Users' Feedback about a Digital Well-Being System

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Abstract
In this research, we investigated the users' feedback to understand the requirements of Turkish users of a digital well-being system which maximizes users' happiness. We focus on the software features that persuade digital well-being system users to increase their happiness. Fifteen digital addicted university students participated to the surveys and in the interviews. A simple wireframe was designed to share a content-intensive simple image. Users focused on features. In addition, the participants gave feedback about the system while using the application about their happiness. Users' needs were asked depending on the users' feedback. Based on users' feedback, we list the software features they would like to have in their digital well-being system to manage their happiness.

Keywords: Digital well-being systems; Software users' feedback; Software requirements; Persuasive technology

JEL Classification: I31, O39

DOI: http://doi.org/10.24818/ejis.2022.15

1. Introduction

Users' feedback is a main source of knowledge on how users perceive the role of software in meeting their requirements. Collectively, such feedback helps shaping software autonomous and semi-autonomous adaptation decisions of what is called Social Adaptation. It also helps developers to identify loci in the system where an evolution should be introduced in the next release. Despite this role of users' feedback, there is a lack of systematic engineering approaches on how to design its acquisition mechanisms (Almaliki *et al*., 2014). Ali *et al*. (2012) proposed social adaptation which is a specific kind of adaptation that analyse users' feedback, obtained during the software lifetime, as a primary driver in planning and guiding adaptation. They proposed a novel requirements engineering modelling and analysis approach meant for systems, adopting social adaptation. Almaliki *et al*. (2014) observed that the acquisition of feedback should be itself adaptive to the context of use. They conducted an empirical study following a mixed-method sequential exploratory approach to explore the main drivers of such adaptation, and to understand

[1] Received: 12 March 2022; Revised: 7 April 2022; Accepted: 15 May 2022

users' attitude when being asked to provide feedback. Their findings were meant to enrich the knowledge base for developers and researchers in users-centric, or crowd-centric adaptation. According to Ganci (2016), it is necessary to understand what kind of problems a user needs to solve in order for a software to be developed. A good software design should focus entirely on user goals and needs. Then, the user's requirements should be translated into a concrete software design. Users, and scenarios created for users, represent real individuals and events. The software design should be created for real users, and their exact goals should be defined.

Drawing from an interdisciplinary body of literature on the concept of "well-being", Gui *et al.* (2017:155) offered a definition of "digital well-being" as a state obtainable not only by the individual through his/her personal "digital well-being skills", but also as a characteristic of a community whose norms, values and expectations contribute to its members' comfort, safety, satisfaction and fulfilment. They presented the fruitfulness of the concepts of "digital well-being" and "digital well-being skills" for interdisciplinary social research and policy. Burr *et al*. (2020) presented the first thematic review of the literature on the ethical issues concerning digital well-being. The term "digital well-being" was used to refer to the impact of digital technologies on what it means to live a life that is good for a human. This research aims to investigate the requirements of Turkish users of a digital well-being system which maximizes users' happiness. Software systems that manage users' digital addiction and well-being have been developed in the digital well-being category (Peters *et al*., 2020) in recent years.

In this research we focus on the software features that persuade digital well-being system users to increase their happiness (Fogg, 2003). During the mixed research process, the participants gave feedback about the system and their happiness while using the application. Users were asked about their needs. Based on users' feedback, we asked them what software features they would like to have in their digital wellbeing system to manage their happiness. We also asked about features that would persuade users to increase their happiness. As a result of our qualitative research, we have listed our findings.

In Section 2, the frame of the concept of happiness was drawn as a summarization. Section 3 presents the method and the data collection process. Section 3 explains our results. Last section concludes the research.

2. Happiness: A Brief Literature Review

A seventeen-century philosopher said that all mortals seek happiness, which is a sign that none of them have it. Since the existence of humankind, happiness has been one of the concepts that are difficult to define and to understand. For this reason, we come across different definitions of it, for daily life understanding, literature or philosophy. A simple definition provided by the Turkish Language Association (TDK, 2022) affirms that happiness is the state of being proud, of being able to reach all aspirations completely and continuously, prosperity, blessing, enjoyment. The start of the concept can be what people really want in their lives. The ultimate conclusion is that they want to be happy. It can be said that, even after hundreds of years, we still have not succeeded in reaching the ideal state of happiness. Even though we are in a better situation in areas such as health care, access to food, access to information, etc. compared to just 30 years ago, we are still left sometimes with the feeling that our lives are wasted, and we spend our days filled with

worries instead of happiness. What is the real reason for this constant dissatisfaction, from human psychology point of view? Do we not know where to look?

