

What are you doing about your mental health?: How are gamification elements perceived in self-care apps by users?

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Abstract

Currently, mental health problems are more and more common among people which creates the need for untraditional solutions one of which are self-care apps. **AIM** The aim of this research was to find out how do users appreciate gamification elements in self-care mental health mobile applications (apps). The Technology Acceptance Model (TAM) (Davis, 1989) was used to further look into the link users create between gamification elements and future use intention. **METHOD** To retrieve the necessary data, this research developed an interview study with diary elements. 21 participants used one among three self-care apps. A codebook was developed and in the end consisted of 22 codes. **RESULTS** Almost all gamification elements coded were perceived both negatively and positively. Mostly negatively were the comments about sharing and streak/statistics. Virtual pet and customization/personalization were the most positively perceived. Payment appeared as unexpected factor when conceptualizing future use intention of users. Furthermore, it was found that users were not concerned with gamification elements but were more interested in the usability and ease of use of a technology when discussing future use intention. **CONCLUSION** All in all, gamification elements cannot be characterized collectively as other factors should be considered in mental health aspect. Furthermore, a connection between gamification elements and future use intention was not found.

Keywords:

Mental health, self-care apps, gamification, gamification elements, perceived usefulness, perceived ease of use, future use intention, technology acceptance model

1. Introduction

With the boom of technology, comes the boom of mobile apps. They range from serious games, through social media apps to self-care mental health apps. The technology boom together with the increasing cases of mental health struggles leads app developers and entrepreneurs to experiment with gamifying said self-care apps (Sooradas et al., 2023). Donker et al (2013) define mental health apps as apps that aim to improve inner health and well-being. Gamification is using game element in non-game context (Detering, 2011). The increasing demand for mental health care has resulted in overloaded schedules of psychologists and an increased interest in alternative help methods such as self-care mobile apps. The digitalization of services has made it possible for users to find this new way to treat their mental health problems (Santoso et al, 2021). This is true especially for young people because of the cost-effectiveness of the apps (Do et al, 2018). However, most recent studies show that college students seem to be hesitant towards using said mental health apps (Bautista & Schueller, 2023). However, do gamification element play a role in the future use intention? TAM (Davis, 1989) could be used to explore this possible relation. The model states that perceived ease of use and perceived usefulness influence future use intention which on its own influences actual use of technology. However these studies do not provide the perception of the user on these topics. It might be crucial to understand in depth the thoughts of users firsthand. Thus, the following research question emerges:

RQ: “How are gamification elements appreciated by users of self-care mental health apps? “

To answer this question, three apps were chosen: Calm, Finch and Forest. The three apps tackle different mental health issues and use different methods to do so. Therefore, the results of the analysis could pose as greatly interesting.

2. Theoretical framework

The concepts of mental health and self-care, gamification elements in mobile applications and Technology Acceptance Model (TAM) are vital concepts for this study. Therefore, this section focuses on defining and connecting these topics in order to provide a solid background for the understanding of the research.

2.1 Self-care and Mental health

A person's well-being is a complex matter that has been studied extensively among scholars. It is believed for it to be a somewhat holistic connection between body and mind which depend on and influence each other (Adams, 2019). Maintaining this connection conceptualizes the practice of self-care which on itself relies on excelling in being well-functioning (Barnett et al., 2007) and preserving personal wellness (Hattie et al., 2004). Concretely, this is achievable by focusing on medical or mental health matters to tackle everyday stress (Adams, 2019). The current ubiquity of smartphones makes mobile apps be perceived as a cost-effective way to tackle said issues easily and accessibly (De La Torre-Diez et al., 2015). Further details will be discussed later in this paper.

There has always been a struggle within the academic society when it comes to giving one solid definition of mental health (Palumbo & Galderisi, 2020) as it is one of the topics that has been constantly rediscovered and redeveloped. Therefore, the definitions of mental health throughout the years differ per context. One of the first characterizations of the topic was given by Tucker (1964) - he states that mental health may be considered as such when there is no presence of mental illness but also decides to explore the positive concepts of mental health. He uses the four definitions of Gillis (1961) and further adds his own to make up the final six he is discussing in the paper: mental health as a biological entity, mental health as a subjective state, mental health as the capacity for adjustment to cultural norms, mental health defined in terms of a particular theory or views of mental functioning, mental health as an ecological concept and mental health as a combination of any of the above. This salutogenic definition already presents a quite diverse and

inclusive picture of the numerous aspects of mental health. However, Tucker (1964) still grounds his work in the absence of mental illness, while later, researchers begin to disagree with this concept. The World Health Organization is one of the examples since they clearly state that mental health is more than the absence of disease, it relates to how mental, physical and social states balance each other out (WHO, 2004). They take their statement even further by arguing that “health and illness may co-exist”. Later, Chambers et al (2015) propose a new definition of mental health since the one given by WHO (2004) is affected by the culture that determines it. Their new definition states that mental health is *“a state of internal equilibrium which enables individuals to use their abilities in harmony with universal values of society”* with the important components of social skills, recognition, emotion care and social role flexibility which help balance the relationship of body and mind. This refers back to the same connection Adams (2019) found regarding self-care maintenance. Common mental health issues range from, e.g., depression, anxiety and stress to ADHD (Attention Deficit Hyperactivity Disorder) and PTSD (Post-Traumatic Stress Disorder) (Gaspersz et al., 2012). The current study focuses on depression, anxiety, and ADHD. Depression is defined as a cognitive condition that lasts for more than two months and is characterized by a number of symptoms (Paykel, 2022). Furthermore, the core symptoms are listed as being in a depressed mood and a loss of interest of pleasure. Here, depressed is defined as lowering of spirits while mood refers to short-term mental states that can be observed. Looking at the definition of anxiety, it is referred to as uncontrollable and focused on multiple life problems with a worry that lasts for more than a month (Kessler et al., 2001) . This worry is characterised as extreme and unrealistic regarding regular life circumstances. Researchers struggle to agree on what ADHD is because of its extensive aspects (Beljan et al., 2012). However, Beljan et al. (2012) explain it as not simply a disorder of attention but is a complex mixture of disturbance of attention, inhibition and behavioural activities.

