Is Technology Necessary for Overcoming Anxiety: An Empirical Study

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Abstract

In this thesis I am focusing on how technology is helping students in overcoming anxiety, what technological artifacts students are using to deal with it. There is different coping mechanism to deal with anxiety. Some people prefer to be alone and some likes to surround them with friends and family. Most people experience anxiety depending on their surrounding or their experiences so to find out what are the reasons students' experience anxiety I conducted semi-structured interviews. I collected data by asking participants about their general thoughts on anxiety, what are their opinions on dealing with anxiety with professional help and technological help, and in the end I asked them what future they envision in terms of anxiety. I conducted these interviews with students from diverse background to get their insights on what causes them anxiety and how they deal with it. Living alone, cultural shocks and managing studies are some of the reasons I got from interviews. When it comes to technological artifacts there are mobile applications and digital assistants available which helps in dealing with anxiety and I did market analysis on them too. For analyzing the data collected from interviews I did thematic analysis and from the results of the interview I created design fiction which propose the solutions to the problems faced by students.

Table of Contents

ACKNOWLEDGEMENT **2**

ABSTRACT **3**

CHAPTER 1 ..... **7**

INTRODUCTION 7

CHAPTER 2 ..... **9**

LITERATURE REVIEW 9

2.1 Anxiety *9*

2.2 Anxiety & College Students *10*

CHAPTER 3 ..... **12**

MARKET ANALYSIS 12

3.1 APPLICATIONS 12

3.1.1 Mindshift CBT-Anxiety Relief *12*

3.1.2 Pocket Coach *15*

3.1.3 WYSA *17*

3.1.4 CALM *21*

3.2 DIGITAL ASSISTANT 23

3.2.1 Alexa, Siri, and Google Assistant *23*

CHAPTER 4 ..... **27**

METHODOLOGY 27

4.1 Design Case Study *27*

4.2 Participants *29*

4.3 Data Collection Methods *30*

4.3.1 Observations 30

4.3.2 Workshops 30

4.3.3 Interviews 31

4.4 Interview guideline *32*

CHAPTER 5 ..... **36**

RESULTS 36

5.1 Thoughts about Anxiety in General *36*

5.2 Dealing with Anxiety through Professional Help *38*

5.3 Dealing with Anxiety through Technological Help *39*

5.4 Dealing with Anxiety in Future *42*

CHAPTER 6 ..... **44**

DESIGN FICTIONS 44

Episode 1 ..... *44*

Episode 2 ..... *45*

Episode 3 ..... *46*

Episode 4 Peace of Mind/ Holidays *47*

CHAPTER 7 ..... **49**

LIMITATION 49

CHAPTER 8 ..... **50**

DISCUSSION 50

8.1 Anxiety in general *50*

8.2 Dealing with Anxiety via professional help *51*

8.3 Dealing with Anxiety with technological help *51*

8.4 Anxiety in Future *52*

CHAPTER 9 ..... **53**

CONCLUSION AND FUTURE WORK 53

BIBLIOGRAPHY **54**

APPENDIX A **56**

DECLARATION OF CONSENT **56**

CONFIRMATION **57**

List of Figures

FIGURE 1: MIND SHIFT RATING ---------- 12
FIGURE 2: MIND SHIFT INTERFACE ---------- 13
FIGURE 3: QUICK RELIEF OPTION ---------- 14
FIGURE 4: POCKET COACH RATINGS ---------- 15
FIGURE 5: POCKET COACH INTERFACE ---------- 16
FIGURE 6: WYSA RATINGS ---------- 17
FIGURE 7 WYSA INTERFACE ---------- 18
FIGURE 8: OPTIONS FOR THE USERS ---------- 19
FIGURE 9: TOOL PACKS ---------- 20
FIGURE 10: CALM RATINGS ---------- 21
FIGURE 11: CALM INTERFACE ---------- 22
FIGURE 12: HELP FROM SIRI ---------- 23
FIGURE 13: CONVERSATION WITH GOOGLE ASSISTANT ---------- 24
FIGURE 14: CONVERSATION WITH GOOGLE ASSISTANT ---------- 25
FIGURE 15:TIPS TO CONTROL ANXIETY ---------- 26
FIGURE 16: DESIGN CASE STUDY TIMELINE ---------- 28
FIGURE 17: WORKSHOP SUPPLIES AND WORKSHOP ---------- 30
FIGURE 18: BASIC QUESTIONS ---------- 32
FIGURE 19: GENERAL QUESTIONS ABOUT ANXIETY ---------- 32
FIGURE 20: PROFESSIONAL HELP QUESTIONS ---------- 33
FIGURE 21: TECHNOLOGICAL ARTIFACTS QUESTIONS ---------- 34
FIGURE 22: FUTURE ORIENTED QUESTIONS ---------- 35

Chapter 1

Introduction

The objective of this study is to understand what people go through in their day-to-day life. Everybody is dealing with their problems in their own way. Some people are very vocal about them and wants to share it with people and do not shy away from getting help. On the other hand, there are people who do not feel confident talking about their problems and keep suppressing it more and more and eventually get anxious from this. We cannot say that only a certain group of people suffers from anxiety as this is natural and can happen to anyone. But here in this study I are going to focus on students. Students go through so much pressure either from their college/university, exams or from their surrounding environment. There are so many students who are away from their families and living alone, so the anxiety of being away and to do better in class sometimes gets too much and it takes a toll on their health. "A significant fraction of college students suffer from serious mental health issues including depression, anxiety, self-harm and suicidal thought" [1]. Generally students are in constant pressure and anxiety, and they need something to distract their mind. In these modern times we have a lot of technology-based devices which helps students to combat that. Some people in the start do not feel comfortable talking about it so they try to seek help from the technological devices.

These days students are exposed to internet and technology and they approach internet for any kind of help it can provide. When they realize they are going through anxiety they do the same and look for help on internet. When they think it is not serious and they can manage it on its own, then these technological artifacts come in first. There are many applications and digital assistants through which students can get help. In this research study I did market analysis on mobile applications and digital assistants. What audience they are targeting and what are their goals. What are the services they are providing and how they are helping. I conducted semi-structured interviews and got insights on how students approach technology when they are stressed out. The focus of semi-structured interviews was their approach on anxiety in general, dealing with anxiety via professional help, dealing with technological artifacts and their thoughts

on how they are perceiving anxiety in future. In 50 years from now how they imagine technology will be progressing when it comes to anxiety. Living in the era of technology people are using it for everything. In this study I will identify how technology is helping in overcoming anxiety? Do technological artifacts help in dealing with it?