Aristotle believed that happiness was a way of life rather than a sensible state. He thought that with constant practice, somebody could bring out the good in that person. According to Epicurus, one of the ancient Greek thinkers, happiness did not originate only in the spiritual world, but rather heavily related to worldly matters. Nietzsche was critical of happiness. He argued that a peaceful and carefree life is for ordinary people. He disagreed with the ongoing state of well-being and thought that happiness was a temporary state. Nietzsche went further and defined happiness as the "Ideal Laziness State". Democritus emphasized hedonic adaptation by saying that happiness means thinking about something beautiful, and happiness stays not in power or in money, but in truth and versatility (Csikszentmihalyi, 2005).

Slavoj Zizek, one of today's philosophers, states that it is not an invariable truth that being truly happy changes according to personal views. Zizek argues that the person who does not know exactly what he really wants is in a state of constant discontent (The Happy Project, 2022).

Csikszentmihalyi, in his book *Flow* (Csikszentmihalyi, 2009), states that we cannot reach happiness by consciously seeking it, but we can find happiness by focusing on the good or bad details of our lives. It has always been the pleasure of thinking that motivates great thinkers, not the material rewards they can earn by thinking. The first function of “flow” activities such as music, skiing and playing games is to offer enjoyable experiences (Csikszentmihalyi, 2009). According to Csikszentmihalyi, happiness is not pursued, but happiness goes after other things, just as a person who is devoted to a higher purpose feels happiness without even realizing it while reaching his goal.

The only thing that hasn't changed from past to present is that our pursuit of happiness continues. From the point of view of companies, happiness requires looking at it from a capitalist point of view. It is a well-known fact that a happy workforce brings a great competitive advantage to businesses in the modern economy. Happy people make a positive contribution to the economy they are in, and become a driving force. Even in a negative situation, as it is stated in Kenny's article, published in January 2015 *Bloomberg Businessweek* magazine, that being optimistic is good for the economy (Kenny, 2015). According to the positive psychology, things done thinking that they will increase our happiness, can, actually, increase our happiness.

Diener proposed the modern hedonic approach; subjective well-being theory (Diener *et al.* 2011). There are three basic components of hedonism and subjective well-being: life satisfaction, positive mood presence, and negative mood presence. Aristotle saw hedonic happiness as a crude ideal. He suggested that there is true happiness in virtue, doing what it is worth to do. Eudaimonic theories emphasize the importance of happiness as a process and the pursuit of goals, meaning to lead a good life. According to eudaimonic theories, acting on desires is not a requirement for happiness, suggesting that some results of the pursuit of happiness will not be good or will not result in well-being. According to the eudaimonic theory, a good life, and therefore long-lasting happiness and well-being, is objective rather than subjective. Unlike hedonism, eudaimonism is much more complex, rather than the pursuit of pleasure for the sake of pleasure. Eudaimonism representative assesses six basic dimensions of Ryff's theoretical model of psychological well-being: autonomy, environmental mastery, personal growth, purpose in life, positive relationships with others, and self-acceptance. Keyes and Annas (2009) have said that individuals with high levels of both subjective well-being and eudaimonic well-being are "thriving"

compared to those high only in subjective or in eudaimonic well-being. This brings out the most long-term and short-term benefits when hedonism and eudaimonism work together. This has given rise to hybrid theories. According to positive psychology, which has become widespread in recent years, happiness is an "eclectic" discipline.

Meanings such as pleasure from life, life satisfaction and love express subjective well-being. The Oxford Happiness Scale factors (Hills and Argyl, 2002) are life being rewarding, mental alertness, self-satisfaction, finding good things, life satisfaction, being able to use time, looking interesting, happy memories, and meaning in life. Happiness is related to personality, life circumstances, choices and behaviours in life. According to Lyubomirsky (2007), 50% of our genes, 10% of life conditions and 40% of our choices and behaviours in life are effective in our subjective happiness. Our choices in life include activities we want or love to do, such as giving thanks, being kind, building good relationships, meditation, worship, playing sports. All this will increase our level of happiness.

Authentic Happiness Theory (Seligman, 2004) argued that there are 3 different types of happiness: pleasures, good life and meaningful life. The meaningful life simply represents what is greater and more valuable than the pleasures and desires of the self. Hedonic happiness types alone do not provide happiness. There must be meaning in life. According to Seligman (Seligman, 2004), happiness that comes only with things that give pleasure does not provide permanent happiness. He says that happy people are very social. Seligman noticed that very happy, satisfied people get along well with others and enjoy companionship. Enjoying social activities and being with others may not provide deep intellectual and emotional satisfaction, but they are necessary for happiness (Collin, 2012). According to Seligman's PERMA model (Seligman's PERMA™ theory of well-being) (Seligman, 2018), the main components that stimulate flow are: positive emotion (P), engagement in flow (E), relationships (R), meaning (M) and success (accomplishment) (A). There are techniques that can be used to increase each component.

