ongoing hEps are editable. Although it is written that it can be edited on this screen, the participants stated that it would be more appropriate to provide this information with a pop-up notification. It is thought that this situation may have occurred due to the large amount of information on the ongoing hEps detail page. Hence;

*Cycle 3: hEp should provide necessary clues with suitable method for screens with editable features.*

During the cycles, some participants expressed feeling negative emotions because they were not able to complete their hEp. When users fail to complete their hEps properly in the time they have specified, they should encounter a guiding screen and select the cause of this negative condition so that they might be able to successfully complete their subsequent hEps.

*When users cannot complete their hEps in time, they should encounter a prompting question that they can better understand why they could not complete.*

### *Certainty*

One participant stated that she wanted to see all the hEps she created both clearly and with all details. Currently, completed hEps are ordered in a list, and participants cannot see which day they created hEps and which day they did not. This situation was seen as an important deficiency. In order to properly follow the daily, weekly, monthly, etc. goals, usage statistics should be presented to individuals in a way that does not allow for misunderstanding. Thus;

*Cycle 3: hEp should be able to present usage statistics clearly, without causing any misunderstanding.*

Participants stated that they had problems due to ambiguous statements about the completion time of hEp and it is a contradictory feature with other applications. Therefore;

*Cycle 2: The sentences in the hEp should prevent ambiguity and the features of the hEp should not contradict with general understanding regarding applications.*

### *Personalization*

Some of the participants made suggestions that the visual features of hEp should be improved, while some of the participants made suggestions that it should be optional based on the user's preference. Therefore;

*Cycle 2: hEp should have flexible, customizable features to meet the different expectations and preferences (visual or content related) of different users.*

Although the participant showing severe PIU underlined the need to set short-term goals for herself, no such statement was heard from the other participants. Some of the participants with severe PIU in the pilot stages also stated that they could not achieve the long-term goals but could achieve the short-term goals. Therefore;

*Cycle 1: hEp should customize the hEps that can be created by the participant, based on the user's PIU level.*

### 4.2.4.2 Visual Design

One of the participants said that a more vivid color should be used for the buttons in the completed hEps main page. Because this screen is the screen that shows that the users have successfully completed their hEps. In other words, she stated that she wanted to see the completed hEps as buttons on the completed hEps main page, with the emphasis that they have been achieved. Based on this discourse;

217

*Cycle 3: Motivating visual design should be used on the buttons that the users give importance.*

After the 1st cycle, a participant stated that the font sizes of the description texts in the hEp were small and could be difficult for visually impaired users. Based on this situation;

*Cycle 1: hEp should have fonts suitable for users with visual impairments.*

One participant noticed that the menu items do not have a case consistency and stated that this situation should be corrected. Based on this situation:

*Cycle 3: The same type of contents in hEp should have a consistent style among themselves.*

### 4.2.4.3    Interaction

***Affective notifications***

One participant in the first cycle stated that receiving motivational notifications from hEp during the daytime can be effective in setting new goals. Consistently, one of the experts in the pilots stated that in order to establish a link with the application, the application should provide notifications as if it were interacting with herself. Moreover, a participant from cycle 2 requested motivational notifications for completed hEps. Therefore;

*Cycle 2: hEp should provide affective notifications for the users to affiliate to the application.*

***Pushing notifications***

Applications send various notifications to remind the user about the application and to enable him / her to use the application again. Cycle 1 participants

emphasized that hEp should send similar notifications. In addition, the participants in the pilot stages stated that the application should remind itself with a notification when it is not used for a while. Therefore;

*Cycle 1: After a period of inactivity, hEp should remind users of itself.*

In applications with a countdown, various notifications are sent to the user about the time. Participants stated that they also expected such a feature from hEp. Therefore;

*Cycle 1: hEp should provide notifications to users regarding their remaining time.*

### 4.2.4.4 Technical Features

Various technical problems have occurred in hEp during cycles. Some of these problems are consistently experienced on all devices, while some have been experienced on a small number of devices. It is important that hEp works consistently. Therefore;

*Cycle 4: hEp should have technical features that will work properly on different devices.*

# CHAPTER 5

## DISCUSSION & CONCLUSION

In this section, stage 1 and stage 2 are discussed under subheadings. In stage 1, Internet use patterns & behaviors of the undergraduate university students were discussed according to academic, social, and recreational subtypes, relationship among demographics, problematic Internet use (PIU), and Internet use patterns (IUP), and the model that include the direct and indirect effects of self-regulation, academic procrastination, and academic performance on PIU constructs are discussed. In stage 2, discussions were made on the participants' Internet usage behaviors and how they consider these behaviors. In addition, the usability features of the developed hEp application, the experiences of the participants about hEp and the design principles that emerged in the research cycles were discussed. In addition to discussion, implications have been suggested for practitioners and for future studies.

## 5.1    Stage 1

### 5.1.1    Relationship among Demographics, Problematic Internet Use (PIU), and Internet Use Patterns (IUP)

This study revealed no significant gender differences in problematic Internet use. However, the literature shows different results in this regard. Both an earlier and a recent review studies claimed that males show more PIU behaviors than females (Anderson, Steen, & Stavropoulos, 2017; Shaw & Black, 2008). Several other studies also claimed that the development of PIU is more likely in males (Lachmann, Sariyska, Kannen, Cooper, & Montag, 2016; Li, Zhang, Li, Zhen, & Wang, 2010; Schimmenti et al., 2019). However, a recent study that examined problematic

smartphone use showed that females use smartphones problematically significantly higher than males (Yang, Asbury, & Griffiths, 2019). On the other hand, several studies showed no relationship between gender and the risk of PIU (Vigna-Taglianti et al., 2017; Yu, Recker, Chen, Zhao, & Yang, 2018). The diversity regarding gender and PIU relationship can be pointing out the mediator variables (Anderson et al., 2017). The non-significant gender difference that emerged in this study may have arisen due to the general consideration of problematic usage. That is, significant gender difference can be seen if problematic usage is reviewed according to its subtypes (e.g., problematic Internet gaming, problematic SNS use, etc.). Mediator variables mentioned by the literature can be these sub-types of usage. Other than this, nowadays, Internet sub-usage types are very diverse. Therefore, we can mention the existence of sub-usage types that will appeal to each individual. General PIU was measured in this study. In other words, the PIU score of the user is determined regardless of subtypes such as playing online games, watching videos, and online social interactions. This may be one other reason why there was no gender difference in the overall PIU – gender relationship measured in this study.

No significant relationship was found between age and PIU which is a consistent finding with several research studies (Poli & Agrimi, 2012; Soh, Chew, Koay, & Ang, 2018). On the other hand, Yu et al., (2018) claimed that older adolescents reported more PIU than younger adolescents, Bhandari et al., (2017) claimed that undergraduates at younger ages show more Internet addiction. Therefore, although several previous studies indicated that significantly higher problematic Internet use rates coincides with the last years of adolescence (18-19 years), this study did not find a significant difference among the ages. Currently there are various types of Internet use that are of interest to individuals in various age groups. Therefore, users may be showing similar problematic behavior in the sub-use types that appeals to them, even though the sub-use types are different in different age groups.

Numerous studies examined the relationship between excessive Internet use and academic performance and most of them claimed a negative relationship

(Eldeleklioğlu & Vural, 2013; Kirschner & Karpinski, 2010; Kubey, Lavin, ve Barrows, 2001; Lau, 2017; Lee, 2009; O'Brien, 2011; Singh & Barmola, 2015; Strasser, 2016). The current study found no significant relationship between PIU and academic performance. In this study, only GPA is considered as an academic performance indicator. This non-significant relationship, which is different from many other studies, may be related to this situation.

Internet use durations (IUD) for academic social, and recreational purposes do not differ by gender for the current study. However, males use flirting apps, MMO gaming, and posting for communication purposes significantly more than females. On the other hand, females use the Internet for creation of informative content, commenting on posts, looking photos/watching videos, and sharing posts significantly more than males. An early study that examined Internet use purposes claimed that males use Internet for leisure related purposes and females use social and educational purposes (Weiser, 2000). A recent one stated that female adolescents use the Internet for social networking and male adolescents use for online gaming and adult sites (Dufour et al., 2016). Both of the studies are in parallel with the current study. Differently, social uses other than social media are available for both genders based on the current study. In Internet forums or websites, males share more posts, that is, they initiate interaction, and females comment on shared posts, that is, they involve in the interaction. Anderson et al., (2017) stated that there can be factors that mediate the relationship between gender and Internet use. On the other hand, in this study, we examined the types of Internet use under three main headings: academic, social, and recreational. There are many different types of usage under these three main topics. For example, under the social use type, there are many sub-types of use; from using messaging in multiplayer online games to communicating via WhatsApp. Therefore, even if the sub-use purposes differ, the total use duration may not differ based on gender.

This study revealed a positive relationship between age and academic Internet use duration. A study comparing the academic Internet use of students under 20 and over 20 showed a similar result. Students over 20 use online educational

resources more effectively for their academic development than students under 20 (Verdugo-Castro, García-Holgado, & Sánchez-Gómez, 2019). This study revealed that undergraduate students at younger ages display more social Internet use than the undergraduate students at older ages. A previous study revealed that younger people use social media significantly higher than older people (Blackwell, Leaman, Tramposch, Osborne, & Liss, 2017). It can be said that in the first years of the university, the students use the Internet mostly for social purposes, in the last years they use it for more academic purposes.

No significant relationship was found between academic, social, and recreational IUD & academic performance and academic, social, and recreational IUPF & academic performance. The literature that examined Internet use and academic performance relationship revealed a negative relationship (Uzun & Kilis, 2019; Xu, Wang, Peng, & Wu, 2019). These findings are in contradiction with the findings of the present study. Moreover, in a meta-analysis study, Huang (2018) examined the relationship between social use and academic performance and found a small negative correlation between SNS use and academic performance. Some of the studies included in this meta-analysis study investigated the relationship between SNS use & academic performance by considering Internet usage duration, some considered Internet usage frequency and some others considered both variables together. In the current study, when duration and frequency is considered, non-significant relationships have emerged. The reason for these non-significant relationships might point out mediator variables. Because, although Uzun and Kilis (2019) found a negative relationship between Internet use and academic performance, they also found a non-significant relationship between video gaming & academic performance and Internet searching & academic performance. Although it gives the opposite results with the current study, this situation provides evidence that the relationship between Internet use and academic performance needed to be examined in more detail. Furthermore, taking only GPA as an academic performance indicator in the current study may have been effective in this result. In addition to students' GPAs, different indicators such as their projects, in-class verbal

expressions may also be variables that can provide information about their academic performance. Therefore, not considering such indicators as academic performance might have led to these results. Moreover, it is important to examine other variables that can mediate or moderate the relationships. In support, a meta-analysis on the academic performance and SNS use revealed that although SNS use is positively associated with literacy scores, however, it is negatively associated with GPA scores (Liu, Kirschner, & Karpinski, 2017). That is, the moderator variable can also be decisive on the relationship. As a conclusion, the non-significant relationship between academic, social, and recreational IUD & academic performance and academic, social, and recreational IUPF & academic performance might point out mediator or moderator variables. In addition, as stated before, considering GPA as the only indicator of academic performance might have influence on these results.

This study investigated the relationship between Internet use patterns (IUPs) and PIU. IUPs are determined by the total time spent for each use type, that is Internet use duration (IUD) and the frequencies of sub-uses under each use type, namely, Internet use purpose frequency (IUPF). Total time spent for academic purposes is negatively associated with PIU. That is, as the Internet use duration for academic purposes increases, problematic behavior decreases. In studies addressing the duration of Internet use, Internet use duration is mostly considered as a single variable without separating into sub-types (Eldeleklioğlu & Vural, 2013; Moreno, Jelenchick, & Breland, 2015; Vally, 2019). In his study, Vally (2019) emphasized that the relationship between PIU and IUD can be mediated by preferred type of activity on the Internet. Results of the current study support this statement. While academic use duration is negatively correlated with PIU, social and recreational IUDs are positively correlated with PIU. Literature also supports these results. Academic IUD has a negative relationship with PIU (Mamun et al., 2020). However, social (Van Rooij, Ferguson, Van de Mheen, & Schoenmakers, 2017) and recreational (Beutel et al., 2011; Jelenchick et al., 2015) IUDs are positively associated with PIU. Although correlations between academic, social, and recreational IUD and PIU significant, only the correlation between social IUPF and

PIU is significant. PIU has relationship with both social use purpose frequency and social use duration. That is, social use patterns (frequency and duration) can be completely related to PIU. Moreover, it can be claimed that rather than the diversity of academic and recreational use types, the duration of these uses correlate with the problematic behavior.