Chapter 2

Literature Review

Nowadays people are focusing on mental health and anxiety, and it is considered as an important topic of discussion. As we are living in the modern world, we have many resources in our hand for seeking help. There are many application devices, and digital agents for our guidance. “The rapid increase of spoken conversational agents, such as Alexa, Siri, and Google Home has led to an increasing interest in developing mental health apps for example Calm, Pocket Coach, Wysa, Mind Shift and Headspace for these devices” [2]. These digital agents are practical and have shown effectiveness and have helped users. “Conversational agents may offer a convenient, engaging way of getting support at any time” [3]. Due to the impact of these digital assistance devices more and more people are attracted towards them. Due to which the companies are making huge revenues in the business. “The development of emotion detection technologies has brought up as a quite profitable opportunity in the corporate sector” [4]. Because of that the more companies are benefiting from these technologies, the more they are marketing about them.

2.1 Anxiety

Anxiety is a broad term for several disorders that cause nervousness, apprehension, fear, and worrying. These disorders have a strong impact on how we act, behave, and as well as the ability to show physical symptoms. In this modern era of technology on one hand if it is helping students in many ways then it can also have a negative influence on students’ personality. Students experience different things in their surrounding it can be pressure from school/college or getting bullied by their peers and these things can lead to one having anxiety disorder. “Anxiety is a chronic and fluctuating state of mind causing individuals to deal with excessive worry and tension from internal and external triggers” [5]. As it is chronic and can be provoked at any time and “resulting in increased need for medical services” [6]. These days people are dealing with different kind of anxiety for example anxiety of living alone, anxiety of moving to

new place, anxiety of giving exams and anxiety of speaking/performing in-front of people, “can have substantial negative impacts on all aspects of a person’s life” [7]. When people do not feel confident in front of audience they tend to go to social platforms where nobody knows them and try to hide behind the screens. “Research has shown that people who are deeply distressed prefer confiding their anxieties to chatbots rather than to humans” [8] [9]. They feel sheltered behind screens as no one can know who is behind the screens “because they fear being rejected or judged” [10]. Due to this fear of being judged, people tend to isolate themselves and do not seek help because of the stigma attached to it, research studies have shown that “Stigma and discrimination against people with mental health problems are a global public health issue” [11] “Such anxieties of being stigmatized by others often cause them to avoid reaching out to professionals for proper help” [12]. Every patient approaches anxiety in a unique way and has a unique experience, and these concerns have a significant impact on one's life.

2.2 Anxiety & College Students

The rise in technology and social media has its pros and cons, with the evolution of technology in 21st century there was a significant increase in the anxiety and is common in all age groups, especially students. “Mental health problems are highly prevalent and appear to be increasing in frequency and severity among the college student population”[1]. It gets out of control when it starts impacting on person’s personality. “A significant fraction of college students suffer from serious mental health issues including depression, anxiety, self-harm and suicidal thoughts” [13]. In a present time, due to these new technologies and devices many young people and students are attracted towards them. These days’ students go through stress because of exams, their studies, or some experience it when they are moving to a new place. The agitation of meeting new people sometimes gives anxiety to people. “The transition from college to university can have a variety of psychological effects on students who need to cope with daily obligations by themselves in a new setting, which can result in loneliness and social isolation” [14]. As a result of these changes in students, college offer help to students by giving them access to free mental health services but students are less likely to acknowledge it. “Often students may not feel confident speaking about their issues and anxiety and tend to confides in technology[15].

There are times when students want to talk about their feeling with their peers because they feel they will understand it better. They are living in same conditions with same pressure, so they feel confident about opening in front of their fellows. Students also expressed wanting to have fellowship and the opportunity to engage in conversations with peers who are experiencing similar issues as them. Specifically, they asked for things like "Peer-to-peer conversations, alumni network, resources and a community of people that are dealing with similar issues"[16]. It is also very important for individuals to understand what is causing them stress and anxiety. When people have knowledge about this then they try to avoid those things and maybe work on them. Kwangyoung Lee et al. (2018) mentioned that: "A workshop called Mind-Navigator is done with students, we envision a system that allows individuals to explore the causes of stress; create their own behavioral strategies, which we call self-intervention plans, to cope with the stress; and examine how these plans impact their lives. After the workshop, improvements were shown in participants' behaviors.

Chapter 3

Market Analysis

There are many applications and digital assistants available in the market. Many apps are directly targeting anxiety and on the other hand there are mindfulness and health apps which are also helping users to overcome anxiety. Digital Assistant are also helping users when they try to communicate with them. In this study I am going to talk about few applications which are designed for the purpose of helping users with anxiety. I used these applications and digital assistants myself for a short period of time to see if they are helpful or not. After using them myself these artifacts had a very positive impact on me.

Following are the applications and digital assistant that I have used and I will be discussing in detail.

3.1 Applications

3.1.1 Mindshift CBT-Anxiety Relief

This app is specifically targeting audience with anxiety. The interface of the app is good and very user friendly. On the App Store the rating is 5.0 and it is available in 2 languages English & French.

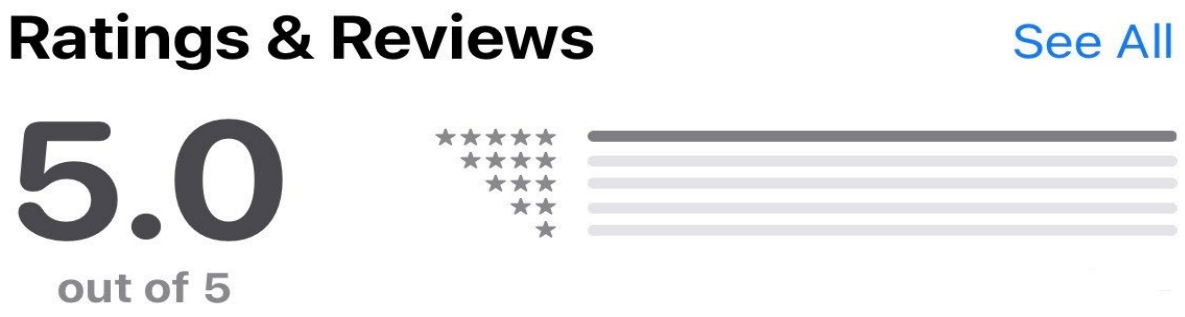

Figure 1: Mind Shift Rating

The content of this app is very helpful, and it helps the users to keep track of their wellbeing. Every day the user can submit how he/she is feeling and what symptoms he/she was experiencing throughout the day. The user can see his/her progress too in a Check-In Summary form. It also educates the user about different type of anxiety and what are the causes of each type. Different signs of body and mind are given to guide the user about his/her feelings and tips are also given to help him/her to deal with it.