“Positive technology” takes the responsible role of a “digital coach,” supporting people in achieving personal goals and behaviour change. The design of such technology requires knowledge of different disciplines such as psychology, design and human-computer interaction. However, possible synergies are not yet used to full effect, and it needs common frameworks to support a more deliberate design of the “therapeutic interaction” mediated through technology. For positive technology design, positive psychology, and resource-oriented approaches appear as particularly promising starting point (Diefenbach, 2018).

3. Method

Mixed research method was used in this study. Surveys and interviews were conducted with the 15 selected participants who were Erciyes University students. First, online survey was applied to the participants. Later, the participants used an application. In addition, the participants gave feedback about the application via Whatsapp while using the application.

First, online surveys were administered to the participants. Afterwards, the participants were directed to use the application. Interview questions were asked within this framework. The survey and the interviews were conducted with the participants who agreed to install

and to use the Space app[2], which manages digital addiction, and ReWi app[3], the program that manages happiness, right after their use. Based on semi-structured interview guide, we talked about what users expect and need from a digital well-being app, and what features an app should have to convince them to be happy.

All the participants have been informed in details about the research objectives, and about the fact that they can withdraw from the research anytime they want. Happiness, digital addiction concepts and digital well-being systems were explained to the participants in detail, at the beginning of the research. Ethical issues were discussed with the participants. Ethical Consent Form and other ethical documents were filled and signed by each participant. Online data collection was completed between October 15, 2019 and January 15, 2020. Face-to-face interviews took place between December 15, 2019 and February 28, 2020. It started with seventeen volunteer participants (only volunteer participants were included in the study), but as a result of the survey, 15 participants continued with the in-depth interviews. 15 in-depth interviews were conducted. Data were collected as audio recordings.

3.1. Data Collection

Seventeen students, from those who offered volunteer, were selected by purposive sampling method, taking into account the results of the digital addiction survey they had participated. Participants with different characteristics were selected. Erciyes University Department of Business Administration, Department of Economics students as well as students from Business Administration, Management Information Systems, Industrial Engineering, Computer Engineering, Electronics Engineering and Mechanical Engineering participated in the study as end users. Seven of the participants had system analysis design knowledge at the designer level. Two of the participants were advanced game addicts. One of the participants stated that he is addicted to Youtube and watching videos. One of the participants is a social media phenomenon and is an Instagram addict. All of the female participants (4 persons) are social media addicts. Some characteristics of the participants are given in ***Table 1***.

Table 1. Details of Participants

Participant code	Gender	Age	Education field	Education degree	Role
K1	Female	23	Business and Administration	Undergraduate student	End user
K2	Male	28	Management Information Systems	Master student	End user/ Designer
K3	Male	21	Economics	Undergraduate student	End user
K4	Female	24	Business and Administration	Undergraduate student	End user
K5	Male	24	Economics	Undergraduate student	End user
K6	Female	22	Economics	Undergraduate student	End user
K7	Male	22	Business and Administration	Undergraduate student	End user

[2] For Space app, look at: https://findyourphonelifebalance.com/
[3] For ReWi app, look at: https://apprecs.com/ios/914948787/rewi

Participant code	Gender	Age	Education field	Education degree	Role
K8	Male	29	Biomedical Engineering	phD student	End user
K9	Male	22	Marketing	Master student	End user
K10	Male	20	Electrical Electronics Engineering	Undergraduate student	End user
K11	Male	21	Electrical Electronics Engineering	Undergraduate student	End user
K12	Male	21	Computer Engineering	Undergraduate student	End user/ Designer
K13	Male	22	Business and Administration	Undergraduate student	End user
K14	Male	20	Computer Engineering	Undergraduate student	End user/ Designer
K15	Female	22	Electrical Electronics Engineering	Undergraduate student	End user

The following survey questions were asked to the participants: Five factor personality scale (Yoo and Gretzel, 2011; Uyar, 2019), Bartle's test[4] , Gaming Disorder Scale (Pontes and Griffiths, 2015; Arıcak *et al*., 2018); PERMA (Seligman, 2012; Demirci *et al*., 2017). Social Media Addiction Scale (Sahin, 2018), Mobile Addiction Scale (Kwo *et al*., 2013; Demirci *et al*., 2014), Toronto Alexithymia scale (Güleç *et al.* 2009; Bagby *et al.* 1994) and Demographic questions (gender (optional), age, education type and level).