Although many studies emphasize the negative relationship between academic procrastination and academic performance (Balkıs & Duru, 2017; Ferrari et al., 2005; Goroshit, 2018; Kim & Seo, 2015; Steel, 2007), no significant relationship was found between these two variables in this study. This may be because academic performance was measured with GPA. Another study encountered a similar result when it considered GPA as the only criterion of academic performance (Janssen, 2015). As stated before, students' projects, assignment contents, and observations of experts in the classes can also be criteria that can indicate academic performance. Not considering them may be the cause of this situation. Moreover, a limitation regarding sampling may have also caused this situation. Because the majority of the participants were freshmen from the faculty of education. Convenience sampling was used in this study. Therefore, the distribution of students according to grade level and faculties are not random. Faculty and grade level might have impact on GPA. The reason for the non-significant relationship between academic performance and academic procrastination may be due to grade level and faculty variables that might have effect on GPA.

The criticisms (Griffiths, King, & Demetrovics, 2014; Monaghan 2014) on the inclusion of Internet Gaming Disorder as "Conditions for Further Study" (APA, 2013, p.795) in DSM-V regarding addiction are also supported by the results of this study. This study revealed a positive significant relationship between social and recreational Internet use durations and PIU. In other words, regardless of the sub-use type, the increase in social and recreational usage durations has a positive relationship with problematic use. Therefore, treating only a sub-use type (Internet Gaming Disorder) as a concept related to addiction might be an obstacle to adequately addressing deregulated, exaggerated Internet use.

### 5.1.2    Structural Model

In this part of the study, it is aimed to model the relationship among self-regulation, academic procrastination, academic performance, and problematic Internet use constructs, namely, preference for online social interaction (POSI), Internet use for mood regulation (MREG) and deficient self-regulation of Internet use (DSR). To be more specific, structural model examined the extent to which the constructs of problematic Internet use, POSI, MREG, and DSR are predicted in a model that include the direct and indirect effects of self-regulation, academic procrastination, and academic performance. Accordingly, self-regulation had a significant negative direct effect on academic procrastination. Various studies have characterized procrastination as self-regulation failure (Ferrari, 2001; Rebetez, Rochat, Barsics, & Van der Linden, 2016; Tice & Baumeister, 1997) due to the strong negative relationship between them. Moreover, academic form the procrastination also has a strong relationship with self-regulation failure (Balkis & Duru, 2015; Baumeister et al., 2007; Senécal et al, 1995). Self-regulation is characterized as purposeful action (Ziegler & Opdenakker, 2018), while academic procrastination is characterized as voluntarily delay which lead to negative consequences (Senécal et al, 1995). These two contrasting concepts have a negative high correlation in the present study as well. Therefore, as a result of this study, academic form of the procrastination can be described as self-regulation failure.

Self-regulation had a significant and positive direct effect on academic performance. This relationship between self-regulation and academic performance is consistent with the literature (Pintrich & Groot, 1990; Pintrich, 1995; Zimmerman, 2002). Learners need to display "purposeful actions" for positive academic outcomes. Therefore, the relationship between self-regulation and academic performance in the current study is an expected result. Self-regulation had a significant negative direct effect on POSI. In previous studies, it has been stated that the excessiveness of online interaction indicates the weakness of self-regulation (Caplan, 2010; Moretta & Buodo, 2018). Moreover, Caplan (2005) claimed that

POSI is a direct positive predictor of DSR. DSR is ''a state in which conscious self-control is relatively diminished'' (LaRose et al., 2003, p. 232). More specifically, deficient self-regulation refers to a failure to adequately monitor one's use, judge one's usage behaviors, and adjust one's pattern of use (Bandura, 1986, 1991). Current study revealed that, self-regulation had a significant negative direct effect on DSR of Internet use. The situation that purposeful action does not occur and diminished self-control are quite consistent with each other. Therefore, the individual's inability to perform the purposeful action regarding Internet use also shows an inadequacy in general self-regulation skills. Moreover, based on the hypothesized model, the negative indirect effect of self-regulation on DSR of Internet use was mediated through academic-procrastination. Literature supports the positive relationship between procrastination and deficient self-regulation of Internet use (Meier, Reinecke, & Meltzer, 2016; Reinecke et al., 2016) beside the negative relationship between self-regulation and DSR of Internet use (LaRose et al., 2003). Therefore, the direct and indirect effect of self-regulation on DSR of Internet use, which emerged in this study, is consistent with the literature.

Self-regulation had a significant positive direct effect on Internet use for mood regulation (MREG). Mood is defined as "pervasive, global, generalized affective components or states that influence seemingly non-affect-related events" (Isen, 1984, p.185). Individuals display self-regulatory action toward sustaining positive moods and eliminating negative moods (Morris & Reilly, 1987). Positive effect of self-regulation on Internet use for MREG can be seen as surprising when previous studies on the relationship between problematic Internet use and self-regulation were reviewed. The literature suggests that the preference to use the Internet for mood regulation will lead to deficient self-regulation and hence negative outcomes (Caplan, 2002; Caplan, 2007; LaRose et al., 2003). On the other hand, various studies show that individuals exhibit self-regulatory behavior to bring their moods to an appropriate level for them (Carver & Scheier, 2012; Morris & Reilly, 1987). Therefore, the self-regulatory action they prefer to uplift their moods may also be spending time on the Internet. Current study revealed that the relationship

between self-regulation and Internet use for MREG is negative when this relationship is mediated by academic procrastination. In addition to the negative relationship between self-regulation and academic procrastination, the positive relationship between Internet use for MREG and academic procrastination has been emphasized in various studies (Reinecke et al., 2016; Sirois & Pychyl, 2013). Reinecke et al. (2016) claimed that trait procrastination significantly predicts recreational Internet use and this use serves the short-term mood regulation purposes of procrastinators. Therefore, the direct positive effect of self-regulation on MREG and the indirect negative effect mediated by academic procrastination, which emerged in this study, are consistent with the literature.

Direct effect of academic performance on problematic use constructs were not significant, namely, preference for online social interaction, Internet use for mood regulation and deficient self-regulation of Internet use. As mentioned in the above paragraphs, the non-significant relationship among problematic Internet use and academic performance might stem from the consideration of GPA as the only indicator of academic performance. Moreover, convenience sampling, which has been used in this study may also have an effect on this result. Because distribution of faculties and grade levels were not random. Most of the students were first graders from faculty of education. Their faculty and grade level might influence their GPA.

Among problematic Internet use constructs, POSI had a significant positive direct effect on Internet use for MREG and it had a significant positive direct effect on DSR of Internet use. Internet use for MREG had a significant positive direct effect on DSR of Internet use. Moreover, the positive indirect effect of POSI on DSR of Internet use was mediated by Internet use for MREG. These relationships are consistent with the original study results regarding the GPIUS2 constructs (Caplan, 2010).

First stage of this study aimed to reveal effects of self-regulation, academic procrastination and academic achievement on problematic Internet use constructs (POSI, MREG, and DSR). Results revealed the negative effect of self-regulation on

229

problematic Internet use behavior. Moreover, positive effect of academic procrastination behavior on PIU constructs were also revealed. However, non-significant effect of academic achievement on PIU constructs were also observed. Effect of academic procrastination on PIU constructs were consistent with the literature and might suggest an intervention program that aim to reduce academic procrastination might also reduce the PIU behavior. On the other hand, even though the results of this first stage results revealed a non-significant relationship among academic achievement and PIU constructs, considering numerous studies (Felisoni & Godoi, 2018; Junco & Cotten, 2012; Liu et al., 2017; Nichols, 2011; Ophira et al., 2009), it can also have an impact on PIU behavior. Literature suggests that PIU & academic procrastination, PIU & academic achievement relationships are bidirectional (Junco & Cotten, 2012; Liu et al., 2017; Nichols, 2011; Reinecke et al., 2018). Therefore, these variables can have effects on each other in a vicious cycle. From this point of view, the intervention program developed in the second stage of this study was ground on enhancing self-regulation skills and reducing academic procrastination and PIU behaviors.

## 5.2    Stage 2

### 5.2.1    Internet Use Behaviors

At this stage of the study, it was aimed to describe the Internet usage behavior of the participants in more detail. For this purpose, a semi-structured interview was conducted with the second stage participants. This study showed that university students use the Internet and social media for both academic and non-academic purposes. Academic purposes are not only related to their own field of study, but also include areas that will contribute to the personal development of them. A study conducted on academic Internet use indicated that university students use the Internet only for compulsory activities (Ergun-Başak & Aydın, 2019). However, in the

present study, it has been revealed that undergraduates also involved in academic uses for just improving themselves. It has been observed that they use the Internet for various social and recreational purposes as non-academic purposes. The most mentioned uses are watching videos on various digital platforms, spending time on social media and communicating with others. These statements are consistent with the literature (Ergun-Başak & Aydın, 2019; Monaghan, 2014).

The majority of the participants evaluated their Internet usage times as high or very high, and expressed their dissatisfaction with this situation. Moreover, as of the second cycle, Covid-19 pandemic has emerged and has been a variable that negatively affects the Internet usage behavior of individuals. Participants emphasized the significant increase in social and recreational use duration due to Covid-19 pandemic. In the first phase of the current study, the positive relationship between social and recreational usage times and problematic Internet use was emphasized. Supporting this, recent studies have highlighted the relationship between Covid-19 pandemic and problematic Internet use (Alheneidi, AlSumait, AlSumait, & Smith, 2021; Islam et al., 2020; Király et al., 2020). In other words, when all these studies are evaluated as a whole, increased social and recreational Internet use due to Covid-19 pandemic may point out a problematic level of Internet use.

Some of the participants emphasized that they were aware of their negative Internet usage behaviors, and some of them emphasized that they took various measures to avoid negative use. According to the results of the survey, the self-regulation scores of the participants who stated that they were aware that they could not control their Internet usage behaviors were not low. Considering the relationship between self-regulation and PIU (Billieux & Van Der Linden, 2012; Caplan, 2010; Kim & Davis, 2009), it can be inferred that the participants may have given answers about their self-regulation skills in line with social desirability. In addition, the applied scale is a general self-regulation scale. Participants may think that their self-regulation is high in dimensions other than their Internet use. For this reason, they may have given themselves high scores on the self-regulation scale. This can be an

explanation on the discrepancy between their comments on their Internet usage and self-regulation scores. On the other hand, the self-regulation scores of the participants who stated that they took various measures to control their Internet usage behavior are consistent with these statements.

Although a small number of participants related to the effects of Internet use behaviors mentioned the non-negative effects, most of them listed the academic, psychological, and physical negative effects of this behavior on themselves. Regarding academic effects, one of the participants stated during the interview that the Internet has positive effects for her as she preferred to use the Internet for mood regulation purposes. Another emphasized that her Internet usage behavior did not have any positive or negative effect on her. It is striking that the GPIUS2 scores of these two participants are very low. This may be evidence that not the use motive of the Internet (mood regulation or online social interaction) but the duration and impulsivity of these uses determine the PIU behavior. This inference is consistent with the first stage results. The negative academic effects emphasized by the vast majority of participants as academic procrastination (Meier et al., 2016; Odacı, 2011; Reinecke et al., 2016; Yang et al., 2018), waste of time (Laconi et al., 2015; Lopez-Fernandez, Freixa-Blanxart, & Honrubia-Serrano, 2013), causing divide attention due to multitasking (Parry, le Roux, & Bantjes, 2020; Reinecke et al., 2018) cognitive preoccupation (Assunção & Matos, 2017; Caplan, 2010), and inefficient studying (Junco & Cotten, 2012; Korie, 2015; Singh & Barmola, 2015) are consistent with the literature.

In the current study, the themes that emerged about the psychological effects of Internet use behaviors are procrastination, interpersonal relationships, feeling negative emotions, and dependency. The literature confirms the relationship between these variables and problematic Internet usage behavior. Reinecke et al. (2018) emphasized the positive relationship between trait procrastination and insufficiently controlled Internet use in their study with adolescents. A number of studies pointed out the negative relationship between problematic Internet use and interpersonal relationships (Caplan 2006; Kim, LaRose, & Peng, 2009; Milani, Osualdella, & Di

232

Blasio, 2009; Moretta & Buodo, 2020). Besides, several studies emphasized that individuals who cannot regulate their emotions tend to adopt addictive behaviors to escape from negative emotions (Akbari, 2017; Kim et al., 2009; Stead & Bibby, 2017). Kim et al. (2009) described negative emotions – PIU relationship with the metaphor of "rich get richer"; individuals who feel lonely with poor offline social skills benefit from online social interaction, and this online interaction returns them as negative emotions as harming school, work, or relationship related situations. The current study also showed that problematic Internet use leads to negative emotions. Therefore, the relationship between problematic Internet use and negative emotions may be in a vicious circle by feeding each other. While talking about the effects of Internet use behavior on their psychology, the participants mostly talked about the negative effects. A small number of participants mentioned the positive effects, and some of them emphasized that these positive effects are short-term and show themselves as unhappiness and regret in the long term. Some of the participants described themselves as Internet addicts. Besides, the statements of several participants about their Internet use made us think that they might be showing addictive symptoms. These finding are similar to a recent qualitative study (Li & Lin, 2019). That is, excessive, deregulated Internet usage behavior can be described as a behavior that eventually causes negative outcomes on the user.