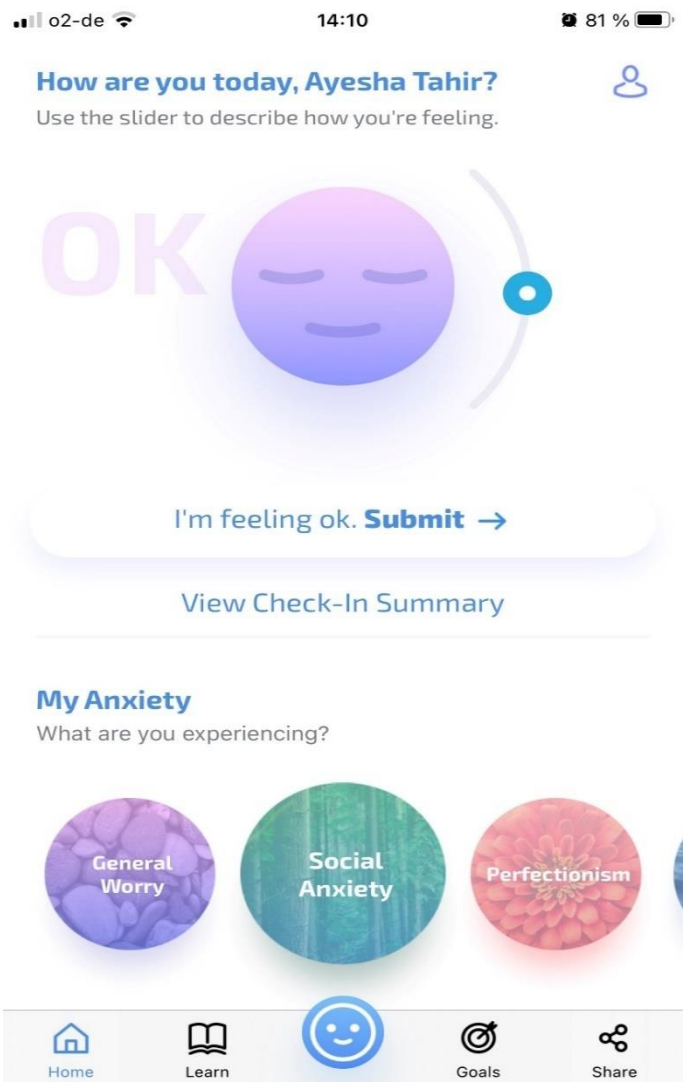

Figure 2: Mind Shift Interface

Different types of tools are given to manage anxiety. The user can jot down his thoughts and feelings and there are small 3-5 minutes audio clips like a therapy session to help him/her to calm their breathing, release tension, to overcome fear of public speaking and social anxiety. The app also has a quick relief option to guide you in small ways to divert your attention by doing small things like taking small steps or doing breathing exercise or shift your mind.

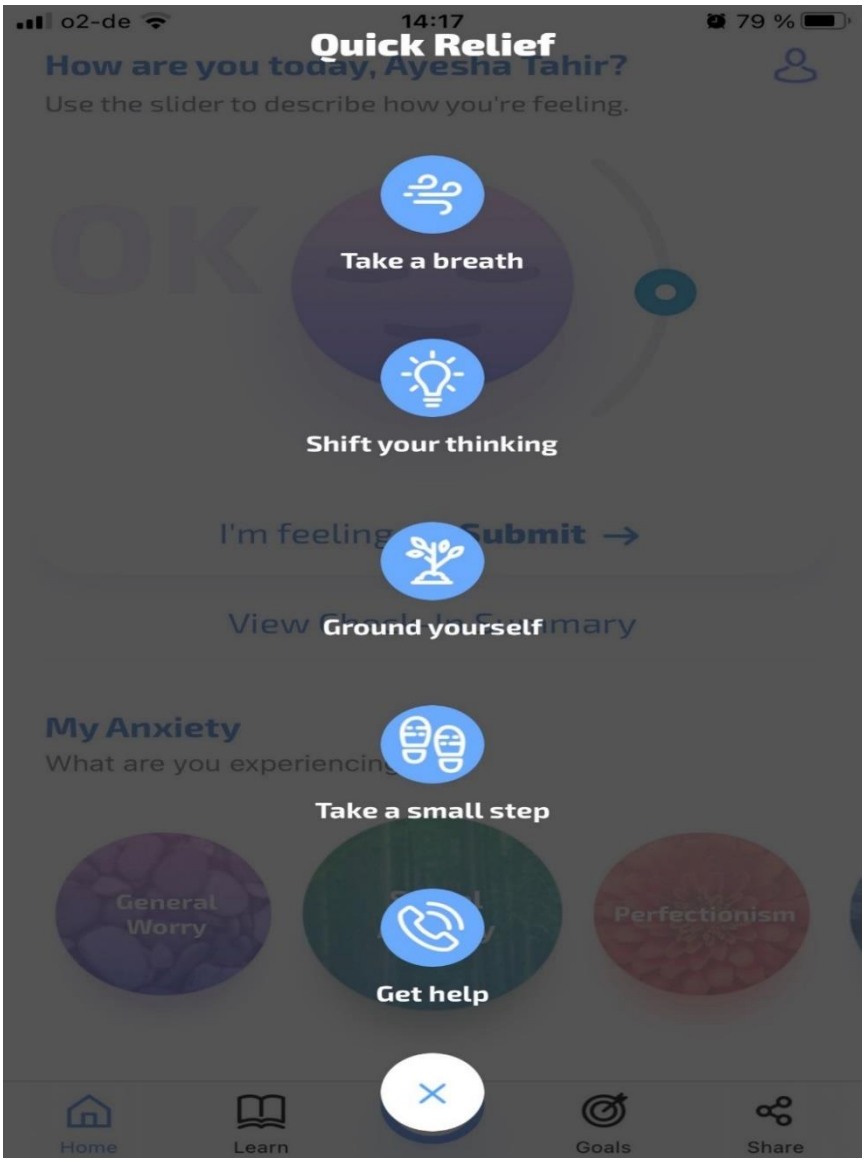

Figure 3: Quick Relief Option

3.1.2 Pocket Coach

This app is targeting audience with anxiety and panic. The application is user friendly and has a pleasant interface. The app is easy to use and self-explanatory. The application is available in English and German. It has a 4.8 rating on the app store.