During the interviews, participants were directed to think about the subject and design within the framework of software and happiness management concepts. Participants were encouraged to think differently within the framework of the concept of "happiness" and attention was drawn to happiness measurements.

It was desired to determine user expectations from the software system, aiming to combat with digital addiction, which manages happiness. The participants were asked what features an application should have in order to increase the happiness of the users. Questions about persuasion technology and gamification were also asked to the participants. The questions were arranged in a way that made it easier for the participants to answer. Questions were presented to the participants by giving examples from the application they used most frequently. In order to get more detailed answers from the participants, the questions in the interview form were detailed. The aim was to discover the expectations and needs of the users from the software. Besides, how could we increase the level of user's happiness with a software? We asked participants whether persuasive technology and gamification techniques affect the happiness levels of the user by exemplifying them. The participants were encouraged to think and to elaborate their answers, in order to obtain the most information during the interview. However, out-of-purpose data from the interviews were not included in our qualitative research analysis, as the literature recommends (Lichtman, 2013).

[4] Bartle Test: https://matthewbarr.co.uk/bartle/

4. Results

According to the survey analysis results of the participants given in ***Table 2*** and ***Table 3***, personality traits, player traits, emotional awareness and happiness levels, and addiction levels can be seen.

Table 2. Mobile device addiction, social media addiction factors, game addiction disorder, FOMO levels and PERMA level of the participants

Participant code	Mobile device addiction	Virtual tolerance	Virtual communication	Virtual problem	Virtual information	Game addiction disorder	FOMO	PERMA
K1	2,78	3,8	3,22	2,22	4,50	1,22	3,91	7,43
K2	1,54	2,8	1,89	1,89	2,83	3,56	2,27	7,78
K3	2,41	3,2	2,33	3,11	2,67	4,67	2,36	8,35
K4	2,22	3,8	2,22	1,56	4,00	2,00	2,59	7,87
K5	3,24	3	2,78	3,33	3,67	2,22	3,59	7,13
K6	3,22	4,4	3,22	2,89	3,33	1,89	2,64	7,48
K7	3,34	4	3,00	2,33	3,17	2,67	3,18	7,26
K8	3,66	4,4	2,89	3,22	4,50	4,56	3,59	7,74
K9	3,07	4,2	4,11	2,56	4,00	1,00	3,50	6,48
K10	3,41	4	3,22	2,78	4,83	3,33	5,00	7,30
K11	1,90	2,2	2,89	2,56	3,00	1,56	2,27	5,35
K12	2,73	1,4	2,56	1,67	1,50	3,89	2,09	6,43
K13	3,10	3,8	2,56	2,33	4,00	1,22	4,36	8,26
K14	1,46	2,2	2,11	1,44	1,67	2,67	1,59	7,26
K15	3,93	4,4	3,67	3,78	4,00	3,33	4,00	8,35

Source: Authors' own calculations

Table 3. Personality traits and Bartle's player traits of the participants

Participant code	Neuroticism	Extrovert	Open minded	Compliant	Honest	Explorer	Socialize	Achiever
K1	4,6	4	2,8	5	3,6	0,47	0,40	0,67
K2	3	4	5	5	5	0,87	0,53	0,33
K3	1,4	4,8	5	4,6	4,2	0,67	0,53	0,20
K4	4	4,6	5	5	4	0,53	0,27	0,73
K5	2,8	4,8	4,8	4,4	4,2	0,60	0,47	0,33
K6	3	3,2	4,4	5	4,4	0,53	0,73	0,33
K7	4,8	4,8	5	4,6	3,4	0,67	0,40	0,27
K8	3	3,8	4,6	3	4	0,20	0,33	0,80
K9	2,2	3,8	4,4	3,8	3	0,40	0,60	0,47
K10	4,6	4,6	4,2	3,2	4,4	0,40	0,60	0,47
K11	3,8	4,8	3,8	4,4	2,6	0,73	0,53	0,33
K12	3,8	3,4	4,6	3,8	3,6	0,60	0,47	0,53
K13	2,4	5	4,8	4,8	5	0,53	0,47	0,67
K14	2,6	4,2	5	3,8	4,2	0,53	0,33	0,67

Source: Authors' own calculations

Interviews were analysed by qualitative research method. The purpose of qualitative research is to build theories or develop analytical processes and frameworks (Creswell, 2014). Practically, a researcher tries to extract categories of codes to explain the features of social processes under basic research concepts (Smith and Biley, 1997). Smith and Biley (1997) emphasized that the grounded theory is more appropriate when little research is

done in a field, especially in determining the variables related to the phenomenon. The absence of a theoretical framework to guide the data collection process, analysis and interpretation is also a sufficient reason (Smith and Biley, 1997). The qualitative data obtained in the interviews were analysed with the thematic analysis method of Braun and Clarke (2006). In this research, we find categories and sub-categories of software features that persuades users to happiness.