2.2 Gamification and gamification elements

To define gamification, this section will first describe the concept of game. Games can be best illustrated by their nine characteristics – player, environment, rule, challenge, interaction, goal, emotional experience, quantifiable outcome and negotiable consequences (Yohannis et al., 2014).

The figure below illustrates these characteristics in detail.

Figure 1

Game characteristics

TABLE I. GAME CHARACTERISTICS.

Characteristics	Sources
Player	Players [4], player [5], participants [6], players [7], decision makers [8], participants [9]
Environment	Context of pretended reality [6], limiting context [8], resources, game tokens [9], limited in scope [10], separate, fictitious [11]
Rule	Rules [4], rules [12], rule based object [5], defined by rules [7], structures [13] procedure, rules [14], specific rules [10], governed by rules [11]
Challenge	Abstract challenges [4], efforts [5], try to achieve [6], conflict, interference [15], artificial conflict [7], seeking to achieve [8], decision in order to manage, pursuit [9], exercise, opposition between forces [14], a specific state of affairs [10], uncertain [11]
Interaction	Interactivity, feedback [4], feedback object [12], interactive [15], engage [7], play [13], activity [6], activity [8], activity, engage [10], activity [11]
Goal	Goal [12], arbitrary, nontrivial goals [6], goal [15], goals [13], objectives [8], a goal [9]
Emotional experience	Emotional reaction [4], emotionally attached [5], entertainment [15], fun [11]
Quantifiable outcome	Quantifiable outcome [4], quantifiable outcomes [5], quantifiable outcome [7], disequilibria outcome [14]
Negotiable consequence	Voluntary participation [12], consequences are negotiable [5], voluntary control object [14], separate, fictitious [11]

These characteristics can be used to point out the extent to which an object possesses gamefulness. For example, if the object has one or some of the characteristics, it can be determined as more or less gameful accordingly (Yohannis et al., 2014).

According to Deterding et al (2011) the use of such game elements in non-game context with the aim to increase engagement, motivation and user experience is referred to as gamification of an object. This process therefore transforms an object into a game or puts it in a game state.

Moreover, its game characteristics are being increased through the adoption of game elements. The aim of applying gamification elements in technology depends on the context the technology is being used in. One of the most common areas for this is education. Gamification is seen as an influential tool for increasing students' motivation which is a relevant factor when bettering the condition of the learning process (Subirats et al., 2023). Another example where game elements are used in a non-game context is when organizations want to enhance their employees' performance. Specifically, gamification is applied in e-learning for employees to enhance their adoption for the technology (El Horr & Lemoine, 2023). These are only two examples of the use of gamification, however, the focus of this paper lays in understanding the influence of the concept on the use of mental health apps.

Huotari et al (2012) discuss gamification from an experimental point of view tied with service marketing theory. They see gamification as "a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation". Three years later, Cheng et al (2019) state that this definition fits health research's goals when it comes to implementing gamification for mental health and self-care scopes. Six et al. (2021) found that while mental health apps are in general effective in reducing depressive symptoms, gamification elements do not significantly influence said symptoms. They further recommend exploration of the effectiveness of gamification elements in mental health apps for other disorders. The user's perception on the topic was also not explored. Therefore, it might be beneficial to gain an understanding from user point of view about how they perceive the most common gamification elements applied in mental health and self-care apps.

Cheng et al. (2019) gathered information from 17 articles about 50 apps in total. Their findings show that the most often coded elements were *levels of progress feedback, points or scoring, rewards, or prizes, narrative or theme, personalisation and customization*. The *levels of progress feedback* refer to when the user is presented with their progress in the structure and the

remaining progress they should make before completing the current task. *Points or scoring* indicate the process of gaining points when achieving a task or a goal and is based on user's performance. The user also could receive *prizes or rewards* when reaching specific milestones. The *narrative and theme* are part of the app and define how it presents itself. This could or could not include an underlying storyline. *Personalization and customization* are closely connected as both depend on the user – to customize avatars or other types of representation or to teach the system to adapt to their behaviour. Auf et al (2021) added *unlocking (rewards, achievements, content) with progress, chatbots, goals and graphics* to the list. *Unlockable content* describes reaching certain milestones or reaching certain goals and therefore releasing additional content. *Chatbots* are automated by an algorithm that lets users access a chat to ask for help. *Goals* are meaningful objectives that the user aims to reach.

Cheng et al. (2019) showed that enhancing user engagement was one of the main reasons for using gamification specifically in mental health apps. Other studies also lean on theory and quantitative data (Wang et al., 2023; Lee et al., 2022). However, they often do not take into account users' perspective. Thus, the first subquestion of this study emerges:

SQ1: "Which gamification elements and which of their aspects in self-care mental health apps do users perceive/experience as effective and appealing?"

2.3 Technology acceptance model

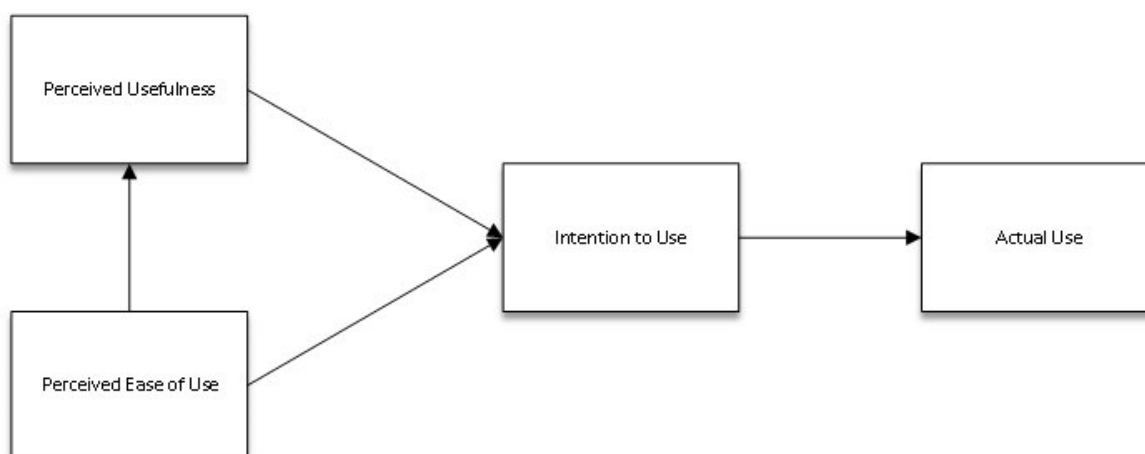
To understand how gamification elements can influence the user's intention to continue or discontinue using a certain application, this study will make use of the Technology Acceptance Model. The model can be seen at Figure 2 below. The TAM has two main components that influence the user's intention of use – perceived usefulness and perceived ease of use (Davis, 1989). He views perceived usefulness as the extent to which a user believes that certain technology is beneficial for the performance of said user. For employees this means that the technology in question helps them increase the quality and quantity of work practice. For example, new automatized system of