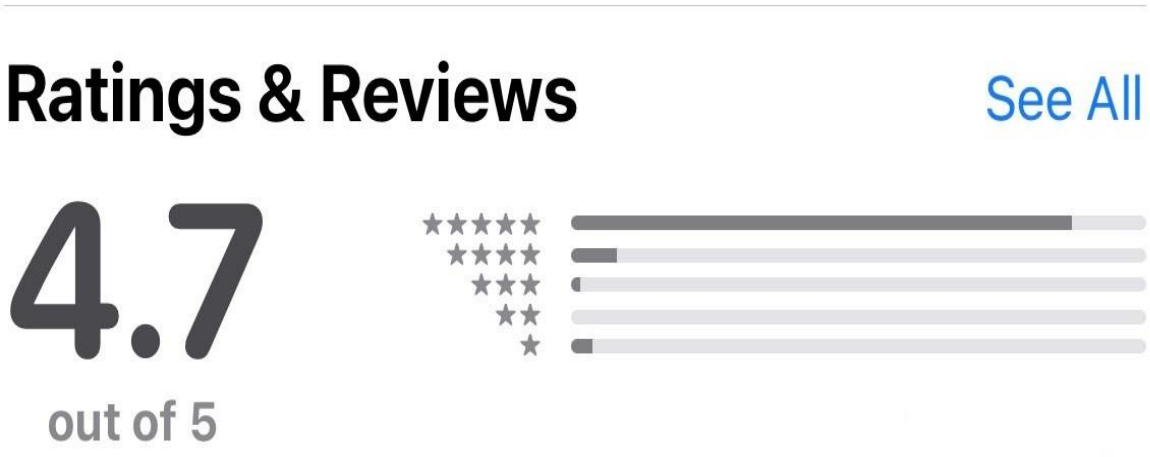

Figure 4: Pocket Coach Ratings

The content of the app is very simple and, in the start, asks the user about how he/she has been feeling and general questions about anxiety and the symptoms he/she might have been experiencing. The app asked about 8-10 questions and then generates a personalized course for user based on the answers he/she has given. Then the course is being divided into few chapters. Every chapter has few examples and is like a chat-bot. The virtual assistant will ask questions and to answer them he/she can type it or give responses based on the suggestions given in chat-bot.

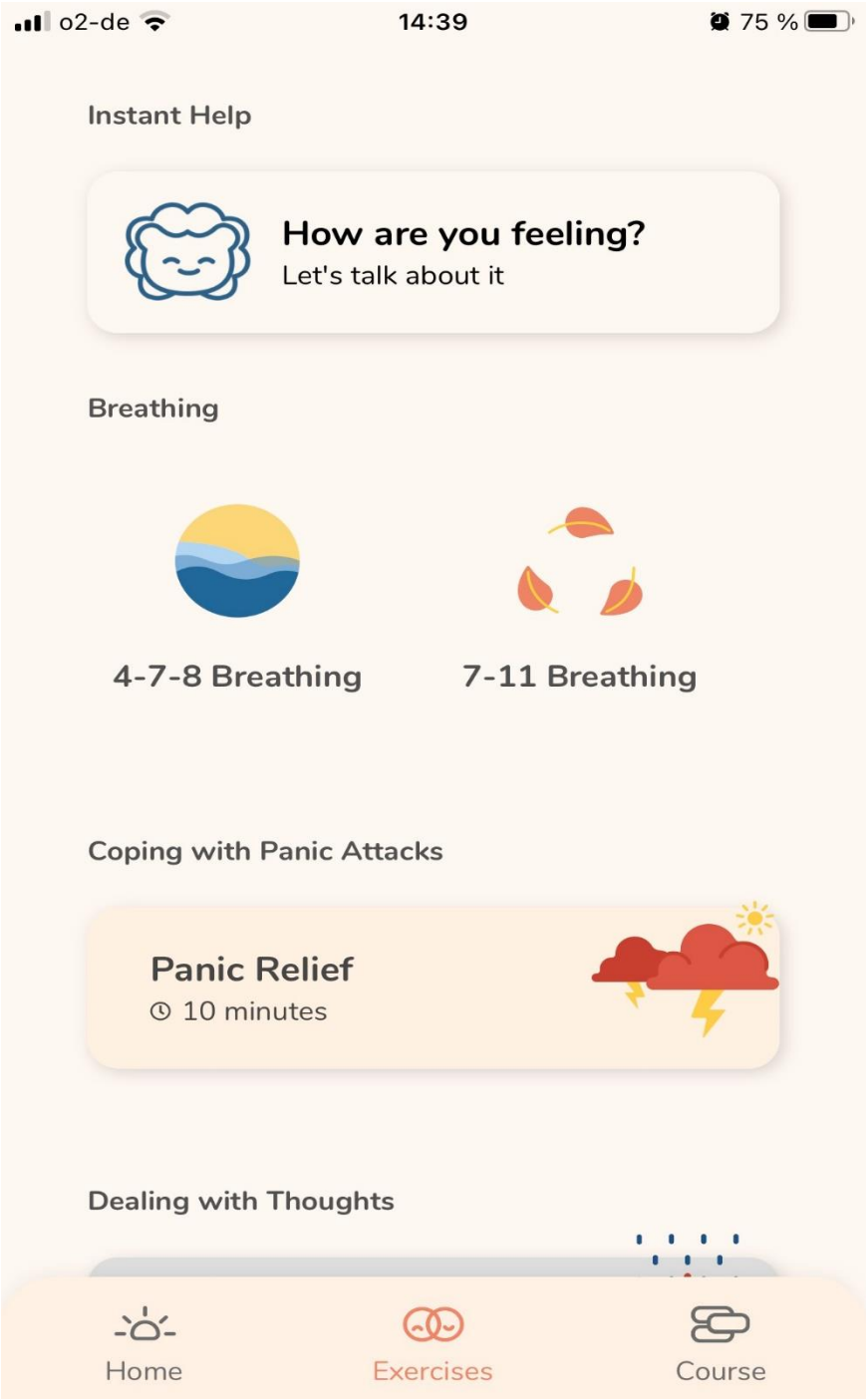

Figure 5: Pocket Coach Interface

This also keeps the record of how the user is feeling and there are small exercises given to help him/her with anxiety. In the exercises first the user must do around 5-8 minutes breathing exercises and then continue with small therapy sessions. There are different options given so the user can choose from them what he/she is feeling like.