According to users, there should be a system that will detect the user's social media addiction and advise the user in terms of happiness. With regard to social network addiction, a system should be considered to manage the users' time of use and happiness with recommendations and feedback, instead of leaving their devices, whose happiness level has decreased due to technology. The features the users founded are grouped together as follows.

- My Profile (Personality, Happiness, Persuasiveness, Activities I Like (Music, Sports, Art))
- My Goals (Agenda, Activity, Sports, Sleep, Happiness, Digital usage times, Screen locks, Pleasure, Socializing, Meditation/Worship, My Recommendations, Gratitude, Kindness)
- Recommendations and feedbacks (Motion tracking, Socialization offers, Favourite activity offer, Sleep, Socializing-focused gifts, Advice listening status, Durations and uses, Happiness)
- History (Picture history, Video history, Story history, Search history)
- Frequency of use (Application frequency, Screen lock, Location-Time, Other application usage, Durations)
- Relationships (Friend invitation and Adding, Sharing, Comparison, Friend recommendation)
- Social media (Facebook, Instagram, Google, Socialization rate)
- Happiness+ (Increase my happiness; Gives automatic advice)
- Avatar (Help support, DiB explanation information (background)-special in 21 diaries, Point collection rules, reminders and feedbacks, Voice recording and History recording on/off-text data)
- Happiness meter (Crowd and individual, Automatic measurement with words (Natural Language Processing), Voice recording to word conversion and measurement) (Awareness, Update test, Hashtag search, Sharing happiness (e.g. Facebook, Watsapp)
- Feedback settings (Interlock, Excitation, Spatial, Temporal, Emotional), Frequency of access to the application)
- Map (Location-based usage and happiness)
- Program selection (21-day addiction combat program, Normal use)
- Settings (Logout, Help, Privacy policy, Personal data)
- Game+ (Point system, Positive conditioning, +1 point for each activity, Positive conditioning, Advice listening status +1 point)
- Give feedback (User gives feedback to the software, Entries that bring additional points, Feedback to the software)

According to Interaction Design Foundation's definition (2022), user experience design is about designing the ideal experience of using a service or product. Within the framework of user feedback, we extract categories, ***Table 4*** presents the categories which persuades to increase happiness in a digital well-being system.

Table 4. Persuasive properties to increase users' happiness

Factors that persuade to happiness	Sub-categories
Avatar-virtual diary	
Comparisons by personality	
	Showing happiness and/or users with worse averages
Feedback	
	Giving feedback when inactive
	Feedback with emojis - drinking coffee emoji
	Offering different usage suggestions
	Showing the application listening status to the user
Usage time feedback	
	Sharing positive usage time to other users - optional by personality type
	Sharing negative feedback from the application with the solution alternative
	Positive messages from the app
Happiness level information	
	Location-based happiness feedback
	Happiness increase feedback
	High happiness level feedback
	Weekly happiness status feedback
Gamification features	
	Collecting points
	Positive conditioning
Virtual diary feature	
App gifts	
	Paid app being free as the score increases
	The application gives gifts focused on socialization
Feedback on sleep	
	Reminders
Relations	
	Friend recommendation of the app
	Socializing offers
Activities	
	User offers activities he likes
	Offer to listen to his favorite music
Objectives	
	Giving feedback when goals are achieved

Source: Authors' own calculations

5. Conclusion

With the Covid-19 Pandemic, social networks became our daily life. Users have learned about technology and how to live with it. In this research, we collected digital well-being users' feedback to present the categories which persuades users to increase their happiness.

In addition, we listed the digital well-being system features to manage happiness depending on the users' feedback. As a result of our research, we have determined that ease of use and user-oriented designs are the first features preferred by users. Users are also looking for features that express themselves.

Acknowledgement: This research is supported by TÜBİTAK 1003 Priority areas R&D project, Project id: **116E676**, Project title: "Mutlu proje: Sosyal Mutluluk Ölçen Bir Sosyo-Teknik Madenleme Sistemi (The happy project: An adaptive socio-technical mining methodology)". *We would like to thank to Prof. Dr. Raian Ali for his support and for sharing with us his knowledge and experiences.*

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