registering members of an organization could be perceived as useful to not have to handle physical forms. Perceived ease of use, on the other hand, relates to the degree to which the technology is free of effort. Effort is a limited resource that one uses to do their work (Radner & Rothschild, 1975). Furthermore, these two factors can be influenced by external variables such as experience, age, familiarity with technology, etc. Thus, there is a selection of factors that influence each other and altogether influence user's willingness to use a certain bit of technology. For example, An and Lee (2018) found that perceived usefulness and perceived ease of use together with two external factors: subjective norm and output quality have significant effects on behaviour intention for mental health apps. Subjective norm refers to the opinion of important people in the user's life that could influence the user's own opinion. Output quality indicates the way the technology in question executes its main vital tasks. Furthermore, Vanduhe et al. (2020) argues that gamification elements indeed have a positive effect on behaviour intention in the context of instructor training in higher education institutes. Given that gamification elements by themselves could have impact on user's mental health it is, however, not clear whether and how they are perceived by users regarding their intention of future use. The following subquestion emerges:

SQ2: "How do users link gamification elements to the intention of continuance or discontinuance of use of self-care mental health apps?"

Figure 2

Technology Acceptance Model



3. Method

This section explains the methodology used in this study. First, the research design and stimuli are explained in detail. Further, the procedure, instrument, sample and participants are discussed. The section concludes with the analysis of the data.

3.1 Research design

In order to answer the research questions, this research used an interview study with diary elements. The interview method allows for discussing topics on a deeper level of reasoning than quantitative methods are able to. When qualitative data is being collected, the researcher is able to make causal connections and gain insights behind a simple statement by the interviewee. Moreover, a semi-structured technique of interviewing was used. It allowed the researcher to make use of a list of mandatory topics but also to lead the conversation into a different direction in case new relevant information comes forward (Boeije, 2010). The combination of diary elements and interview allowed for deeper insights into how participants perceive the gamification elements. The method further allows the participants to give reasoning for liking or disliking a certain feature while a survey or another quantitative method would only give a statistical answer which lacks a cause or justification. Furthermore, the diary elements served as a tool for the participants to consider their experiences and note them down as they happen.

Stimuli

There were 3 mobile applications used in this study – Calm, Finch and Forest. They were found by entering key words in Play Store. The key words included “anxiety”, “ADHD”, “depression”, “self-care” and “productivity”. Criteria for choosing the apps were high number of downloads, positive reviews, presence of gamification elements mentioned in the theoretical framework section of this study. Further details about the three apps follow.

Calm is described as a meditation and stress relief application in the Play Store. It offers meditation videos, sleep stories, soundscapes, movement exercises, kids section and motivational stories by celebrities. The user is able to customize the scene of the home screen. This includes changing the background and sound. Streaks and statistics for use are also available. Moreover, the user is able to log their mood and sleep and write a reflection or gratitude entry. The design of the app is minimalistic with dark blue as dominating colour.

Finch provides the opportunity to take care of a baby bird (pet) by completing daily goals. Every day the bird could be sent on an adventure in case it has enough energy to do so. This energy can be gained by the user completing a goal, writing reflections, performing breathing exercises, enacting movements (yoga, stretches, etc.), listening to soundscapes or taking a quiz. Each of these activities is meant to help the user to feel better. Once the energy bar is full, the bird goes on an adventure for a few hours. After it is back, the user has a small conversation about the adventure. Each conversation builds and forms the personality of the pet since the user is able to choose between two phrases to answer to what the bird is telling. Furthermore, the virtual bird grows after each adventure and after specific number of adventures it evolves into toddler, kid, teen and so on. The user is also able to customize the appearance of the bird and the home screen which is the house of the bird by collecting unlockable items from the store. Moreover, another screen leads the user to a statistics display. On top of the screen, the user is able to see the total number of written words, achieved goals, completed breathing exercises and taken quizzes. Under this, a summary of each day is presented. An additional button leads to insights about the mood of the participant. This mood log in is done a few times a day when the user first enters the app. Finally, the user is able to add “neighbours” of their bird in a so-called Tree town. The neighbours are other user’s pets. This can be seen as the social aspect of the app since the neighbouring pets could belong to friends of the user that also use the application.

Forest is a productivity app that provides the user with a timer or a stopwatch. The unique feature here is that a tree grows with each completed session of focus. The trees are further collected in a forest. The more trees the forest has – the more productive time the user spent in the app. Furthermore, the user is rewarded with coins after growing a healthy tree. The coins could be used to unlock new types of trees or to buy a tree for the Real forest. Each tree in the Real forest is planted in real life. Preset achievements and statistics of the frequency of planting trees are provided as well. The app also offers the opportunity to control the usage of other applications. The user is being motivated to not exit the app while the timer is on, otherwise the tree that is being planted will die. However, necessary apps could be added to My allow list by user's choice. Once an app is added to this list, the user can access it without their tree dying.