3.1.3 WYSA

The app is targeting the audience with depression, anxiety, and stress. The user experience of the app is simple and easy to use. The app is only available in English and has a rating of 4.8.

Figure 6: Wysa Ratings

The app has various options, and the user can choose them what he/she wants to improve. It is a chat-bot app. The user has the option of maintaining the journal.

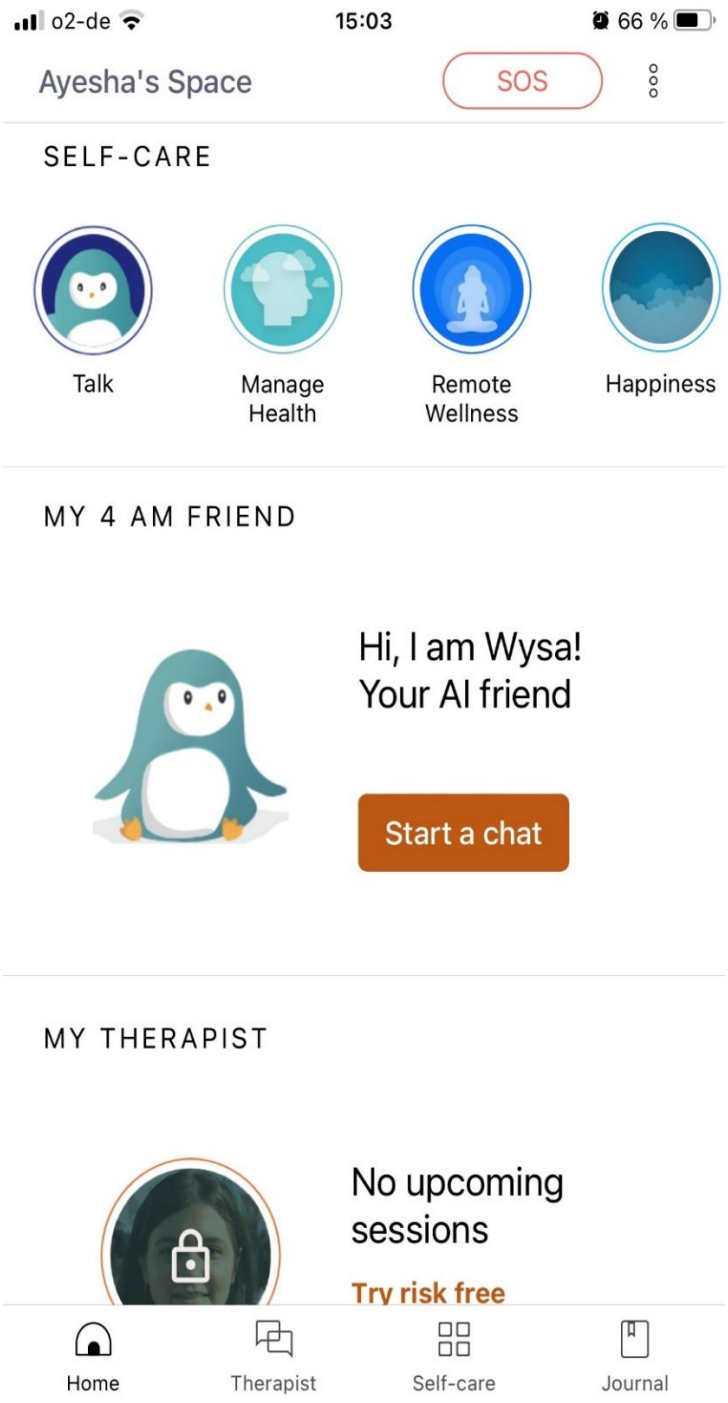

Figure 7 Wysa Interface

Figure 8: Options for the users

There are small motivational audio clips which they are calling them as Packs. These packs have small therapy sessions of about 3-5 minutes about self-love, being productive and managing the anxiety.