Another result of this study is that Internet usage behaviors of some participants negatively affect their physical well-being. Studies conducted in the past also support this finding. About physical well-being; studies on eating behaviors (Dalky, Al Momani, Al-Drabaah, & Jarrah, 2017), physical activity (Park, 2014), eye strain (Balhara, Mahapatra, Sharma, & Bhargava, 2018) also indicated the negative relationship between deregulated, excessive Internet use and physical wellbeing.

This part of the study includes the discussion of the results, in which the second stage participants comprehensively express their Internet usage behaviors and the academic, psychological, and physical effects of these behaviors. This study, which coincided with the Covid-19 pandemic, revealed that the participants' use of

the Internet for social and recreational purposes increased since the pandemic and most of them found their Internet usage behaviors excessive, unhealthy, and deregulated. The results of this study showed that the duration and extent of the participants' impulsive use rather than their Internet use motivation (mood regulation, online social interaction, etc.) might determine the problematic use. The most important consequences of deregulated, excessive, unhealthy Internet usage behavior were procrastination and negative impact on interpersonal relationships.

### 5.2.2 Usability of hEp

The usability of hEp has been evaluated according to the literature (Erdinç & Lewis, 2013; Komninos, 2020; Nielsen, 2005). The category that the participants made the most comments on was information quality. Evaluations on the quality of the information contained in hEp and the information / content that the participants want to be in hEp are evaluated under this title. For participants, the time-related contents were the most confusing one. Therefore, suggestions for this content were both very diverse and too many. Since there is a countdown in hEp, in the first cycles, participants thought that they would receive a notification when their duration was running low / finished. These expectations are related to the fact that most of the applications with countdown have this kind of notification feature. Users act on the assumption that there is consistency within the application and across different applications. Therefore, there should be consistency between the user's knowledge on a feature and the interface (Ritter, Baxter, & Churchill, 2014). Nielsen (2005) evaluated this situation under the title of consistency and standards. A feature that did not fit the theoretical frame of hEp, but requested by the participants, was that hEp could be started and paused at any time. This feature was not added as it requires a completely different arrangement to the technical infrastructure of the existing application. As this change is not possible during the research process, studies on this subject have been noted for future studies.

When the countdown feature was added, some participants found it appropriate and positive. Some stated that they prefer not to be. How satisfactory the system – the application, is perceived by the user is also related to its usability (Nielsen, 2012). Therefore, the countdown feature is satisfactory for some users but not for others. No development has been made for users experiencing unsatisfaction due to this feature of hEp. One reason for this is that it is not known whether it brings academic benefit in the short-long term for users who are disturbed by this countdown, and the other is the information in the literature on this subject. Because hEp is a program that aims to direct the mind to a certain goal with high commitment from the moment it is started, due to its theoretical framework (Oettingen et al., 2001). Attempting to achieve this goal within a certain time frame contributes to goal accomplishment. Locke (1990) defined one of the 5 important principles of goal setting as "challenge". "Challenging goal" means that the individual is motivated and displays the maximum effort to reach that goal. Time constraints make a significant contribution to the goal to be challenging (Fried & Slowik, 2004).

Participants stated that if they finished hEp before the set time, they were not sure whether they could click the complete hEp button. Uncertainty should be removed to increase usability (Ritter et al., 2014). Accordingly, an explanation sentence has been added stating that they can finish the hEp before the set time which in turn as an effort to increase information quality (Erdinç & Lewis, 2013).

A participant suggested the creation of an interface and content in which users could write one main goal and its smaller sub-goals. This recommendation is a combination of MCII self-regulation strategies (Adriaanse et al., 2010) and the small-steps principle (Rosenshine, 2012). MCII strategies have already support smaller goals to be written and achieved in short periods of time. However, for some users it might be useful to add a major goal and sub-goals feature.

A pop-up information is requested that the ongoing hEps detail screen is editable. This demand is consistent with Nielsen's (2005) principle of recognition rather than recall. Systems or applications should reduce the cognitive load of the

user by making the actions visible. Although this change was not made in the current version of hEp, it has been noted for future releases.

Confetti rain animation was added in the fourth cycle as a symbolic award which was requested from the participants in the first three cycles. According to motivation theory and numerous studies, symbolic rewards increase motivation and lead to a better performance (Frey, 2006; Gallus & Frey, 2016; McLeod, 2007).

Completion delay field is a feature added before the last cycle. It presents due hEps with a red background. Participants stated that the purpose of this feature is understandable. This feature has been added in line with the visibility of system status principle of Nielsen (2005). Its purpose is to keep users informed about whether they can complete the hEps on time.

The next screen seen by the participants who click the complete hEp button and complete their hEp is the awareness screen. Some participants stated that it would be appropriate to add emotion-emphasizing features on this screen. This situation points out the importance of affects in education-learning processes and motivation (Wu, Huang, & Hwang, 2016).

The following situation regarding the main texts on the sequential screens was observed: Users who create hEp without reading the hEp guide or hEp samples tend to write major goals that require a long process. As the phrase goes, they used hEp as a wish fulfilling tree. This may be because the expressions / questions used in main texts are suitable for both general and specific goals. Although this was the case for only one of the participants using hEp, a large number of non-participant hEp users have written major goals without looking at the guiding content. The relevant participant stated that she misunderstood this situation about hEp creation and that it was about herself not about the hEp. Further data needs to be collected before any corrective action can be taken on this situation.

Regarding guiding content, hEp guide was found too long by the participants and they did not choose to read it. However, no changes have been made in the hEp

guide. Because it may not be possible to provide face-to-face or online training to all users for the use of hEp. Therefore, it was thought that it would be more appropriate to keep the hEp guide in its current detailed form. However, some of the participants stated that they found the hEp sample contents very useful. The reason they find hEp sample contents more useful may be that in sample contents allow users to create hEps correctly. Because the sample contents presented how the contents are expected on each sequential screen from goal to plan for various goal setting processes example in various fields. Participants may have liked this guide as they have the opportunity to create hEps in line with the sample content closest to their field.

hEp was presented to participants with three different notifications in the third cycle. These are time is running out, start a new hEp, and complete the hEp notifications. These push notifications aim to increase the user's engagement with hEp. A study on user engagement in a mobile learning app revealed that push notifications are the most effective elements that can increase learner engagement (Pham, Nguyen, Hwang, & Chen, 2016). In this study, besides the three added notifications, participants requested that they would like to receive various new motivating notifications. No improvement has yet been made, as each participant's suggestion is different from each other. More data is needed in order to evaluate the different notification requests of the participants more accurately and to determine which of them will be beneficial for the users to use hEp more effectively. Therefore, these changes have been noted for consideration in future releases.

Interface category examined how the current features of hEp regarding appearance, layout, navigation etc. are perceived by the user. It is emphasized that the names of the buttons in the hEp are generally understandable and serve their purpose. One user said that the button of completed hEps are need to be presented with a warm color tone on the screen displaying the completed hEps, emphasizing that they are completed. Since this request comes from only one participant, it is thought that different participants may find different color tones more appealing, and it is thought that the theme selection feature planned to be added in future releases might also meet this demand, so no changes have been made on this request.

One of the plus buttons, which is used on the homepage and is used to create a new hEp, has been found clear since it is used similarly in different applications (Ritter et al., 2014). However, it has been said that an explanation should be added about what the plus buttons on the obstacle / plan screens do. Therefore, it is necessary and important to present appropriate statement to users to increase the quality of information (Erdinç & Lewis, 2013). Hence, this feature has been noted for future releases.

Regarding the general visual features of hEp, the participants used the expressions of appropriate, simple and pleasant, but some participants suggested visual enhancements. It is important that the user feels satisfaction with the application (Nielsen, 2012) and an important factor that will ensure this satisfaction is personalization of the system (Ye et al., 2019). Therefore, even though it has not been added yet, offering visual theme / color / font options in hEp and enabling the participant to choose the theme / color / font they want can positively reflect on user satisfaction.

One of the participants requested that she would like to be able to view her past hEps in hEp both in the calendar and in the list. Because, in the current situation, the hEps that are only displayed in the list cause the perception that she was very effective in terms of goal setting and goal accomplishment. However, some days she stated that she did not create any hEp and hEp did not give any clue about this situation. In a study examining the smoking cessation mobile application, the part that users mostly look at in the application is the achieved benefits section (Luna-Perejon et al., 2019). In other words, users want to see the content they have achieved with that app. Therefore, this recommendation of the participant is important in the process of developing future hEp.

The emerging themes related to system usefulness are ease of learning and use and error experience. Ease of learning is one of the important principles of usability (Komninos, 2020). Participants stated that hEp is generally easy to learn and use. Errors were experienced by some participants. One of these errors occurred

with the update of hEp, experienced by all active users and was resolved as soon as possible. Other errors have not been consistently experienced, but in later versions of hEp it should work stably regardless of the device model, operating system version. Error tolerance, defined by the Interaction and Design Foundation (Komninos, 2020) means that even if error occurs, the application should provide the user with the opportunity to easily recover that error state.

User satisfaction, another dimension of usability is realized for hEp users. Most of the users emphasized that they experienced satisfaction and a small portion of them did not experience dissatisfaction. Satisfaction is one of the most important factors for users to be loyal to the application (Kim, Kim, & Wachter, 2013; Revels, Tojib, & Tsarenko, 2010). Therefore, in line with the statements of the participants, it can be stated that hEp provides the satisfaction.

### 5.2.3     Experiences on hEp

The experiences of the participants with hEp during 4 cycles were evaluated and four main categories emerged. The first of these, perceived effectiveness of hEp, includes the views of the participants on the effectiveness of hEp related with regulating their Internet use behaviors and academic habits. Most of the participants stated that hEp boosts goal achievement. After creating hEp, they emphasized that they felt obliged to achieve the relevant goal, gave priority to that goal over the other tasks, and felt responsible for it (Locke & Latham, 2002). These statements are consistent with other studies that claim the positive impact of MCII self-regulation strategies -which is the theoretical basis of the hEp application- on goal pursuit. Because MCII strategies transform the fantasies of individuals into effortful action and promote successful performance (Oettingen, 2012; Loy, Wieber, Gollwitzer, & Oettingen, 2016). In other words, these strategies have an energizer effect for the goal attainment (Duckworth, Grant, Loew, Oettingen, & Gollwitzer, 2011; Martenstyn & Grant, 2021). Participants stated that they behave more strongly-minded and disciplined than usual while striving for their goals after creating hEps.

Some participants even emphasized that due to the Covid-19 pandemic, they get further away from their lessons due to both uncertainty and anxiety brought by the pandemic, but that hEp made them to concentrate on their academic goals. In a study examining the effects of MCII strategies on adolescents' self-discipline, it was found that students in the MCII group completed 60% more questions than students in the placebo group in the high-stake test practice (Duckworth et al., 2011). Self-discipline which is a sub-dimension of self-control (Tangney, Baumeister, & Boone, 2004) has been a challenge for students due to the Covid-19 pandemic related with online education (Bączek, Zagańczyk-Bączek, Szpringer, Jaroszyński, & Wożakowska-Kapłon, 2021; Rahdadella & Latifah, 2020). Three cycles of the current study were conducted in this online education process. When the statements of the participants and the studies on relationship between self-discipline and self-regulation strategies of MCII are taken together, using hEp in unexpectedly difficult situations can provide an important advantage for undergraduate students in terms of self-discipline. On the other hand, undergraduate student participants included in the pilot cycles stated that hEp did not contribute to goal achievement. When the goals created by these participants were examined, it was observed that they wrote performance goals such as getting a high grade, passing the exam, etc. Creating performance goals means focusing on outcomes and/or avoiding appearing unsuccessful, and/or external motivational resources. However, when we examine mastery-oriented goals, it is seen that learners choose more accurate strategies to reach their goals, learn from their mistakes and have higher intrinsic motivation (Elliott & Dweck, 2005). Therefore, the fact that the undergraduate student participants in the pilot phase thought that hEp had no effect on goal achievement might be due to the fact that the goals they created were performance goals.