3.2 Procedure

First, each participant was provided with a description of the study and what it consists of via a WhatsApp text. They were assigned an app by the researcher. There were 6, 8 and 7 participants for Calm, Finch and Forest respectively. The researcher used personal knowledge of the participants in order to determine which app would be suitable for the interests of each participant. Next, the participants were instructed to download one of the three mobile applications and start using it normally for five consecutive days. The users had to use the assigned to them app normally, as many times a day and for as long as they wanted to each day. Prompts were provided to the participants to give them an idea of what they should address. Each evening, notes had to be taken by the participants. The concluded notes per participant were sent to the researcher before the interview. Next, the interview was scheduled and held. The length of the interviews ranged from 22 to 45 minutes with mean time of 32 minutes and 42 seconds. In the beginning of each session, participants were asked for consent to record twice – once before and once after the start of the recording. During the interview, the participants were asked to elaborate on the topics they wrote

about in their notes as well as additional questions such as demographics and what they are missing in the app.

As mentioned above, prior to the interview participants were asked to consent to record and analyse the data they provide. However, they have already provided the researcher with notes prior to the interview for which they were not asked for consent. Favourably, none of the participants refused to give consent. After the end of the data collection, all personal data was anonymised except for demographics. All data will be erased ultimately one month after the grading of this paper.

It is vital to note that given the nature of the topic of mental health and self-care, the researcher made sure that the participants were comfortable and willing to continue the experiment/interview in the most appropriate for them way.

3.3 Sample

The sampling method for this study was convenience sampling. The participants were pre-selected by an inclusion criteria to make sure that each one of them fit the assigned mobile application. The inclusion criteria procedure was performed by the researcher and consists of defining which application fits which participant according to individual interests. Each participant had to be 18 years or older. Furthermore, the sample consists of the researcher's close circle of friends and fellow students.

This study included 21 participants in total. All of them provided notes and participated in an individual interview. The age range was between 18 and 26. 8 of the participants were Dutch, 8 were German and the other 5 had either Bulgarian, Romanian or Spanish nationality. Furthermore, the sample was almost evenly distributed by gender with 11 of the participants being female, 9 were male and 1 was non-binary. Finally, all of the participants were students with the exception of 2 who were working.

3.4 Analysis and instrument

In order to prepare for the data analysis, a document with the notes of each participant was created and the interview was added to the respective document. The data was cleaned and anonymized. Then, all 21 documents were uploaded in ATLAS.ti where the coding process was performed. In total, three rounds of thematic coding were performed. The framework by Braun and Clarke (2006) was used. Open coding was started already during the data collection where the researcher was first getting to know the data. Once the interviews were transcribed and together with the notes uploaded in Atlas.ti, connections between the fragments were formed. These codes were further broken down in subcodes. Further, additional codes were added from existing literature. There were 4 main code groups: features, general for the app, gamification elements and other. Full codebook and prevalence of codes can be seen in Table 1.

Due to time restrictions, reliability check of the codebook was not performed by a second coder.

Table 1

Coding scheme

Code	Definition	Prevalence
Features		
Least useful	Least useful feature	9
Most motivating	Most motivating feature	17
Most useful	Most useful feature	13
General for the app		
Future use intention	Continuance or discontinuance of use intention	16
Gamification	Opinion of gamification of the app	46
General	General remarks about the app	3

Perceived ease of use	How effortless is the app to use	96
Perceived usefulness	How much was the app useful	43
Gamification elements		
Check-ins	Mood, reflection, gratification, sleep	36
Design	Colours, style, minimalism, cluttering	12
Goals/Achievements	Presence, nature of goals and achievements	47
Notifications	Frequency, nature of notifications	38
Other	Quizzes, quotes, etc.	13
Personalization/Customization	Clothes, background, name, etc.	53
Pet	Solely about Finch and concept of the bird	36
Sharing	Sharing of progress, achievements, socializing	63
Streaks/Statistics	Mindful days, streaks, mood	38
Trees	Forest, trees	30
Unlocking features		37
Other		
General	Other remarks	2
Mental health	Influence on mental health	45
Payment	Subscription	24

4. Results

4.1 Gamification elements

4.1.1 Gamification

Next to the separate gamification and adjacent elements, the participants discussed gamification as a whole. The concept created a homey, personal, easy-going and engaging atmosphere in the apps

and served as an additional motivator. The interviewees that used Finch, pointed out that the virtual pet took away the association with a self-care app and made them feel comfortable while using it. It was mentioned that they felt the app to be not that serious and deep which further enhanced the down-to-earth sense. Specifically for Forest, the gamification elements were seen as a side benefit and made the app more likable and enjoyable. However, three participants reported that there would be no difference in how they used the app regardless of the presence or absence of the gamification elements. The reason why was that for them, more important was the main function of the app (being more productive) and they did not need an additional motivator to use it. On the other hand, gamification in Calm was perceived as distracting and not relaxing. This is in contrast with the purpose of the app to calm and ground the user. Thus, the following quote:

“I choose to go to this app when I want to have a moment for myself without any notifications on my phone, without people interrupting me. So I then what I did is to turn on the video and I put my phone aside. So it doesn't have to be any game elements to make it more attractive to me to use it because I either way, kind of just don't want to use it in a weird sense.” – Participant 1, Female, 23

This quote further touches upon why participants use an app or why they do not. As it will be discussed later, an app would not be used if it does not serve its purpose and any gamification intensifies the already existing likeability towards it.

4.1.2 Check-ins

Overall, the different check-ins were seen as appealing mostly because they allowed the participant to do something beneficial quickly. This was the case for Finch with all three types of check-ins because of the easy access to them while Calm provides straightforward access only to the mood check-in. Therefore, participants reported that it would be a good idea to make the reflection and gratitude check-ins more prominent. Moreover, these features were seen as a moment solely for the user where they could focus on one specific activity, detaching from their surroundings. On the

other hand, results showed that the check-ins might not be seen as a necessary feature of the Calm app since it was perceived as a tool for meditation only.

The mood tracker was the most liked. Participants reported that the feature gave a great overview of their mood which made them more aware of their feelings and might have served as a motivator that they might have felt better the next day. In Calm, the homepage changes according to the current mood the user entered. This feature was strongly appreciated. However, there was a clear need for a more diverse selection of moods available since the six options were not seen as enough. A participant suggested the use of a mood wheel which would provide a greater collection of moods.

Participants had split opinions about the reflection check-in. Some saw it as a useless feature for Calm since they were normally using their own journal for reflecting while for other this was the main feature in the Finch app. Apart from these strong opinions, it was also seen that in the beginning the participants were sceptical and negative to reflect but later they tried the feature and saw its benefits. What played a big role for the adoption of the feature was the quick and easy access to it. Multiple users of Finch reported that having the check-in accessible was the reason why they used it.