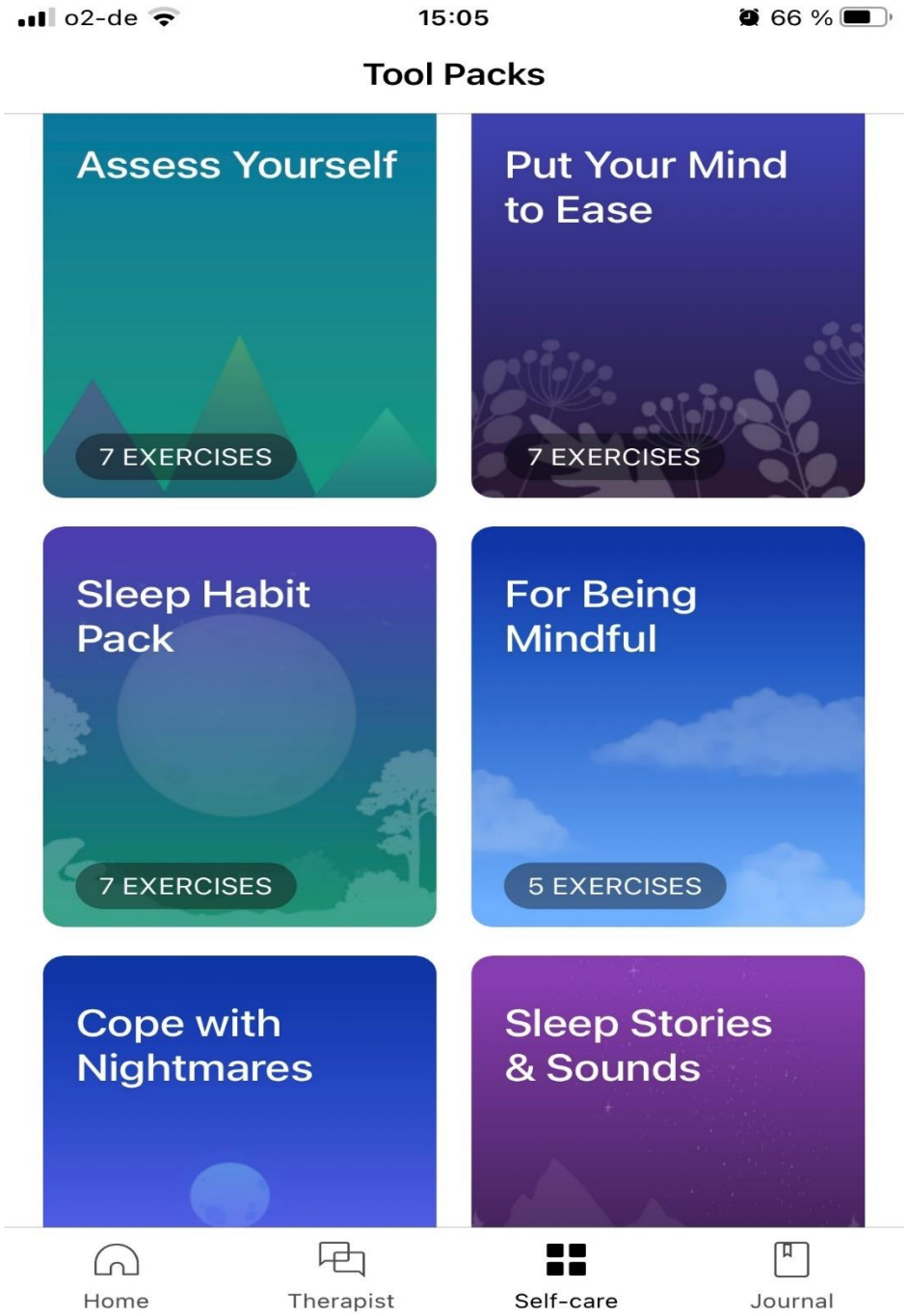

Figure 9: Tool Packs

3.1.4 CALM

The app is targeting people who are suffering from sleeping problems and anxiety. This app is very user friendly and is available in 7 languages English, French, German, Japanese, Korean, Portuguese, and Spanish. It has a 4.7 rating on the app-store.

Figure 10: Calm Ratings

This app has various therapy sessions to improve the user's sleep cycle. It has different practices to start meditation and help the user to keep at it. It has several options to calm down. The user can do daily journaling by check-in about how his/her day was, what his/her affirmations are, and the user can also reflect upon his/her day. He/she can also do breathing exercises and body workout. All in all, it helps to stay focused and calm.

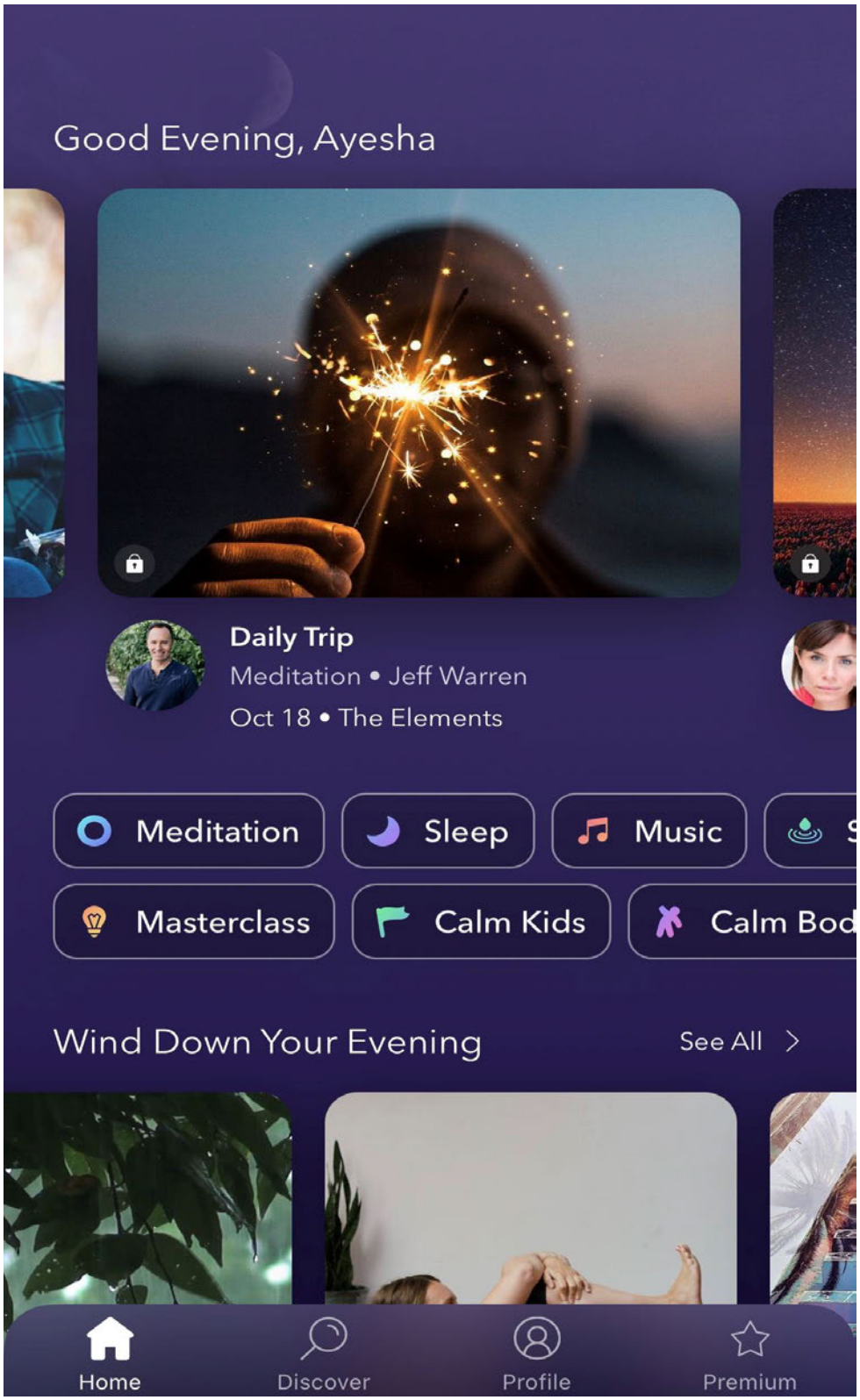

Figure 11: Calm Interface

3.2 Digital Assistant

These digital assistants were easy to use, and people use them in their daily life. Daily to-do lists and planners can be managed on them. They are becoming part of people's life. So, when it comes to anxiety and stress, they encourage users to talk to them. For Example, when the user says, "I am feeling alone" the response is "I am here for you if you want to talk". This gives the user a feeling of companionship. If you specifically tell them about symptoms, they will provide you with articles from the internet and try to help in every possible way.