Participants emphasized that their studying plans and behaviors changed thanks to hEp. Some of the participants who did not prioritize studying have prioritized post-hEp academic studies. While they studied more irregularly before hEp, they started to study more regularly. They emphasized that their reluctance to study have changed. They said that they were able to achieve this because the whole

process became clear in their minds through hEp. This positive change in participants' behavior is consistent with past MCII studies (Oettingen, 2012; Oettingen & Gollwitzer, 2010; Oettingen & Gollwitzer, 2015. For successful behavior change, it is necessary to be committed to the goal, especially for the difficult goals (Locke & Latham, 2002), to pursue the goal effectively, to make appropriate plans to overcome the obstacles that may be encountered in this process (Oettingen, 2012). In this study, the participants stated that they studied in a more focused and planned way towards their goals. This may be evidence of their high commitment to their goals and their effective goal pursuit as a result of hEp creation. Participants emphasized that in line with their hEps, they not only changed their studying habits but also Internet usage habits. Participants who showed task switching behavior during their academic studies did not show this behavior, participants who spent hours on the Internet and did academic procrastination reduced this behavior, and the participants who could not stay away from the Internet for a long time continued to study without Internet breaks for a long time. In addition to goal commitment and goal pursuit, participants' plans to address potential obstacles related with their use of the Internet might also contributed to this change (Gollwitzer & Sheeran, 2006).

Participants stated that creating hEp supports and guides them in the goal attainment process. Oettingen (2012) emphasized that the MCII guide the individuals in determining the goals they can achieve and identifying the obstacles to these goals. Martenstyn and Grant (2021) described MCII strategies as a self-coaching method. This characterization is consistent with the hEp characterization as supportive and guiding in the eyes of the participants. In addition, in the current study, the participants stated that they realized that they were able to fulfill academic tasks thanks to hEp. That is, their perceived self-efficacy that they can achieve their academic goals as they planned, has increased. Since this stage of the study is qualitative, statistical expressions regarding the increase in the self-efficacy of the participants cannot be used. However, in two different experimental studies, contradictory results were obtained as to whether MCII strategies increase self-

efficacy (Fritzsche, Schlier, Oettingen, & Lincoln, 2016; Martenstyn & Grant, 2021). In the first study, it was stated that the participants who showed mild to moderate level depression did not have a significant change in their self-efficacy in the direction of MCII strategies in a three-weeks period (Fritzsche et al., 2016). In the second study, the participants stated a situation they experienced and wanted to change, and then the MCII intervention was applied. After the intervention, the self-efficacy of the participants that they can attain the goal has increased significantly (Martenstyn & Grant, 2021). These studies have important differences in terms of sample and procedure. These contradictory findings may have originated from these differences. Also, the willingness of the participants to change may have affected these results.

Besides the overall effectiveness of hEp, some participants specifically emphasized the step (goal-time-outcome-emotion-obstacle-plan) which made the greatest contribution for goal attainment by regulating the Internet use behavior. The most effective step for most of the participants is the time step. Latham and Locke (1975) argued in their study that when time restrictions were imposed, the performance of workers increased compared to normal. In this study, too, the participants mostly stated that they managed to complete the tasks in the time they set. However, some of them stated that they were uncomfortable with this time constraint and that they could not accomplish the task, and some of them stated that they were uncomfortable with this restriction even though they did the task on time. Individual differences, such as self-trust, self-efficacy, etc. may have been effective at this point. When faced with a challenging goal, two kinds of efforts are possible: faster and more intense, slower and less intense (Locke & Latham, 2002). Different views on time constraints may be due to this situation. Some participants may have thought that they needed to study faster and more focused in the presence of time constraints and carried out their studies in this way. On the other hand, the existence of such a time constraint may be perceived as a pressure source for some students that will negatively affect their efforts.

Participants stated that creating obstacle-plan binaries embodies the process, so they progressed in a more motivated, more focused way with a clear road map to overcome obstacles. The obstacle-plan steps are the implementation intentions part of the MCII. According to Gollwitzer (1993), regarding implementation intentions, motivation and volitional act are central factors for taking action toward the intended goals. The motivation emphasis in the current study is in line with the implementation intentions. As for the clear roadmap and being more focused dimensions, they may be involved in the volitional act factor. Because for the volitional act, individuals need a concrete and clear plan and a focused act for this plan. The goal screen has been a screen for the participants that motivates and triggers them and embodies their wishes. Moreover, the outcome screen also had such an effect. In many studies, it is emphasized that individuals' thinking about the situations they desire to be realized, beside the obstacles, increases their motivation (Duckworth et al., 2013; Kappes, Oettingen, & Pak, 2012; Oettingen, 2012). Participants stated that, with their use of hEp, they created various awareness about their study habits and Internet usage behaviors. When goal intentions are embodied with implementation intentions, the lack of awareness, which is an important feature of automatic behaviors, is eliminated. Efficient goal-directed behavior appears to be agile rather than avoidant, efficient rather than effortful. In addition, the goal is no longer just an intention, it turns into an act that changes and evolves according to the situation (Gollwitzer & Sheeran, 2006).

In this study, in line with the experiences of the two participants, it was thought that creating hEp for shorter-term goals can be more effective than longer-term goals for some individuals. This situation has been found appropriate in line with the MCII strategies that form the basis of hEp. Because these strategies are strategies that take the desired future with the unwanted current situation together and allow the individual to make plans for the conditions that can be experienced (Oettingen, 2012). The undesirable current situation and conditions to be experienced may change in long-term goals. Therefore, changes in plans are

243

inevitable. Therefore, for some students, it may be more effective to create hEp for shorter-term goals.

One of the most uttered contributions of hEp is obtained awareness. Although this awareness is different for each participant, each of them learned important things about themselves. Thanks to hEp, the participants emphasized that they understand the goals they can accomplish, understand what their obstacles are, realize the ways to overcome obstacles using hEp even if they are aware of their obstacles, see what they can do when they make an effort, and realize which task they can do in how long. This awareness reflect insight. Insight is defined as "the capacity to gain an accurate and deep understanding of someone or something" (Oxford Dictionary, 2021). Therefore, this theme shows that participants establish cause-effect relationships through hEp about their academic performance and Internet usage behaviors that they were not aware of before. This situation can be likened to a person's self, her/his own life, and "eureka" life in psychological counseling sessions. The psychological counseling processes also aim to reach an understanding of the individual about her/himself and others that she/he was not aware of before (Corsini & Wedding, 2012). The statement of one of the participants that "my opponent was actually me" can be presented as evidence for this. In a previous study, when comparing two self-coaching programs, one of which was prepared with MCII strategies, it was indicated that the program created with MCII strategies increased insight of participants more than the other program (Martenstyn & Grant, 2021). Based on these evidences, it can be suggested that hEp can let participants to gain insight.

Another category has been the change on affects. Although most of the feelings after hEp use were positive, some participants stated that they felt upset when they could not complete their goals within the time they set. Positive emotions were feeling peaceful, happy, relaxed, successful, motivated, appreciated and confident. Some of the past MCII studies have been experimentally conducted on reducing negative emotions such as anxiety, anger etc. (Brodersen & Oettingen, 2017; Schweiger Gallo et al., 2018). Another study examined the general effects of

244

MCII strategies on emotions, revealing that they increase positive emotion and decrease negative emotion (Martenstyn & Grant, 2021). The current study is also consistent with previous studies. The reason for experiencing negative emotions after using hEp is that individuals could not complete their tasks in the time they aimed. The unhappiness created by this situation may reflect positively on their later studies. It may be possible for them to make more effort. Regarding this situation, a reflective process can be initiated when users cannot complete their hEps on time. Currently, there is an awareness screen in hEp and users are asked whether they have developed a new awareness for the relevant hEp. Answering this question is optional. However, when users are unable to complete their hEps, they may encounter a screen where possible reasons for this situation are presented as options, such as: "Time is short", "Goal is big", "Not paying attention", etc. and they may be requested to make a selection from this screen. Thus, they can see concretely for what reason they could not complete their hEp.

As for positive feelings, the participants consisted of individuals who had negative thoughts and feelings about their academic performance due to their unregulated, exaggerated Internet use. Hence, these feelings of inadequacy they experienced led to emotional negative outcomes for them. When these individuals increased their purposeful efforts towards their goals through the hEp application, their conversations and feelings with them turned from negative to positive.

### 5.2.4    Design Characteristics of hEp

In this part of the study, findings related to the design principle of hEp are discussed. During the development of the hEp, some of the design principles that emerged in the cycles were implemented in the next cycle, while some were noted for future versions of the hEp due to time related, technical and financial shortcomings. In addition, it was considered necessary to obtain more information from users about their experiences with some of the features in order to make the

necessary changes. Table 5.1 presents the design principles that emerge during the cycles of hEp, as put into action and noted for future releases.

Table 5.1 Design Principles that Emerge During the Cycles of hEp

| Cycle | Subject | Put into Action | Noted for Future Releases |
|---|---|---|---|
| Pilots | Content / Guide | | hEp should enable users to set goals such as "to learn …", "to understand …" rather than to "get high marks" or "pass the exam". |
| 1 | Content / Guide | hEp guide and hEp sample contents should be presented in the application itself in an area that users can easily notice them. | |
| 1 | Visual Design / Fonts | hEp should have fonts suitable for users with visual impairments. | |
| 1 | Interaction / Pushing Notifications | After a period of inactivity, hEp should remind users of itself. | |
| 1 | Interaction / Pushing Notifications | hEp should provide notifications to users regarding their remaining time. | |

Table 5.1 (continued)

| | | | |
|---|---|---|---|
| 1 | Content / Personalization | | hEp should customize the hEps that can be created by the participant, based on the user's PIU level. |
| 2 | Interaction / Affective Notifications | hEp should provide affective notifications for the users to affiliate to the application. | |
| 2 | Content / Certainty | The sentences in the hEp should prevent ambiguity and the features of the hEp should not contradict with general understanding regarding applications. | |
| 2 | Content / Personalization | | hEp should have flexible, customizable features to meet the different expectations and preferences (visual or content related) of different users. |

Table 5.1 (continued)

| 3 | Visual Design | The same type of contents in hEp should have a consistent style among themselves. | |
|---|---|---|---|
| 3 | Content / Guide | hEp should provide necessary clues with suitable method for screens with editable features. | |
| 3 | Content / Guide | | When users start using hEp for the first time, they should see tips that direct them to the hEp guide and hEp samples. |
| 3 | Content / Guide | | Usage tips regarding the buttons in the hEp should be provided to the user. |
| 3 | Visual Design | | Motivating visual design should be used on the buttons that the users give importance. |

Table 5.1 (continued)

| | | | |
|---|---|---|---|
| 3 | Content / Personalization | | hEp should customize the time-related contents according to the users' preferences. |
| 3 | Content / Personalization | | hEp should customize the guiding contents according to the users' field of study. |
| 3 | Content / Certainty | | hEp should be able to present usage statistics clearly, without causing any misunderstanding. |
| 4 | Technical Features | | hEp should have technical features that will work properly on different devices. |
| All cycles | Content/Guide | | When users cannot complete their hEps in time, they should encounter a prompting question that they can better understand why they could not complete. |

### 5.2.4.1 Content Related Principles

*Pilot Cycles: hEp should enable users to set goals such as "to learn ...", "to understand ..." rather than to "get high marks" or "pass the exam".*

During the pilot stages, it was observed that undergraduate students wrote performance goals (passing an exam, receiving a good grade, etc.) but did not find hEp to be effective in achieving those goals. When looking at the features of performance goals, the goal is to achieve an outcome, to be deemed successful or not unsuccessful by external sources (Elliott & Dweck, 2005). hEp, on the other hand, aims to help users learn from their mistakes and employ more effective techniques in order to achieve their goals. As a result, rather than setting performance goals in hEp, users should be encouraged to set mastery-oriented goals.

*Cycle 1: hEp guide and hEp sample contents should be presented in the application itself in an area that users can easily notice them.*

User manuals / instruction manuals are the documents which include information on how to use the product. They are important for improving the use efficiency of the products (Renaud, Houssin, Gardoni, & Armaghan, 2019). For the current study hEp guide and hEp sample contents can be considered as user manuals as providing information on description and creation of hEps.

*Cycle 1: hEp should customize the hEps that can be created by the participant, based on the user's PIU level.*

User needs and abilities are determinant in the use behavior (Lallé, Conati, & Carenini, 2017). In this study, some users with high PIU levels stated that they were successful when they set short-term goals and tried to achieve these goals, but were not successful when they set long-term high effort goals. Based on this, it was thought that it would be appropriate to form a framework for the duration and bigness of the goals according to the user's PIU level. Bandura and Schunck (1981) suggest

that it is better to set short term goals rather than long term goals. Even though it is a general suggestion, it might be inevitable for problematic Internet users.