Similar to the reflection check-in, gratitude check-in brought up opposite remarks. On the one hand, the feature was seen as lifting the mood and a tool to see life from a different, positive perspective. On the other hand, one participant reported that because of personal reasons they associated being grateful with negative emotions. Finally, similarly to the reflection check-in, the quick and easy way to use the feature was strongly appreciated.

4.1.3 Goals/Achievements

Results showed that participants using Finch have mostly positive experience with goals, the ones using Calm were strongly against the feature and the ones using Forest would like to have the option added to the app.

There were various positive implications of goals for Finch with the biggest one being a feeling of accomplishment after completing them. Participants feel rewarded, motivated and with better mood. The small positively formulated goals allowed the user to not feel pressure or feeling of guilt in case they were not accomplished. Moreover, the goals were perceived to deepen the connection between the user and the virtual pet as well as helping the user take time for the smaller things in life they have never felt before and to form new habits. Next to this, a pattern for choosing smaller goals was discovered since bigger ones are taking too much mental capacity. Another reason for this was a fear of failure of completing the bigger goals.

Goals are not a feature in neither Calm nor Forest. Participants thought that they are not a fitting element to add in Calm because it would lead to pressure and feeling of failure if not accomplished. However, people that used Forest pointed out that being able to set their own goals would serve as an additional motivation to use the app and be more productive. It was also mentioned that the current achievements in the app are redundant and not interesting.

4.1.4 Notifications

The results regarding notifications were heavily divided in opinion. Finch and Forest had both positive and negative comments while Calm went more to the negative side.

For Finch, participants seemed to appreciate the nature of the notifications because it felt like someone was checking in on them and reminding them to stop for a moment and think about how exactly they were feeling. This was enhanced by the personal nature of the app (taking care of a pet). Normally, participants would not care about the notifications but the question of "How are you

doing?” from someone they care about, created a more personal connection and motivated the user to open the app. It was often mentioned that this notification distracted them from their problems, but not from their work which they appreciated. However, one of the participants expressed annoyance and a feeling of pressure when seeing the notifications. Another remark was that the notifications were not connected to what the pet was doing in the moment, therefore, the user was not aware of what was happening.

In Forest, the feature was liked only in certain situations. For example, the participants expressed approval of the notification when it was reminding them that they had been focused for a certain amount of time. That often resulted in higher motivation to finish the productive session. However, getting a notification in the middle of being focused was seen as distracting and a stimulus to use the phone. Another example of the notification being appreciated was when it was reminding the user that they have not been focused in a while. On the contrary, some participants mentioned that this kind of reminders are annoying since if they did not use the app, it was because they simply did not want to use it. Furthermore, it was pointed out that not all features of the app were used because there was nothing motivating from the app to show them that said features exist. It was proposed that this could be done via notifications.

Finally, the participants that used Calm had only negative remarks. All of the participants felt that the notifications were not enough and they quickly lost interest or forgot about the app. Also, the few notifications that were received were perceived as too polished and commercial, not personal.

4.1.5 Personalization

In general, personalizing and customizing are seen as a positive feature in all apps. According to the participants, it was present to a different extent in each app which induced wishes for improvement in Calm and Forest. Otherwise, there were only positive comments from the users of Finch.

Results showed that a substantial part of the user experience in Calm were meditations and their characteristics. Personalizing the voice, length and language of the meditations seemed to be of great importance for the participants since it would allow them to find the right video according to their wishes and preferences. As a way to enhance the experience, it was proposed to install a filter that sorts the meditations according to the features above but also on level of difficulty and by mood. The other features that were mentioned by interviewees were the background and sounds. Two of the participants did not have any interest of changing them while for the other four, adjusting the background to a place they are familiar with, brought them homey and relaxing feelings.

Forest was seen as an app without many possibilities for personalization. Two of the interviewees did not have interest in customizing their tree while for the rest it served as a motivator to keep using the app. It was noted that personalizing the time one could focus for, was convenient and easy. One participant pointed out that adding dark mode or a night sky would increase the engagement with the app.

Finally, seven of the interviewees that used Finch expressed satisfaction with the customization options within the app. For them, choosing name, colour, pronounces, clothes of the bird established a bond between the user and the virtual pet. It was seen as engaging and created a feeling of ownership towards the bird.

4.1.6 Pet

As mentioned before, Finch's most differentiating feature was the virtual bird users were taking care of. Seven out of the eight participants showed strong attachment with the bird and ownership feelings towards it. The animal served as a base for users to create an emotional, personal and engaging relationship with the app which made them come back to it often. Leaving the app was seen as harder because of this relationship. Interviewees also mentioned that the bond was strengthened by messages in the app such as "We care about you.". Having the pet also contributed

to the feeling that this was not a mental health app, giving the app a better feeling than the ordinary journaling apps. A positive correlation between time spent in the app and depth of the relations was established.

Two features of the pet were most prominent and had the biggest impact on participants – personality of the bird and its growing. The personality inclined participants to connect and feel as they were taking care of something important. The feeling of ownership was also being positively affected. Secondly, by being able to grow and go on adventures, the bird was seen as a real companion and a reflection of the user. The process of growing and developing the bird's personality was interesting to the participants and was an additional motivation to come back to the app every day.

4.1.7 Sharing

The overall results about the sharing option in all three apps had with a negative sentiment with some circumstantial exceptions. Sharing was seen as something commercial and social media-like. For mental health apps this is contradicting with the purpose of the app as it can lead to comparison between the user and everyone else. Nowadays, comparing oneself to others often leaves people with negative feelings and self-doubt. Sharing such personal experience is seen as too personal and inappropriate to be seen on social media and can even distance users from it.

There are a few situations which users would like sharing and socializing in the app. For example, someone that used Calm made the point that it is good to promote talking about mental health to make the topic less of a taboo. However, this should not be too commercial and superficial because the topic is still sensitive. All of the participants seemed to be in favour of sharing and communicating in the apps but only with people they previously know and are close with. The option to add someone else using the app in Finch was strongly appreciated and users found themselves enjoying the feature. It brought them joy and enhanced their connection with the app and the pet. One interviewee mentioned regarding Forest that their friends were motivating each

other to use the app. Having a feature such as study group and challenges within the group would enhance the experience. All in all, users feel that in case they would like to share something about the app, they would do it in person.