3.2.1 Alexa, Siri, and Google Assistant

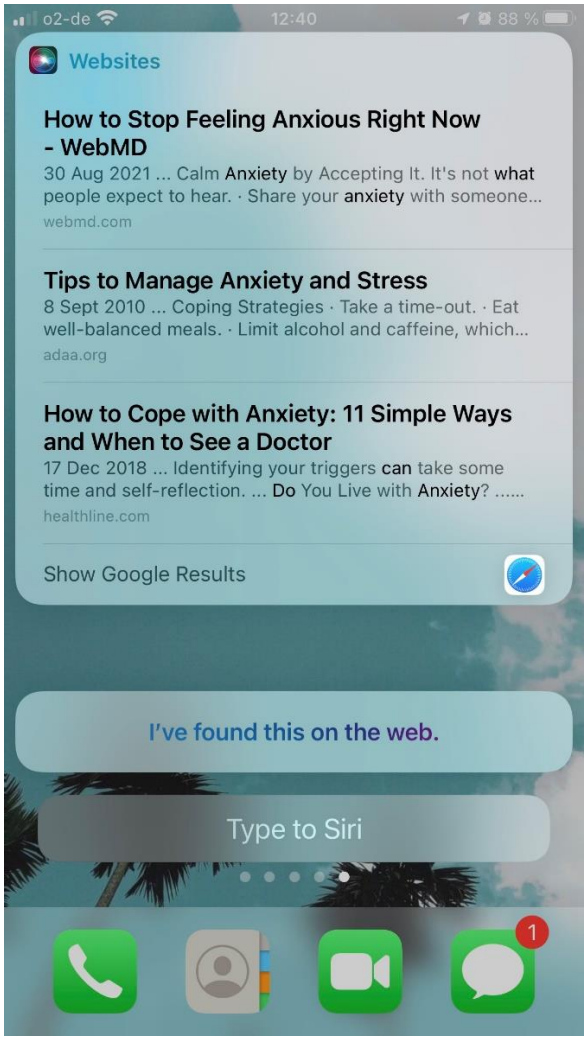

Figure 12: Help from Siri

Figure 13: Conversation with Google Assistant

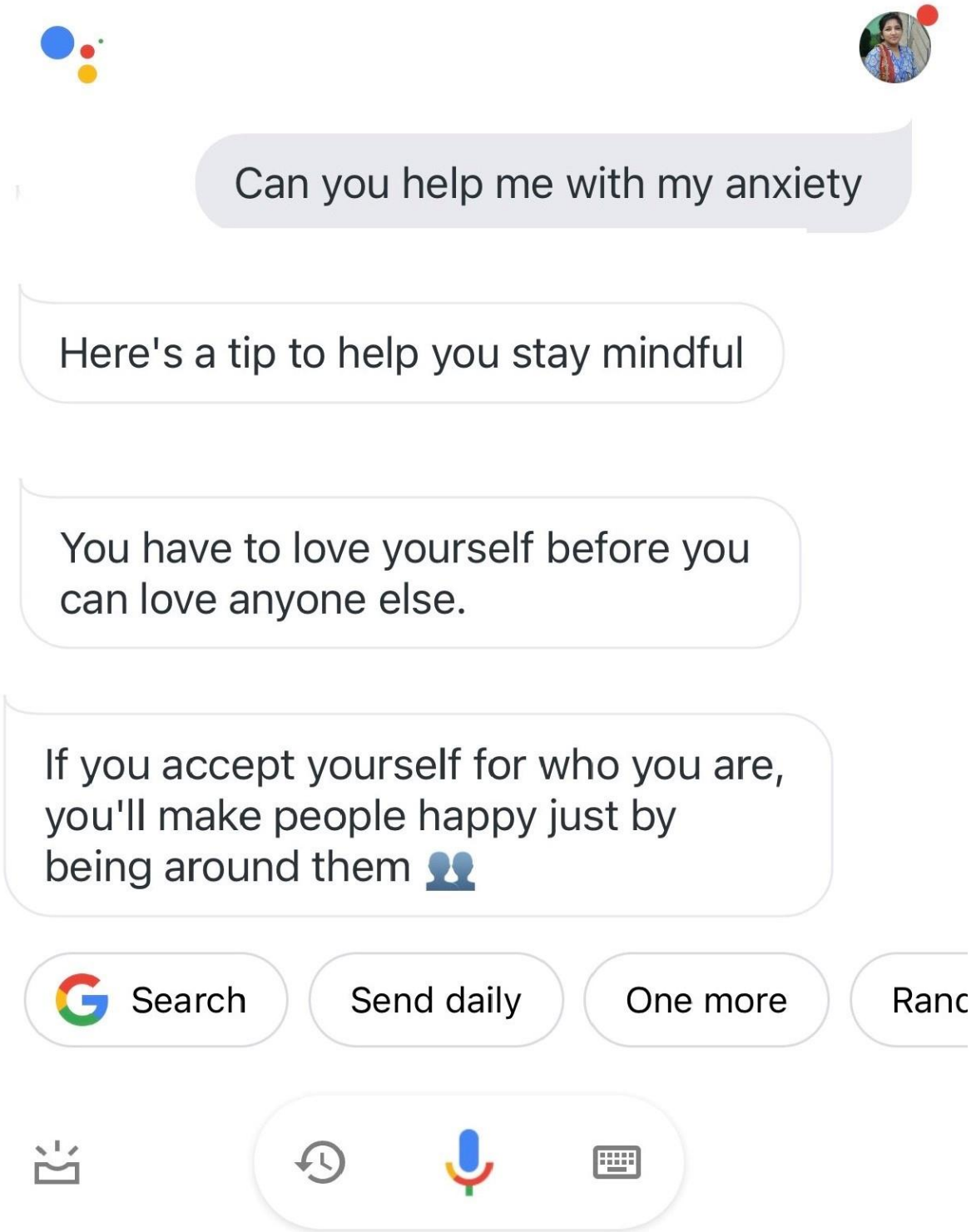

Figure 14: Conversation with Google Assistant

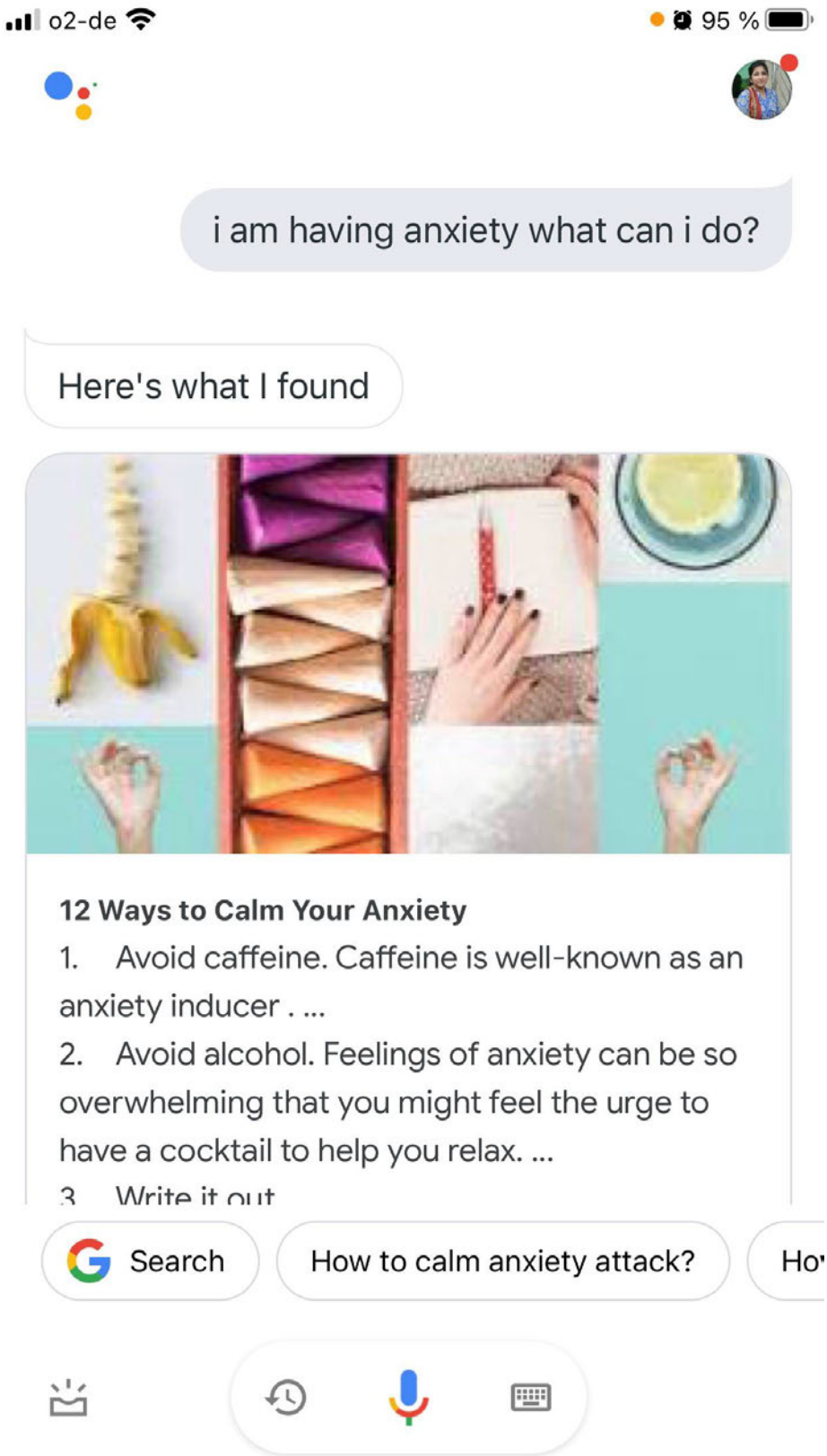

Figure 15:Tips to control anxiety

Chapter 4

Methodology

In this chapter I will highlight the methodological approach I used. The framework of a design case study[17] followed by data collection methods. After the data collection methods, I will highlight on participants and how they were being recruited. In the end I added the interview guideline which I used to interview my participants for this study.

4.1 Design Case Study

Design Case Studies is a research framework that is divided into three phases Pre-study, Design and Appropriation [17]. These three phases are interlinked to each other. They allow the researcher to understand the relationship between social practices and the space of designing