*Cycle 2: The sentences in the hEp should prevent ambiguity and the features of the hEp should not contradict with general understanding regarding applications.*

It is suggested that one of the most important functions of mobile applications is to maintain a consistent user experience. Especially maintaining the behavioral consistency is crucial (Joorabchi, Mesbah, & Kruchten, 2013). In the first two cycles, hEp's time screen didn't have the countdown visuals and notifications that users are used to from other apps. For this reason, users were confused and stated that they expected the application to have the countdown features that they are used to. The claims of the literature about behavioral consistency and this finding are compatible with each other.

*Cycle 2: hEp should have flexible, customizable features to meet the different expectations and preferences (visual or content related) of different users.*

A study examining mobile applications on cognitive behavioral therapy (CBT) stated that design factors are as important as the content of in mobile apps (Stawarz, Preist, Tallon, Wiles, & Coyle, 2018). That is, providing a design that users want to engage in will increase the effectiveness of the apps. Therefore, providing a powerful design which has flexible, customizable features will increase the positive perception of the users toward hEp.

*Cycle 3: hEp should customize the time-related contents according to the users' preferences.*

As stated under usability title, one of the five important principles of goal setting, according to Locke (1990), is "challenge." "Challenging goal" denotes that the individual is motivated to achieve the goal and is putting up maximum effort to achieve it. Time constraints play an important role in keeping the aim challenging (Fried & Slowik, 2004). However, for some users, the presence of this feature has been an obstacle to using hEp. Hence, user characteristics needs to be considered

while designing such apps. In this direction adding an optional time constrain feature to hEp might provide a better experience for users.

*Cycle 3: When users start using hEp for the first time, they should see tips that direct them to the hEp guide and hEp samples.*

Directing users to guiding content when they first install hEp can help them use the app properly. Guiding contents are of great importance so that users can use the application with the least errors and in the most effective way (Renaud et al., 2019). Some of the users who have not taken any training on hEp have used hEp incorrectly. They have shown same incorrect using behavior. Therefore, seeing the guiding contents first when they use hEp for the first time may enable them to use hEp more effectively in line with its purpose.

*Cycle 3: hEp should customize the guiding contents according to the users' field of study.*

In a previous study, 9-item functional requirements were determined based on a mobile application that was developed for elder people for regulating medication intake. One of them is the integration, the customizable of the information provided by the application in line with the data of the people (Verdezoto & WolffOlsen, 2012). Therefore, an undergraduate user in the field of educational sciences and a user in the field of health sciences should see the different custom guiding contents based on their field rather than seeing the same guiding contents.

*Cycle 3: Usage tips regarding the buttons in the hEp should be provided to the user. Cycle 3: hEp should provide necessary clues with suitable method for screens with editable features.*

Hints are important because they provide necessary help to the users. However, some users show help avoidance regarding hints. Therefore, how the hint content is presented is as important as the presence of the hints (Maniktala, Cody, Barnes, & Chi, 2020). Although necessary tips are provided through the hEp guide

and hEp sample contents, these contents should be presented in the appropriate place and with the appropriate wording to prevent users from avoiding help, reading tips.

*Cycle 3: hEp should be able to present usage statistics clearly, without causing any misunderstanding.*

One of the participants requested that she would be able to see her previous hEps in both the calendar and the list in hEp. Because, in the present situation, the hEps that are only shown on the list create the idea that she was very effective at setting and achieving goals. However, she claimed that she had not created any hEp on some days, and that hEp had provided no information regarding the issue. This user also stated that she reviewed the completed hEps to feel better. Eliminating the above-mentioned problem can make the application more effective in this manner. In a study of a smoking cessation mobile app, the accomplished benefits area was shown to be the area that users looked at the most (Luna-Perejon et al., 2019). To put it another way, consumers want to see the material they've created using that app.

*All cycles: When users cannot complete their hEps in time, they should encounter a prompting question that they can better understand why they could not complete.*

One of the most important purposes of hEp is to enable its users to develop self-awareness. Currently, the user is faced with the question of whether they have any awareness of it when they complete their hEp. However, when the user is not able to complete the hEp, they may encounter a question that they can understand the reason for not completing hEp properly and raise awareness in order to gain an advantage for their next goals.

### 5.2.4.2   Visual Design Principles

*Cycle 1: hEp should have fonts suitable for users with visual impairments.*

*Cycle 3: The same type of contents in hEp should have a consistent style among themselves.*

*Cycle 3: Motivating visual design should be used on the buttons that the users give importance.*

Participants used the words appropriate, simple, and pleasant when describing the general visual qualities of hEp, but several recommended aesthetic enhancements. It is critical that the user is satisfied with the application (Nielsen, 2012), and personalization of the system is a key aspect in ensuring this satisfaction (Ye et al., 2019). Therefore, even if it has not yet been implemented, providing visual theme, color, and font options in hEp and allowing participants to select the theme, color, and typeface they like can improve user satisfaction.

### 5.2.4.3 Interaction

*Cycle 1: After a period of inactivity, hEp should remind users of itself.*

*Cycle 1: hEp should provide notifications to users regarding their remaining time.*

In the third cycle, participants received three separate notifications about hEp. Time is running out, start a new hEp, and complete the hEp notifications are the possibilities. These push notifications are intended to encourage user interaction with hEp. Push notifications are the most effective aspects that can boost learner engagement, according to a study on user engagement in a mobile learning app (Pham et al., 2016).

*Cycle 2: hEp should provide affective notifications for the users to affiliate to the application.*

Participants expressed an interest in receiving a variety of new encouraging notifications. Because each participant's idea is unique, no change has yet been achieved. More data is needed to more precisely analyze the various notification

requests made by participants and to determine which of them will help users use hEp more efficiently. As a result, these modifications have been noted for future versions.

### 5.2.4.4    Technical Features Related Principles

Cycle 4: hEp should have technical features that will work properly on different devices.

Some of the participants made errors. One of these failures happened during the hEp upgrade, which was experienced by all active users and was quickly fixed. Other issues haven't been reported regularly, but with newer versions of hEp, it should work consistently independent of device model or operating system version. The Interaction and Design Foundation (Komninos, 2020) defines error tolerance as "the ability of an application to offer the user with the ability to easily recover from an erroneous condition."

### 5.3    Implications

When conducting the study, several limitations occurred in both of the stages. There are several limitations regarding first stage of this study. First, the sample of the study was determined in line with the eligibility of the participants. For this reason, most of the accessible participants were first grade students. The academic performance variable in the SEM model was determined in line with the students' GPAs. As of the period when the data were collected, the first term GPAs of the freshmen were taken as basis. The GPA scores of these students who have just started university may not be sufficient to reflect their real academic performance. Second, the data were collected by asking the participants to report on self-behavior (self-reported measure). Regarding social desirability bias, some of the participants may have provided the data that might not reflect the reality. Third, in structural model, it is thought that the explained variances by self-regulation and academic

procrastination are high due to the high correlation between self-regulation and academic procrastination. Therefore, the high variances explained by self-regulation and academic procrastination in this model may be due to this situation.

There are also several limitations related to the second stage of the study. First, the study coincided with the Covid-19 pandemic period. During the 2019-2020 Spring Semester, it is planned to meet face-to-face with a new PFCP class after each cycle, to introduce the study and the hEp application and to include the volunteer participants in the next cycle. However, this plan was applicable only for the first cycle. In the other cycles, mostly other students from the same class were included. It was aimed to reach at least six participants for each cycle, but it was only possible for the third and fourth cycles. Therefore, the number of participants is limited. During the study process, a high-intensity earthquake occurred in the province where the study was conducted and the Covid-19 pandemic emerged. These unexpected events affected the participants of the study as well as the whole society. Participants' perceptions of hEp may have been affected by these situations. hEp is a newly developed application. Therefore, some technical problems occurred during the study. Participants' perceptions and attitudes towards hEp cannot be evaluated independently from these errors. Throughout the cycles, the development of hEp was determined by financial means. Therefore, some improvements were not possible during this period. For each cycle, the participants were studied with hEp for an average of two weeks, then data were collected through interviews, development suggestions were made to the software developer in line with data analysis, and the necessary improvements were made for the next cycle. Some improvement could not be made due to time constraints. Therefore, one should take these limitations into consideration regarding the implications in the following section.

### 5.3.1    Implications for Practice

The first stage of this study revealed the effects of self-regulation on problematic Internet use constructs, academic procrastination behavior, and academic performance. For this reason, intervention programs that focus on strengthening self-regulation can be prepared in order to reduce problematic Internet use behavior of undergraduate students. Moreover, considering the mediating effect of academic procrastination between self-regulation and problematic Internet use, intervention programs might consider academic procrastination behavior while preparing intervention programs for problematic Internet use.

In this study, it was observed that there is a negative relationship between the use of the Internet for academic purposes and problematic Internet use behavior. Therefore, intervention programs to be prepared may encourage the use of the Internet for academic purposes for undergraduate students.

It has been revealed that there is a positive and significant relationship between social and recreational Internet use and problematic Internet use. For this reason, intervention programs to be prepared may aim to reduce these types of uses. For example, several pop-up information, or notifications might be added to the application regarding the negative effects of intense use of Internet for social and recreational purposes on problematic Internet use behavior.

In the second stage of this study an intervention program named hEp was created. hEp may be offered by student development centers and counseling services as additional support to students who experience academic problems due to their Internet usage behavior, who show procrastination and who need to change their study habits. Accordingly, these centers can prepare brochures, create advertisements, send e-mails and promote hEp. Thus, they can increase the number of students who can benefit from hEp as an auxiliary source.

In the pilot studies and main cycles of this study, participants were contacted before the use of hEp, they were informed on how to use hEp face-to-face or through

online channels, and it was said that the guideline documents related to hEp should be read. In addition, during the hEp usage process, the hEp database was followed, and the participants who used the hEp without its aim were given extra information about how to use hEp. Currently, for some users, hEp requires the participants to be guided before use. It can also require guidance in the usage process. For this reason, practitioners, such as staff of student development centers, can inform users about how to use hEp before using hEp and provide reading of hEp user guide and sample contents of hEp. It should also provide the necessary feedback to users who need guidance during the hEp usage process.

hEp offers the same goal setting features to all users in its current form. However, in this study, it was revealed that it would be appropriate for students with high PIU scores to create hEps with shorter duration. Therefore, before using hEp, practitioners should measure the PIU levels of the users and direct the users with higher PIUs to create hEps with shorter duration.

In this study, it was observed that students who wrote a performance goal (getting a high grade, passing the exam etc.) in the goal screen, had difficulty in developing self-regulatory behavior and thus in realizing their goal. Therefore, future studies should present guiding content for users to promote creation of mastery-oriented goals rather than performance goals during the goal setting phase.

In the current study, it was observed that time constraints had different effects on the participants. While this time constraint increased performance and was a positive feature for some users, it was a negative feature that created time pressure for some other users. Therefore, practitioners should state in advance that hEp can create time pressure on users.

The hEp application developed in this study aimed to increase academic performance by regulating problematic Internet usage behavior. There may be researchers who want to develop hEp-like applications in different problem areas using MCII strategies. The following recommendations are presented for them.

Guides should be prepared that will enable users to write their goals clearly and concisely, and prompts should be used to ensure that the goal is written appropriately on the goal screen. These prompts can be presented as a note on the screen or as a placeholder in the text input area.

Applications that will be developed using MCII strategies should present the suggestions to the users on setting the time optimally in the guiding contents and as a placeholder or note on the time screen.

The content of obstacles and plans written by users in hEp was examined. It was seen that by some participants both were written with superficial and general expressions. However, for the implementation intentions strategy to be implemented effectively, the obstacles and plans must be clear and concrete. Therefore, applications that will be developed using MCII strategies should present specific and concrete statement of if-then plans with guiding contents and notes on the relevant screens. In addition, another situation observed in some of the hEp users is that they write their plans for achieving their academic goals on the plan screen. However, the plan that is expected to be expressed on the plan screen is aimed at overcoming the stated obstacle. It should be emphasized with a note on the plan screen and in the guiding content that their plan should address their obstacles.

Awareness screen was created in addition to MCII strategies in line with self-regulation theories. It is not obligatory to use this screen. For this reason, it was noticed that this screen was not used in the vast majority of the hEps created. However, it is thought that the use of the awareness screen will create an advantage for users who both achieve and fail to achieve their goals in reaching their future goals. For this reason, the importance of using the awareness screen should be presented in the guiding content and as a pop-up information on the awareness screen.