4.1.8 Streaks/Statistics

Similar to notifications, the participants' opinions on streaks and statistics were divided into for and against. On the one hand, maintaining a streak could serve as intrinsic motivation and a rewarding system. Interviewees also saw the low numbers on their statistics as stimulation to keep going and increase them. In Forest they could be more useful in the long run if displayed more prominently. However, these features should not take over the goal of the app and be promoted because it can also harm one's mental health when lost. Participants reported that they can see themselves feeling guilty in case they lose the streak. Furthermore, they found streaks and statistics to be annoying, unnecessary, commercial, pressuring and not interesting. They also mentioned that the features were useless since they do not say anything about the improvement or regression of their mental health.

4.1.9 Design

One category that emerged from analysing the data was Design. Participants that used Calm and Forest seem to approve of the minimalistic, simple and modern designs of the app. These styles promote concentration and calmness. On the contrary, the various happy colours and cute graphics of Finch were highly praised and loved since they enhanced the connection with the virtual pet.

4.1.10 Trees

Participants reported several remarks about Forest. First, collecting as many trees as possible and seeing the forest full gave a sense of accomplishment to the users. The app also made them aware of how much they were using their phone for unnecessary tasks while studying or being in a lecture. Second, results also showed that having variety in the trees is cool and something to strive for. They

also felt more motivated when using the Deep focus function because with the Allow list option they could access other apps that might be needed for studying or working. However, some participants did not see this option and were annoyed by the tree dying since they used other apps. Finally, all of the participants approved of the Real Forest initiative because it was focused on helping with a worldwide cause. Participants were more motivated to collect coins by being more focused in order to buy a real tree with them.

4.1.11 Unlocking features

Collecting coins or energy in order to unlock items was perceived mainly positively. It was seen as an additional motivation and purpose to use the app. Three interviewees expressed interest in collecting coins so they could buy new items for their bird. Filling up the energy bar in Finch is satisfying for four of the participants but for two it was of no interest. When it comes to Forest, four participants mentioned that their main motivation to use the app was wanting to finish their tasks and unlocking new trees was only a side aesthetically pleasing goal to strive for. However, once they have discovered the Real Forest, collecting coins became an objective for all participants.

4.1.12 Other

There are three topics that the participants mentioned themselves and their opinion was shared by at least one other participant. First, Calm provides a different quote every day. This was appreciated by two participants. Second, the quizzes in Finch were received with contrasting feelings. One of the participants mentioned that they very much liked them while another one argued that they could provoke negative feelings since they might show the bad state an user was in when they already knew this information. A third interviewee commented that they realised that these quizzes were meant as a starting point in case the user is missing important symptoms. Therefore, in case the results of the quizzes were concerning, only then the participant would reflect on their feelings and consider further measures.

4.2 Technology Acceptance Model

4.2.1 Perceived ease of use

Results showed that all three apps have some elements relating to ease of use that need to be improved. Calm was perceived as chaotic and unorganized, Finch had too many buttons and options and Forest had a simple interface but some features were hidden from the user. More details are discussed below.

Calm was perceived as very chaotic, messy and uncategorized which makes the app overwhelming and not user-friendly. Participants struggled with spending too much time on finding the right video because of the structure of the app. Thus, their willingness to use the app reduced with time.

“I feel as if I’m spending more time searching for free content than actually doing something.” – Participant 4, Female, 26

This feeling was worsened by the big amount of choices the app presented the users with. Furthermore, the app had an ADHD help section but the app itself was not ADHD friendly at all. One participant noted that the check-ins were hard to find which resulted in them not being used. They also mentioned that once they found the check-ins, it was not clear what they could do with them, therefore, they needed more guidance from the app. This proposition was in line with another interviewee’s idea to implement an instruction video or tutorial in the beginning of the setup process. On a positive note, three participants argued that the meditation play screen was simple and easy to navigate.

Finch was in general easy to use for six of the participants. Interviewees enjoyed the features being connected with each other and the most important features (pet, goals, reflections) were in the same place on the home screen. The more specific features (statistics, bird’s personality) were less accessible. On the one hand, one of the participants pointed out that in case they wanted

to make it more complicated, they could but the app was usable only with the home screen. Furthermore, despite the app being confusing at times, the user did not perceive this as a problem when comparing it to other apps. On the other hand, the lack of explanation of all of the functions was annoying and demotivating.

Forest was mainly praised by participants because of its simple interface and design. The interviewees were impressed by the quick setup of the timer and appreciated the straightforward home screen. This was particularly important for users since they did not want to lose time before starting to study or work. However, it was pointed out that the other features of the app (forest, settings, real forest) were hidden in the burger menu.

4.2.2 Perceived usefulness

All of the participants were struggling to determine whether the app they were using was useful and whether it changed their lifestyle for the better.

Calm was seen as helpful for a few small purposes. For example, whining down before bed together with realizing when it was time to do that. The latter refers to the times when the participants did not realise that it was late and a notification from the app reminded them it might be good to wrap up the day. A participant that had bigger experience with meditation pointed out that the app was more suitable for beginners since the videos in the app were basic and even boring for someone with a bit of experience. There were three participants mentioned that the app was not giving them anything useful because it did not fit their needs and feelings.

Finch was mostly perceived positively under two conditions. First, a participant with severe depression argued that the app did not necessarily ease their condition but lifted their mood occasionally. They thought that the app would be suitable for individuals with lighter depression since then improvements could be seen in the longer term. Another interviewee pointed out that the app would be helpful only if the user was heavily engaged with it. Finally, a participant

mentioned that they would go through the day the same way with or without the app. Therefore, for them the app was not perceived as useful.

All in all, Forest was perceived most positively out of the three apps. All participants felt engaged with the app while using it and were focused on their tasks. It prevented users from stopping to study before the time they had set was done as it served as an excuse to keep being focused. They felt responsible to finish the timer and not let the tree die. A sense of accomplishment after receiving the tree was also reported. However, two participants that were working and not studying, pointed out that the app would be more useful for them if they were studying. Work was described as dynamic and social time, therefore, an app that encourages deep focus did not fit. Moreover, six participants did not use the app apart from working or studying because they did not need to set a timer during their free time.

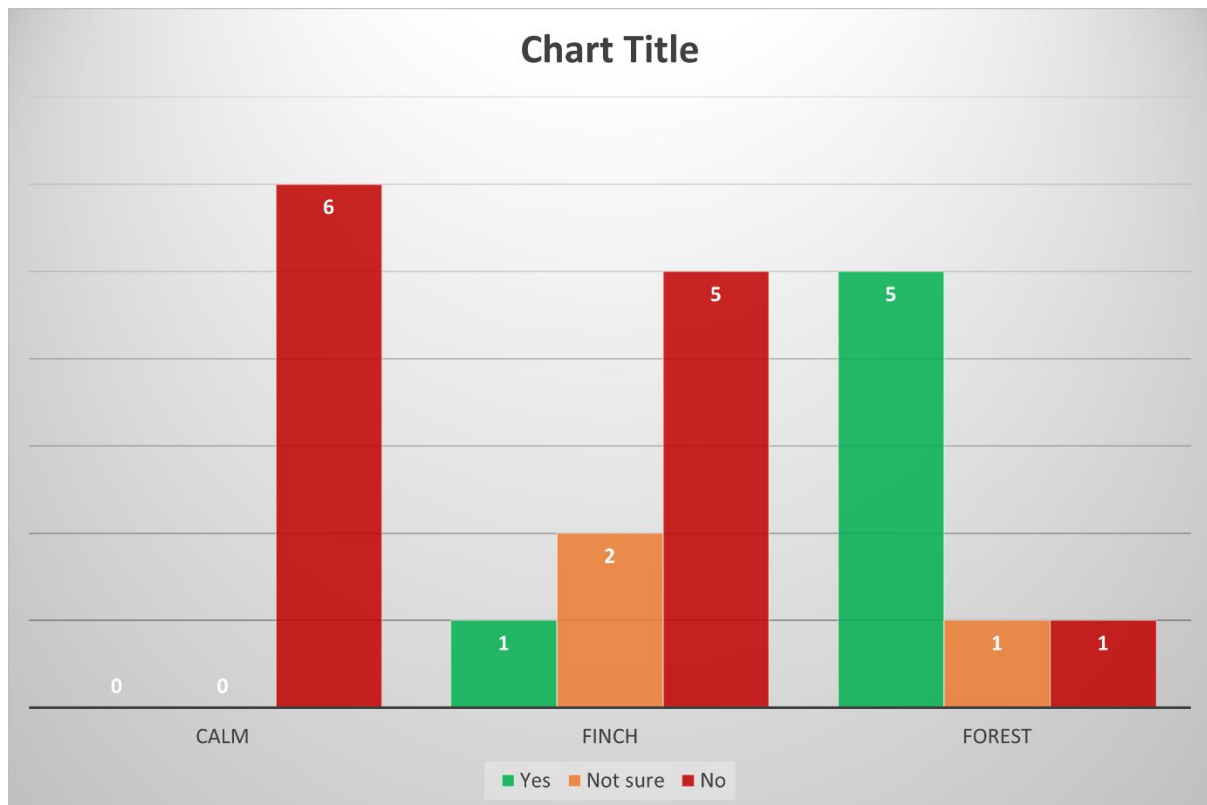
“When you don’t need to be productive, there’s no real benefit to having that.” – Participant 17, Male, 24

One interviewee reported that they used the app while doing the dishes which helped him focus on the task and not watch “useless” videos.

4.2.3 Future use intention

Results showed that participants are most willing to continue using Forest, the least Calm and were divided about Finch. The figure below summarizes the future intention use per app.

Figure 3

Future use intention

As it can be seen, there were no users that would continue using Calm. Three of the interviewees noted that the app simply did not work for them, one considered the app to not be useful or easy to use, one would use it for a week and forget about it and one did not want to pay for the app. One participant would definitely continue to use Finch, two were not sure. Four of the ones who would not continue using it noted that the app simply did not fit them and one thought the app to be for children and refused to continue using it. All five of the interviewees that would continue using Forest would do it only while studying while one of the other participants argued that they would use another technique, therefore the app would not be attractive for them.

4.3 Other

4.3.1 Mental health

The mental health aspect of the three apps was perceived both positively and negatively. In general, participants tended to be insecure when sharing such personal experience on social media but they were open to talk with their friends and family about it. Furthermore, it was pointed out that positive change in mental health could be seen only after using the app for a longer period of time.

Reportedly, Calm could influence the use both positively and negatively. Participants were calmer, less anxious and in piece with themselves. The app further provided a beneficial environment where the user could think, take time for themselves and reflect. Moreover, the check-ins could lead to improving mental health once they create a long-term routine. However, the interviewees were heavily unsatisfied with the prominent sharing option in the app. All of them shared the opinion that the app was a private matter and they would not be willing to share it on social media in the way the app suggested. Doing that was associated with bragging and showing off which could have negative effects on other users on social media. Furthermore, participants seemed to strongly relate the feature with comparing themselves to others. Comparing oneself to others was seen as toxic and it brought down the users which on itself negatively influenced mental health. The same effect was observed regarding losing a streak or having low numbers in the statistic section.

According to the participants, using Finch did not have any bad effects on their mental health. Checking-in on the little bird served as a mood booster for 6 out of 8 participants. Interviewees also felt better after receiving notes from the app such as “We care about you.”. One user was more connected to nature and aware of little things that brought them happiness. A long-lasting beneficial impact could be formed by achieving certain goals (be grateful, take a deep breath, etc) consistently. During busy days, participants felt more mindful when using the app.

Forest increased productivity which caused satisfaction of finished work. Two participants reported they were feeling less stressed while another participant was less distracted but not less stressed or anxious. Interviewees also reported that the app allowed them to actively make time for breaks and divide their productive time with periods of rest. Finally, four users were happy to earn and unlock new types of trees.