Considering the wide variety of mobile applications today and the high personalization features, app developers should provide various options related to visual themes, font styles, etc. to be more precise, visual design of the application by

default. This situation can be effective for the user to develop a positive feeling to the application.

hEp users stated that they would like to see motivational notifications in hEp so that they would receive support on the way to their goals. Given the importance of sending such notifications so that users can develop an attachment to applications, developers can add some motivational notifications by default in such intervention program apps.

## 5.3.2 Implications for Future Research

Relationship between gender and Internet use behavior is not significant in the current study. Some studies suggested that males use Internet more problematically than females, while some others suggested females use more problematically. These differences regarding findings may be due to moderator or mediator variables. These variables need to be examined in more detail.

In the current study, there was no significant relationship between academic performance and Internet use behaviors. Only GPA was evaluated as an academic performance indicator. Including indicators such as extracurricular activities, internship -if applicable-, coursework, and extra projects, etc. in future studies will contribute to better inference to this relationship. In addition, individual evaluation of academic performance in different fields will support better understanding of this situation.

In this study, Internet usage patterns questionnaire was developed by the researcher based on a previously developed Internet usage questionnaire. Improving this questionnaire in future studies is essential for two reasons: First, items of the questionnaire were classified for the first time as academic, social and recreational. Therefore, its improvement will increase its strength. Second, Internet use patterns are getting more and more diversified and the number of users and tools are

increasing. For these reasons, this questionnaire should be continuously improved in order to be up to date.

As the focus of this study, problematic Internet usage constructs were taken as endogenous variables. However, when the literature is examined, a bidirectional relationship between these constructs and academic performance and academic procrastination behaviors draw attention. Therefore, future studies may examine these bidirectional relationships in more detail.

This study aimed to develop the hEp mobile application, which aims to increase the academic performance of the users by regulating their Internet usage behaviors, and formed in line with the MCII self-regulation strategies. Hence, hEp was developed throughout the cycles with a design-based research study. Future studies should investigate the effectiveness of hEp by conducting experimental studies.

The current state of hEp requires participants to start their academic studies immediately after creating a hEp and is not supported by a technical infrastructure that can show the participant's total study time and break time for each hEp. Moreover, another similar request was that hEp could be started and paused at any time. These features were not added as they require completely different arrangement to the technical infrastructure of the existing application. As these changes were not possible during the research process, future studies can focus on examining the effectiveness of hEp in case of adding these features.

The main goal and sub-goal feature has not been added to the current version of hEp. Because MCII self-regulation strategies both support writing long-term goals and short-term clear goals. However, some users may prefer to see their main goals and sub-goals as a whole, for various reasons. This preference can positively affect goal attainment. Therefore, future studies can be carried out adding main and sub-goals feature.

In this study, three participants, two from pilot studies and one from one of the main cycles, had very high problematic Internet usage scores. The common point of these participants was that they limited their hEp use to goals of an average of 1 hour and they emphasized that they would not be able to achieve the goals for longer periods in the interviews. This situation was not anticipated, but it emerged in the process. Therefore, it would be appropriate for future studies to prepare intervention programs considering the PIU score. At this point, the variables such as the bigness of the goal and how long the users give them to achieve the goal stand out. For users with high PIU levels, it may be suggested that they set their goals smaller and try to achieve these small goals in shorter time frames, max. a few hours.

According to the literature (Luna-Perejon et al., 2019), users want to see what they have achieved with the app. The hEps completed in hEp appears in a list in the current situation. One participant stated that she wanted to see the achievements not only in a list but also in a calendar. Because viewing only in a list creates the perception that hEps are created and goals are achieved every day. In order to avoid this misperception, studies can be carried out before future releases of hEp, taking into account how the clear usage statistics will be presented.

University students, one of the two groups in which problematic Internet use behavior is seen the most, has been the target audience of this study. Studies on problematic Internet use also draw attention to the negative effects of this behavior on adolescents and emphasize the necessity of intervention programs. Therefore, the effect of hEp on high school students is an issue that needs to be investigated. The effectiveness of hEp on adolescents should be investigated through future studies.

Various findings have been obtained regarding time setting feature of hEp. Some of the participants stated that studying during a predetermined time period positively affected their performance towards their goals, some said that although it had a positive effect on their performance, it had a negative impact on their psychology, and some said that it neither affected their performance nor their

262

psychology positively. In future studies, the effect of the optional use of the time feature of hEp needs to be investigated.

In line with the findings, it was revealed that hEp has a positive effect on the academic performance of university students by regulating their Internet usage behavior. Future studies should consider other problem areas that negatively affect the academic performance of university students, and develop hEp for different problem areas and examine its effectiveness with experimental studies.

Various design principles have been proposed in this study. Some of these principles are put into action however, some have been noted for later releases due to technical inadequacy, time constraints and lack of sufficient information. After these principles are applied to new versions of hEp, this study should be repeated with a similar group of participants.

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# A. Ethics Committee Approval for Stage 1



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Sayı: 28620816 / 363

06 Haziran 2018

Konu:     Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi:     İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Zahide YILDIRIM

Danışmanlığını yaptığınız doktora öğrencisi Sonay CANER'in "**Üniversite Öğrencilerinin İnternet Kullanım Alışkanlıkları ile Çeşitli Değişkenler Arasındaki İlişkinin İncelenmesi**" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay **2018-EGT-101** protokol numarası ile **08.06.2018 - 30.12.2019** tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Ş. Halil TURAN
Başkan V

Prof. Dr. Ayhan SOL
Üye

Prof. Dr. Ayhan Gürbüz DEMİR
Üye

Doç. Dr. Yaşar KONDAKÇI
Üye

Doç. Dr. Zana ÇITAK
Üye

Doç. Dr. Emre SELÇUK
Üye

Dr. Öğr. Üyesi Pınar KAYGAN
Üye

## B. Ethics Committee Approval for Stage 2

Sayı: 28620816 / 619

11 ARALIK 2018

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Zahide YILDIRIM

Danışmanlığını yaptığınız Sonay CANER'in **"Türkiye'deki Üniversite Öğrencilerinin Etkili İnternet Kullanımına Yönelik Müdahale Programı Geliştirme"** başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay **2018-EGT-101** protokol numarası ile araştırma yapması onaylanmıştır.

Saygılarımla bilgilerinize sunarım.

Prof. Dr. Tülin GENÇÖZ
Başkan

Prof. Dr. Ayhan SOL
Üye

Prof. Dr. Ayhan Gürbüz DEMİR
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Prof.Dr. Yaşar KONDAKÇI (4.)
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Ali Emre TURGUT
Üye

Doç. Dr. Emre SELÇUK
Üye

Doç.Dr. Üyesi Pınar KAYGAN
Üye

## C. Internet Use Patterns Questionnaire

Aşağıda, İnternet kullanım tercihlerinizi (cep telefonu, tablet, masa üstü veya diz üstü bilgisayar, vb. teknolojiler aracılığıyla) anlamaya yönelik birtakım sorular yer almaktadır. Lütfen her bir soruyu dikkatlice okuyarak yanıtlandırınız. Soruların bir kısmı, İnternet kullanımınızla ilgili bazı tahminlerde bulunmanızı gerektirmektedir. Bu tahminlerde bulunurken, gerçeği en doğru şekilde yansıtacak tahminler olmasına özen gösteriniz.

**1.** İnternet'i yaklaşık olarak kaç yaşında kullanmaya başladınız? :

....................................

**2.** Her gün İnternet kullanıyor musunuz? :☐ Evet ☐ Hayır

**3.** Her gün İnternet **kullanıyorsanız günde** yaklaşık kaç saat kullanıyorsunuz?

:....................................

**4.** Her gün İnternet **kullanmıyorsanız haftalık** yaklaşık kaç saat kullanıyorsunuz?
:...............
.......................

**5.** İnternet'i **AKADEMİK/ ÖĞRENME** amaçlı kullanıyorsanız, spesifik olarak hangi **akademik** amaçlar için kullanıyorsunuz? (birden fazla seçenek işaretleyebilirsiniz.)

☐ Bilgilendirici **akademik** web içeriği **oluşturma** (eğitim blogu, eğitsel web sitesi, Vikipedi gibi sitelerde akademik içerik ekleme/oluşturma ya da Prezi veya Slideshare gibi platformlardan çevrimiçi sunum hazırlama vb.)

☐ Sosyal medya platformlarından **akademik/ öğrenme amaçlı** mesaj/bilgi **paylaşma / okuma** (Facebook gruplarında veya Twitter vb. gibi platformlarda akademik amaçlı ya da eğitimle ilgili bilgi paylaşma)

☐ Online ansiklopedilerden, arama motorlarından, kitlesel çevrimiçi açık ders kaynaklarından ya da eğitimle ilgili diğer kaynaklarından bilgiye **erişme** (Google, Vikipedi, Coursera, edX, vb.)

☐ Üniversite ders yönetim sistemini **kullanma** (ODTUCLASS, LMS, CMS vb.)

☐ **İlgi alanlarınıza yönelik** (derslerle ilgili olmayan) **eğitsel** bilgilendirici içeriklere **erişme/ bilgi edinme**

☐ Diğer (Lütfen belirtiniz.)…....…………………………………………………………………………
……….

**6.** Yukarıda belirttiğiniz kullanımları göz önünde bulundurarak, **AKADEMİK** amaçlarla günde/haftada **yaklaşık** kaç saat İnternet kullanıyorsunuz?

| Günlük kullananlar için | Haftalık kullananlar için |
|---|---|
| ……… saat | ……… saat |

**7.** İnternet'i **SOSYAL** amaçlarla kullanıyorsanız, spesifik olarak hangi **sosyal** amaçlar için kullanıyorsunuz? (birden fazla seçenek işaretleyebilirsiniz.)

☐ **Sosyal medya** platformlarında doğrudan mesaj (**DM**) aracılığıyla **etkileşime geçmek** (Facebook, Twitter, Instagram vb. üzerinden)

☐ **Whatsapp** aracılığıyla **sosyalleşme/ muhabbet etme amaçlı** iletişim kurmak

☐ **Sosyal medya** üzerinden, yapılan paylaşımlara diğer insanlarla **etkileşim kurmak için yorum yapmak**. (Facebook, Twitter, Instagram vb.)

☐ İlgi alanınıza yönelik **İnternet forumlarında** diğer insanlarla **iletişim kurmak için mesaj (post) paylaşmak** (Donanimhaber forum, Kadınlarkulübü, Ekşisözlük vb.)

☐ Diğer insanlarla iletişim kurabilmek için ilgi alanlarınıza yönelik **web sitelerinde yapılan paylaşımlara yorum yapmak** (Onedio, Listelist vb.)

☐ Flört uygulamaları aracılığıyla iletişim kurmak (Tinder, Match vb.)

☐

Diğer………………………………………………………………………………….
..

**8.** Yukarıda belirttiğiniz kullanımları göz önünde bulundurarak, **SOSYAL** amaçlarla günde/haftada **yaklaşık** kaç saat İnternet kullanıyorsunuz?

| Günlük kullananlar için | Haftalık kullananlar için |
|---|---|
| ………. saat | ………. saat |

**9.** İnternet'i spesifik olarak hangi **vakit geçirme** amaçları için kullanıyorsunuz? (birden fazla seçenek işaretleyebilirsiniz.)

☐ Müzik dinleme, Video/film izleme, (**Youtube, Netflix, Fizy, Spotify, Puhutv, Çevrimiçi dizi/film siteleri vb.)**

☐ İnternet'te haberler, gazeteler, sağlık, moda vb. ile ilgili bilgi arama/okuma

☐ İlgi alanlarınıza yönelik web sitelerinden bilgi okuma (**Onedio, Listelist, Bilimfili, Düşünbil** vb.)

☐ **İnstagram, Facebook** gibi sosyal platformlarda fotoğraflara bakma / video izleme / paylaşım yapma

☐ Bireysel oyun oynama (Candycrush vb.)

☐ Çok oyunculu çevrimiçi oyun oynama (WoW, Diablo vb.)

☐ Çevrimiçi alışveriş / satış yapmak (eBay, Gittigidiyor, Hepsiburada, Trendyol vb.)

☐ Kindle vb. üzerinden kitap okumak.

☐ Diğer (Lütfen belirtiniz)
…...………………………………………………………………………………….

**10.** Yukarıda belirttiğiniz kullanımları göz önünde bulundurarak, **VAKİT GEÇİRME** amaçlı günde/haftada **yaklaşık** kaç saat İnternet kullanıyorsunuz?

| Günlük kullananlar için | Haftalık kullananlar için |
|---|---|

|  ………. saat | ….…… saat |
|---|---|

**11.** İnternet'e erişmek için en çok hangi cihazı ya da cihazları kullanıyorsunuz? (Birden çok seçenek işaretleyebilirsiniz.)

☐ Laptop /notebook
☐ Masaüstü bilgisayar
☐ Tablet
☐ Akıllı telefon
☐ İnternet bağlantılı TV
☐ Diğer (Lütfen belirtiniz)
……………………………………………………………………………………………

**12.** İnternet'e en çok nereden ya da nerelerden erişiyorsunuz? (Birden çok seçenek işaretleyebilirsiniz.)

☐ Ev
☐ Yurt
☐ Üniversite/ Kampüs
☐ Özel bir yer yok (Mobil Internet aracılığıyla)
☐ Diğer (Lütfen belirtiniz)
……………………………………………………………………………………………

**13.** İnternet kullanımınızın aşırıya kaçtığını düşünüyor musunuz?

☐ Evet ☐ Kararsızım ☐ Hayır

**14.** Yakınlarınız İnternet kullanımınızın aşırıya kaçtığını düşünüyor mu?

☐ Evet ☐ Hayır

**15.** Son bir yıldaki **akademik amaçlı** İnternet kullanımınız hakkında ne düşünüyorsunuz?

☐ Arttı ☐ Değişme yok ☐ Azaldı

**16.** Son bir yıldaki **sosyal amaçlı** İnternet kullanımınız hakkında ne düşünüyorsunuz?

☐ Arttı ☐ Değişme yok ☐ Azaldı

**17.** Son bir yıldaki **vakit geçirme amaçlı** İnternet kullanımınız hakkında ne düşünüyorsunuz?

☐ Arttı ☐ Değişme yok ☐ Azaldı

## D. Interview Protocol

İNTERNET KULLANIM DAVRANIŞLARI GÖRÜŞME SORULARI

1. Günlük İnternet kullanım sürenizin miktarı hakkında ne düşünüyorsunuz? Neden?

2. İnternet kullanım davranışlarınızı olumsuz görüyorsanız buna neden olan durumlar nedir?

3. İnternet kullanım alışkanlıklarınız yaşantınızı nasıl etkiliyor? Açıklayınız.
   a. Internet kullanımınız sosyal hayatınızı nasıl etkiliyor?
   b. Internet kullanımınız akademik hayatınızı nasıl etkiliyor?

4. Mevcut İnternet kullanımın davranışlarınızın psikolojinize ne tür etkileri olduğunu düşünüyorsunuz?

5. Mevcut İnternet kullanımın davranışlarınızın akademik çalışmalarınıza odaklanma sürenize ne tür etkileri olduğunu düşünüyorsunuz?

6. Ders çalışırken Internet'e girme isteği duyuyor musunuz? Evet ise, bu isteğiniz çalışma sürecinizi (task-switching, multitasking) ve öğrenmenizi (deep / superficial) nasıl etkiliyor?

KULLANILABİLİRLİK GÖRÜŞME SORULARI

1. Uygulamayı telefonunuza indirme / kurma deneyiminiz nasıldı?

2. Uygulamaya üye olma deneyiminiz nasıldı?
   a. Olumlu ise, bu durumun nedenleri nedir?
   b. Olumsuz ise bu durumun nedenleri nedir?

3. Üye olduktan sonra uygulamaya dair kısa bilgiler veren üç sıralı ekranla karşılaştınız, bu ekranlardaki genel ifadelerin hEp'e dair bilgi verdiğini düşünüyor musunuz?

4. hEp rehberinin faydalılığı / gerekliliği hakkında ne düşünüyorsunuz?

5. hEp örnek içeriklerinin faydalılığı / gerekliliği hakkında ne düşünüyorsunuz?

6. hEp rehberi hakkında ne düşünüyorsunuz?

7. hEp örnek içeriklerin sunulması hakkında ne düşünüyorsunuz?

8. Devam Eden hEplerim anasayfasını / detay sayfasını

    a. İlk kez gördüğünüzde ne düşündünüz?

    b. Şimdi ne düşünüyorsunuz?

    c. Bir önceki döngüden farklı olarak, devam eden hEp'lerimde bulunan bir hEp'in süresi dolduysa bu hEp kırmızı arkaplan ile görüntüleniyor. Bu durum hakkında ne düşünüyorsunuz?

9. hEp'i tamamla butonu hakkında ne düşünüyorsunuz?

    a. Bu döngüde diğer döngülerden farklı olarak, hEp'i tamamla butonunu tıkladığınızda "Süreci Değerlendir" ekranına geçerken konfetiler ortaya çıkıyor ve uygulama küçük bir kutlama yapıyor. Bu durum hakkında ne düşünüyorsunuz?

10. Tamamladığım hEplerim anasayfasını / detay sayfasını

    a. İlk kez gördüğünüzde ne düşündünüz?

    b. Şimdi ne düşünüyorsunuz?

11. hEp oluşturma deneyimiz nasıldı, neden?

12. hEp tamamlama deneyiminiz nasıldı, neden?

13. Uygulamayı kullandığınız süreçte hata veya hatalarla karşılaştınız mı? Bu durum uygulamaya dair algınızı / düşüncelerinizi nasıl etkiledi?

14. Uygulamanın renkleri, yazı stilleri, görselleri ve ekrandaki objelerin konumları hakkında ne düşünüyorsunuz?

15. Uyarı mesajlarının konumu, renkleri, görüntülenme yöntemi, yazı özellikleri hakkında ne düşünüyorsunuz?

16. Uygulamada yer alan butonların yönlendirdikleri sayfalar ile uyumları hakkında ne düşünüyorsunuz?

    a. Örneğin belirli bir butonuna tıkladığınızda sizi tahmin ettiğiniz ekrana yönlendiriyor muydu? Yönlendirmeyen butonlar olduğunu düşünüyorsanız, hangi ekran için nasıl bir buton kullanılmasının bu belirsizliği giderebileceğini düşünüyorsunuz?

b. Menü çubuğunu kullandınız mı? Sizin için işlevsel bir buton muydu? Neden?

        i. Altında yer alan diğer butonlar bu ana buton altında olmak için uygun muydu? Neden?

17. Uygulamada geçmek istediğiniz farklı ekranlara geçme deneyiminiz nasıldı?

    a. Uygulamada önceki adımları tamamlamadan sonraki adımlara geçemiyorsunuz. hEp ilerlerken önceki ekranlara geri dönüp ilgili adımı düzeltme gerekliliği duydunuz mu, evet ise deneyiminiz nasıldı?

    b. Uygulamayı kullanırken aşamalı adımlar dışındaki herhangi bir ekrandan farklı bir ekrana geçtiyseniz bu deneyiminiz nasıldı?

18. Uygulamada her bir hEp'inizi oluşturmak için ortalama ne kadar süre ayırdınız? Bu sürenin uzunluğu/kısalığı hakkında ne düşünüyorsunuz?

19. Ekranların bazılarında belirli süre alt limiti var. Bu 5 saniyelik alt limitin uygunluğu hakkında ne düşünüyorsunuz?

    a. Süre alt limitine dair uyarıların görüntülenme süresi / cümlenin anlaşılırlığı / yazı boyutu / yazı rengi hakkında ne düşünüyorsunuz?

20. Ekranların bazılarında belirli harf alt limitleri var. Bu 5 harflik alt limitin uygunluğu hakkında ne düşünüyorsunuz?

    a. Harf alt limitine dair uyarılarındaki cümlenin anlaşılırlığı hakkında ne düşünüyorsunuz?

21. Uygulamada olmasını beklediğiniz fakat mevcut sürümde olmayan herhangi bir şey var mı? (Ek bilgi sayfası, hEp oluşturmaya rehberlik edebilecek bir video, ne kadar süreniz kaldığını gösteren bildirim)

    a. Eğer olmalı ise nasıl olmalı?

22. Tahmin ettiğinizden daha kısa süren hEp'leriniz oldu mu? Bu hEpleri tamamla butonuna tahmininizden daha kısa sürede basmanız gerektiğinde herhangi bir tereddüt yaşadınız mı?

23. Uygulamanın öğrenme kolaylığı/zorluğu ile ilgili ne düşünüyorsunuz?

24. Uygulamanın kullanım kolaylığı/zorluğu ile ilgili ne düşünüyorsunuz?

25. Bu uygulamanın sizde geliştirdiği memnuniyet/memnuniyetsizlik hissi nasıl?

FAYDALILIK GÖRÜŞME SORULARI

1. 3. Döngüde X tane hEp oluşturmuşsunuz ve final döngüsünde Y tane hEp oluşturmuşsunuz. Uygulama üzerinden hEp oluşturmadığınız akademik çalışmaların için zihninizden hEp oluşturduğunuz oldu mu? Açıklayabilir misiz?

2. Uygulamayı kullanmanızın **akademik** davranışlarınızda herhangi bir değişiklik yarattığını düşünüyor musunuz?
   a. Evet ise nasıl bir değişiklik yarattı?
   b. Hayır ise neden herhangi bir değişikliğe neden olmadığını düşünüyorsunuz?

3. Uygulamayı kullanmanın **genel** davranışlarınızda herhangi bir değişiklik yarattığını düşünüyor musunuz?
   a. Evet ise nasıl bir değişiklik yarattı?
   b. Hayır ise neden herhangi bir değişikliğe neden olmadığını düşünüyorsunuz?

4. Uygulamayı kullanmanızın erteleme davranışınıza herhangi bir etkisi olduğunu düşünüyor musunuz, neden?

5. Uygulamayı kullanmanın çalışmalarınızı olumsuz etkileyen isteklerinize (eğlence amaçlı video izleme, çevrimiçi oyun oynama, vb.) yönelik etkisi olduğunu düşünüyor musunuz, neden?

6. Her bir hEp oluşturma sırasında sizden bazı durumları düşünmeniz istendi (hedef/süre/his/kazanım/engel/plan). Bu düşünmeniz istenen durumların her birinin süreci tamamlamanıza, hedefinize ulaşmanıza yönelik etkisi nasıl oldu?
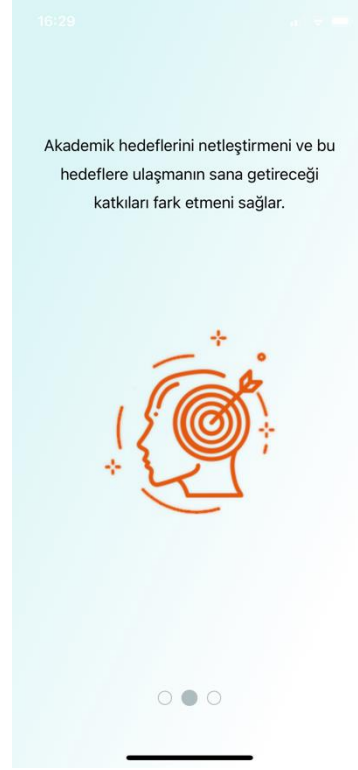   a. Akademik hedefinizi netleştirip yazmanın süreçte ve sonuçta nasıl bir etkisi oldu?

b. Akademik hedefinizi gerçekleştirmek için belirlediğiniz süreyi netleştirip yazmanın süreçte ve sonuçta nasıl bir etkisi oldu?

c. Hedefinizi gerçekleştirdiğiniz takdirde yaşayacağınız hissi, netleştirip emojilerle ifade etmenin/yazmanın süreçte ve sonuçta nasıl bir etkisi oldu?

d. Akademik hedefinizi gerçekleştirme sürecinde yaşayabileceğiniz engelleri netleştirip yazmanın süreçte ve sonuçta nasıl bir etkisi oldu?

e. Akademik hedefinizi gerçekleştirme sürecinde yaşayabileceğiniz engellere yönelik planlar hazırlayıp bunları yazmanın süreçte ve sonuçta nasıl bir etkisi oldu?

7. Süreçte üç farklı bildirim aldınız. Her biri için teker teker düşünelim.

a. Süren dolmak üzere /

b. Süren Doldu /

c. Yeni hEp oluşturmak ister misin?

Bu bildirimlerin hEp kullanımınıza nasıl etkisi oldu?

Hedeflerinizi gerçekleştirmenize nasıl etkisi oldu?

8. Farkındalık ekranı hakkında ne düşünüyorsunuz?

a. Kullandıysanız, nasıl bir deneyimdi?

b. Kullanmadıysanız, neden kullanmadığınızı düşünüyorsunuz?

9. Çalışma bitmiş olmasına rağmen bu uygulamayı kullanmaya devam etmeyi planlıyor musunuz, neden?

10. hEp'i diğer arkadaşlarınıza tavsiye eder misiniz?

a. Evet, ise kullandırmayı hangi cümlelerle teşvik edersiniz?

b. Hayır, ise neden?

11. Konuştuğumuz konular dışında eklemek istediğiniz şeyler varsa lütfen ifade ediniz.

## E. hEp Introduction Screens



hEp'e Hoşgeldin

hEp İnternet kullanımını düzenleyerek akademik hedeflerini gerçekleştirmene rehberlik etmek amacıyla geliştirilmiş bir uygulamadır.