4.3.2 Payment

One topic that emerged from the data that was not anticipated by the researcher was subscription and payment for the content of the app. The freemium business model of Calm was strongly disliked since, as mentioned above, participants are forced to scroll through locked content in order to find free one. This process contributed to the annoyance of the unstructured nature of the app and further appalled participants from using it in the future. Moreover, the constant self-advertisement messages that popped up everywhere seemed to add to the commercial feeling that participants were experiencing from notifications, streaks and sharing. The insecurity the participants felt regarding whether the app was for them or not and whether it could have a long-term impact on their mental health was also stopping them from subscribing for an entire year. This was seen as a too long period and too big of a commitment to a service they were not sure was useful for them. A monthly subscription was seen as a better option but even then participants would have been hesitant to pay for such an app. Another addition that could be more inviting for the participants to subscribe to the app would be if it was supported by psychologists and legitimised by them. That would have given the participants the feeling that the app did not only want their money but was indeed designed to help them.

5. Discussion

5.1 Discussion of main results

The goal of this research was to disclose the perceptions of self-care app users regarding gamification elements and their connection to future use intention. Past research suggested that gamification elements have positive influence on these concepts. The results of this study provided insights about the 2 sub-questions posed earlier and will be discussed in this section.

The first sub-question concerned the gamification elements users perceive as effective and appealing. The results of this study found that not all gamification elements are perceived positively and that users have created conditions under which gamification elements are acceptable in self-care apps. The context of the app and the way the integration of the elements fits the purpose of the mental health app is of most importance for users. For example, the positive formulation of goals in Finch created a safe environment for users. They did not feel pressured or were brought down by failing to complete the goal. This is not in line with previous research which found any gamification element to have positive influence regarding its implementation in the technology. Furthermore, sharing of app features was perceived unfitting for a mental health app until it was about talking with friends and family about the experience. This is in line with the findings of An and Lee (2018) who posed the importance of the opinion of close to the user people. This was further enhanced in the socializing part of the apps since users were more willing to interact via the app with their close ones who also used the same app. Moreover, the connection that was created by the virtual pet with the user was the strongest. Here, personalization and customization are closely connected with the likability of the pet since it created a sense of ownership among participants. This is in line with the research of Cheng et al. (2019) who marked personalization and customization as two of the most influential gamification elements. On the other hand, this was most dominant in the context of Finch, while the users of Forest and Calm were mainly not influenced by this aspect. Additionally, gamification was seen as inappropriate concept in Calm. Participants perceived

playfulness as contradicting to the purpose of Calm to relax them. This is also not in line with prior research. Overall, it cannot be concluded that any gamification element is strongly appreciated by users since the context of its implementation plays a great role for users.

The second sub-question considered the connection between gamification elements and future use intention. This study found that while gamification elements make user experience enjoyable, they do not have big impact on future use intention. This is not in line with the study of Vanduhe et al. (2020). Furthermore, participants were more focused on the usefulness and ease of use of the applications and reported that gamification elements were a nice side benefit but they did not play a big role in decision making regarding future use intention. As long as the app was not performing its purpose, gamification elements were dismissed as useless. This confirms the concept of the technology acceptance model (Davis, 1989) but dismisses gamification elements as additional factor.

Lastly, payment (subscription) was found as an unexpected factor for future use intention. Strong negative feelings were reported about the freemium business model of Calm. Paying for a service that is supposed to enhance mental health was seen as commercial which significantly reduced the intention of users to continue using the app.

5.2 Practical implications

This research provides a number of practical implications that could be in use by app designers. Paid content is strongly discouraged to an extent that users cannot normally use the app. Social media sharing should not be heavily promoted. Instead, private sharing should be encouraged. Developers should also take caution when implementing streaks and statistics since it can lead to negative effects on mental health. They together with goals and achievements should be rather positively formulated in a sense that does not imply feelings of guilt in case of failure. Furthermore, developers should aim to create personal and intimate relationship with the user which might result in better

likability of the app. Lastly, users call for validation of information by an authority and for implementation of instructive tutorials when setting up the app.

5.3 Limitations and recommendations

The current study's sample was limited. First, convenience sampling was used as selection method which could have created bias. Secondly, the sample contained participants with no current mental health problems and that were in no need of self-care apps. This could have created discrepancies in the way these participants perceived the help that was offered in the assigned app and its possible influence on their mental state. The sample could benefit from randomization and inclusion criteria of mental health history in order to acquire valid results.

The selection process of the three apps used in this research could be biased. They were chosen because of previous experience of the researcher with them and no further criteria was considered. It could be that other similar apps have a different or better design or structure which could lead to dissimilar results. For example, differently applied gamification elements could be more disliked or liked than the ones in this study. Therefore, for future research it might be better to consider a specific set of inclusion criteria that would avoid this or other kinds of bias.

In this research, the participants used the assigned to them applications for a 5-day period which was a limited timeframe. In some cases, participants did not discover the full potential of the applications because of their personal schedule or other private reasons. Furthermore, to use Calm, participants had to be in a certain mental state (anxious, stressed, etc.). Since these emotions could not be simulated, it was not possible to observe them in all participants in such short time frame. Therefore, the participants could not experience using the apps in crucial moments such as panic attacks. Further research with a longer timeframe of perhaps a month could give more insightful results in terms of long-term mental health change and depth of app use.

Next, the procedure of the current research was faulted. Since the participants were presented with a topic list containing guidelines for the notetaking, their focus could have been shifted towards gamification elements and adoption process instead of their own interests and remarks. Therefore, a no prompt approach could be beneficial to be investigated in order to observe unbiased and genuine notetaking.

Lastly, due to time constraints, an intercoder reliability check was not conducted. This could have led to a biased codebook and data analysis. For further research, it is advised to conduct such reliability testing.

5.4 Conclusion

Utterly, this paper investigated how users perceive gamification elements in self-care apps. Given the broad nature of gamification elements and the various aspects that could influence one's opinion on them, it is nearly impossible to give one systematic outcome of this study. User's perception is influenced by a number of factors, therefore, it is advised that game developers take them into account in order to increase the future use intention in self-care aspect. Therefore, the results of this study can be used to further investigate the ways mental health apps can be optimised.

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