Akademik hedeflerini netleştirmeni ve bu hedeflere ulaşmanın sana getireceği katkıları fark etmeni sağlar.



Hedeflerine ulaşmanda önüne çıkan engellerin farkına varmana ve bu engelleri aşmaya yönelik etkili planlar yapmana yardımcı olur. **Nihayetinde akademik hedeflerine ulaşmanı kolaylaştırır.**

Devam

## F. hEp Guide

### *hEp* nedir?

- **hEp** sağlıklı İnternet kullanımını teşvik ederek akademik hedeflerini gerçekleştirmene rehberlik etmek amacıyla geliştirilmiş bir uygulamadır.
- *hEp*'de sana bazı sorular yönlendirilmiştir. Bu soruları en kısa ve net haliyle yanıtlaman gerekmektedir. Bu soruları yanıtlarken dikkat etmen gereken şey etrafında **dikkatini dağıtacak herhangi bir şey olmaması** ve dikkatini birkaç dakika boyunca yalnızca *hEp*'e vermendir.

### *hEp*'i kullanmak için neye ihtiyacım var?

- **hEp'i** kullanabilmek için akıllı telefon veya tablet bilgisayara ihtiyacın var.

### *hEp*'in içeriğinde ne var?

- *hEp* akademik hedefini yazdığın, bu hedefini gerçekleştirdiğinde kazanımının ne olacağını netleştirdiğin, bu hedefi başardığında nasıl hissedeceğini belirttiğin, bu hedefe ulaşmanın önünde nasıl engeller olabileceğini belirlediğin ve bu engelleri aşmaya yönelik planlar yaptığın sıralı adımlardan oluşmaktadır.
- hEp'in tamamlanması için aşağıdaki bütün alanları doldurman gerekiyor.

**Hedef**: Bu ekranda yer alan metin kutusuna o günkü/zamanki hedefinin ne olduğunu kısa ancak açık ve net bir şekilde ifade etmelisin. (**Örnek hedef:** "Fizik dersinin vize sınavı için kitabın ilk 3 bölümüne çalışmak.")

**Zaman**: Bu ekranda, hedefini gerçekleştirmek için ihtiyaç duyduğun süreyi gün saat ve dakika alanlarını doldurarak belirtmelisin. (**Örnek zaman:** 0 gün 3 saat 20 dakika)

**Kazanım**: Bu ekranda yer alan metin kutusuna hedefini gerçekleştirmenin sana ne getirisi olacağını kısa ve net bir şekilde ifade etmelisin. (**Örnek kazanım:** "Bu bölümlere çalışırsam hem sınavdan daha yüksek not alacağım hem de sonraki fizik sınavlarında çalışmam gereken bölüm sayısı azalmış olacak.")

**His**: Bu ekranda hedefini başarmanın sende yaratabileceği olası hissi/hisleri emojiler halinde göreceksin. Hedefini başardığın takdirde hangi hissi/hisleri yaşayacağını düşünüyorsan ilgili hissin üstüne bir kez tıklaman gerekiyor. Ayrıca, yaşayacağın hissi metin kutusunu kullanarak daha açık bir şekilde yazabilirsin. (**Örnek his:** Rahatlamış, gururlu, mutlu).

**Engel**: Bu ekranda yer alan metin kutusuna hedefini gerçekleştirmenin önünde engel oluşturabilecek durumu kısa ve net bir şekilde ifade etmelisin. Birden fazla engel olabileceğini düşünüyorsan bunları + butonuna tıklayarak **maddeler halinde** yazabilirsin. (**Örnek engel:** Ders çalışırken Whatsapp, Facebook, Twitter gibi sosyal medya platformlarında gezinme/konuşma isteğim.)

**Plan**: Bu ekranda yer alan metin kutusuna engelini/engellerini aşmak için planının ne olduğunu yazmalısın. Birden fazla engel belirlediysen ve her biri için ayrı planın varsa ya da aynı engel için birden fazla planın varsa bunları + butonuna tıklayarak **maddeler halinde** yazabilirsin. (**Örnek plan:** "Ders çalışırken Whatsapp'a girmek istediğimde, hedefimi bitirmemin bana gururlu hissettireceğini hatırlatacağım.")

- Bu adımları tamamladıktan sonra ilgili akademik hedefine başlamaya artık hazırsın.

## Oluşturduğum hEp'te değişiklik yapabilir miyim?

- Evet, yapabilirsin. **hEp'ini oluştururken** geçtiğin ekranlarda değişiklik yapmak istiyorsan **ekranı sola kaydırıp** istediğin ekrana gidip değişiklik yapabilirsin. **hEp'ini oluşturduktan sonra** değişiklik yapmak istiyorsan "**Devam Eden hEp'lerim**" ekranına gidip, değişiklik yapmak istediğin hEp'i tıklayıp detay ekranına gidebilir ve **hEp'i düzenle** butonuna tıklayıp istediğin değişiklikleri yapabilirsin.

## Hedefimi tamamladığımda ne yapmalıyım?

- Hedefini tamamladıktan sonra "**Devam Eden hEp'lerim**" ekranına gidip "**hEp'i Tamamla**" butonuna tıklaman gerekiyor. Bu buton seni **Farkındalık** ekranına yönlendirecektir. Bu ekranda gerçekleştirdiğin

hedefine dair yeni bir farkındalığın varsa yazıp **Kaydet** butonunu, yeni bir farkındalığın yoksa **hEp'i Bitir** butonunu tıklamalısın.

## hEp'i ne zaman kullanmalıyım?

- **hEp**'i akademik hedeflerine başlamadan **hemen önce** uygulamalısın. Böylece çalışma sürecinde verimliliğin daha yüksek düzeylere çıkabilecektir.

## Her bir hedefi tamamlama süresi ne kadar olmalı?

- Belirlediğin hedefler için belli bir tamamlama süresi yok. Bu tamamen senin ne kadar sürede ilgili hedefi tamamlayacağını düşünmene bağlı olarak değişir. Hedefin, herhangi bir dersinin günlük ödevi veya kısa süreli projesini yapmak olabileceği gibi vize, final sınavlarına ya da daha uzun süreç gerektiren KPSS, YDS gibi sınavlara hazırlanmak da olabilir.

## Bütün hEp'lerimi başarıyla tamamlamam gerekiyor mu?

- Bazı durumlarda hedefi tamamlamakta zorluk çekebilirsin. Böyle bir durumda **Devam Eden Hedeflerim** ekranına gidip **Hedefi Tamamla** butonunu tıklamalısın. Sonrasında **Farkındalık** ekranına yönlendirileceksin. Bu ekranda, hedefini neden <u>tamamlayamadığını</u> ve bu hedefinle ilgili süreçte yeni bir farkındalığın olup olmadığını yazmalısın.

## G. hEp Sample Contents

| | Neyi Başarmak İstiyorsun? | Zamanı Belirle | Kazanımın Ne Olacak | Ne Hissedeceksin? | Engelini Tanımla | Planını Yap |
|---|---|---|---|---|---|---|
| 1 | Eğitim bilimleri sınavı için gelişim psikolojisine çalışmak. | 3 saat | Hem ilgi duyduğum gelişim psikolojisine dair yeni şeyler öğreneceğim hem de sınava daha hazır gireceğim. | Enerjik, özgüvenli | 1- Netflix'te dizi izlemekten çalışmaya başlayamamam. 2- Çalışma masasına oturunca dikkatimi toplayamamam. | 1- Dizi izleme dürtümü bastıramazsam ilgi duyduğum gelişim psikolojisini öğrenmeye fırsatım olmayacağını kendime hatırlatacağım. 2- Dikkatimi toplayana kadar, başka hiçbir şeyle ilgilenmeden masada oturmaya devam edeceğim. |
| 2 | Tasarım dersinin projesi için broşür içeriği hazırlamak. | 4 gün 5 saat | Projenin en zorlu, uzun süren adımını tamamlamış olacağım. | Rahatlamış | Konu içeriğine çok hâkim olmadığım için sürekli sıkılıp ara vermem ve bir türlü ilerleyememem. | Ara vermek istediğimi fark ettiğimde kendime çalışmaya devam etmen gerektiğini hatırlatıp bu zorlu adımı bitirince rahatlamış olacağımı hatırlatacağım. |
| 3 | Hafta sonu matematik ara sınavında çıkacak bütün konulara çalışmak. | 2 gün | İyi bir not alarak dönem ortalamamı yükselteceğim. | Mutlu, cesur | Cumartesi günü gerçekleştirilecek sosyal aktiviteye katılmak istemem. | Aktiviteye katılmak daha çekici gelirse, bu tür aktivitelerin bundan sonrada olacağını ve kendimi ödüllendirmek için katılabileceğimi hatırlayacağım. |
| 4 | SEM adlı istatistiksel analiz yöntemini öğrenmek | 7 gün | İstatistik alanındaki bilgimi daha ileri bir düzeye taşıyacağım. | Özgüvenli | Nereden başlamam gerektiğini bilemediğim için bir türlü başlayamamam | 1- Daha önce bu konuya dair hazırlanmış videolar izleyerek başlayacağım. 2- Bu konuyu iyi anlatan bir iki çalışma bulacağım ve onların rehberliğinde ilerleyeceğim. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | Öz-düzenleme ile ilgili taraması yapmak ve tezimde ilgili başlığa yazmak | 10 gün 5 saat 30 dakika | Tezimin en önemli başlıklarından birini istediğim kalitede hazırlamış olacağım. | Rahatlamış | Literatür taraması yapmak ve uygun sıralamada sentezleyerek sunmakta zorlanmam. | Kendime 15 dakika kadar zaman verip zihnimde literatürü nasıl sunmam gerektiğine dair sıralama yapıp öyle çalışmaya başlayacağım. |
| 6 | Çalışmamda Türkçe olarak hazırladığım içeriği İngilizce'ye çevirmek. | 5 saat 30 dakika | Hem çeviri anlamında önemli bir egzersiz yapmış olacağım hem de bir süredir zihnimi meşgul eden bu konudan kurtulacağım. | Mutlu, rahatlamış, özgüvenli | Bunu yapmamın acelesi olmadığını düşündüğüm için sürekli olarak ertelemem | Yapmam gereken tek işimin bu olmadığını ve şu sıralar vaktim varmış gibi görünse de diğer çalışmalarla art arda geldiği takdirde beni çok yoracağını ve strese gireceğimi kendime hatırlatacağım. |
| 7 | Okuduğum makalenin tezimde yer alması gereken bölümlerini tezime eklemem. | 1 gün 5 saat 30 dakika | Tez jürisinde gelebilecek önemli bir sorunun yanıtını şimdiden vermiş olacağım. | Özgüvenli, yorgun | Başladığımda yeni eksikler fark edip bunlarla da uğraşmak zorunda kalmaktan korkmam. | Yeni eksikler fark etmemin iyi bir şey olduğunu, tezimin kalitesini yükseltecek bir yol olduğunu ve bundan kaçmamam gerektiğini kendime hatırlatacağım. |
| 8 | Yazmam gereken makaleyi tamamlamak. | 30 gün | İkinci bir uluslararası makalemin olması özgeçmişimi güçlendirecektir. | Yorgun, mutlu | Düşünmem gereken çok fazla konu başlığı var ve bütün hepsini düşündüğümde beni yazmaktan alıkoyması. | Küçük adımlar ilkesini uygulayacağım, yani bir çalışma sırasında yalnızca bir konuya odaklanıp onunla ilgili başlığı tamamlamayı amaçlayacağım. |
| 9 | İngilizce pop-quiz'i için hazırlanmak. | 45 dakika | Sınav sabah olacağı için, sınava hazır girdiğimde bütün günüm daha iyi geçecek. | Mutlu, özgüvenli | Oda arkadaşlarımla muhabbet etme isteğim. | Çalışma odasına gidip orada çalışacağım. |
| 10 | Web'de hazırladığım hEp sitesini tamamlamak. | 60 gün | Web tasarımı ve programlama dillerinde kendimi daha yetkin hissedeceğim. | Cesur, özgüvenli | Web tasarımı, geliştirmenin beni zorlaması ve bu nedenle ertelemem. | Her gün için Udemy'den 2 video izleyerek gerekli adımları tamamlamadan eve gitmeyeceğim. |

# CURRICULUM VITAE

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Kara, M., **Caner, S**., Günay Gökben, A., Cengiz, C., İşgör Şimşek, E., & Yıldırım, S. (2018). Validation of an instrument for preservice teachers and an investigation of their new media literacy. *Journal of Educational Computing Research*, *56*(7), 1005-1029.

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