IT artifacts to support these practices [18]. The pre-study phase helps to understand the existing practice and identify the problems users are facing. In the design phase the process and approach that will be used is described. Collection of data, prototyping and designing of product is also done in design phase. In the appropriation phase when design is finalized its goes in market for users to try it out.

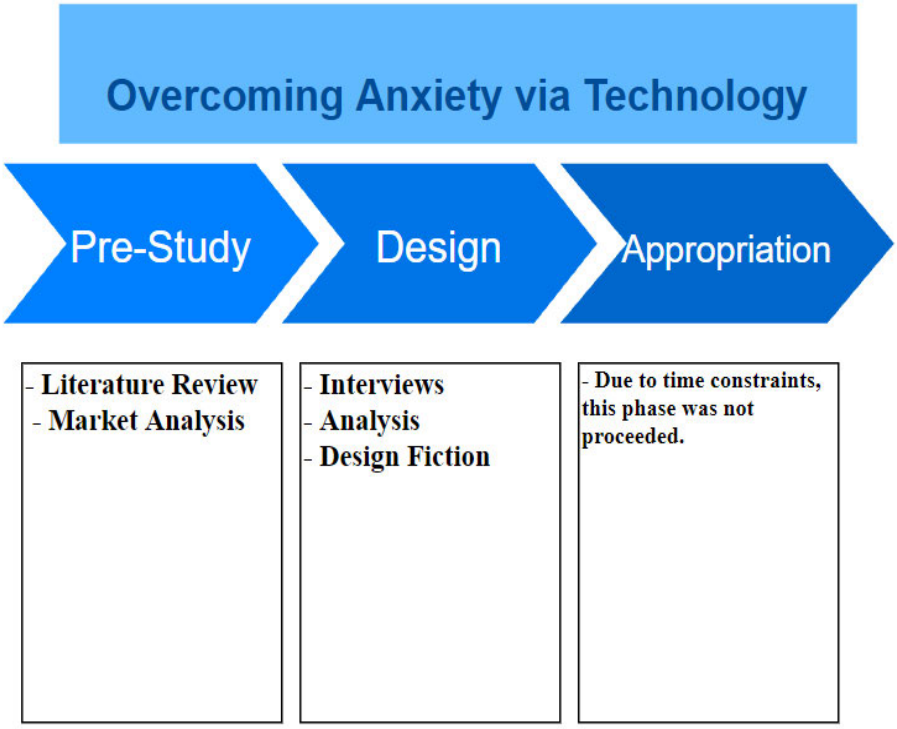

Figure 16: Design Case Study Timeline

The Pre-study phase is a context study for understanding social practices, and participatory ethnographic studies where the researcher requires close collaboration with practitioners [19]. I did a master's project on students experiencing with exam anxiety and from there I decided to focus more deeply on this topic and how users can overcome anxiety with the help of mobile artifacts. For this research, in the pre-study phase I did literature review students dealing with anxiety in their day-to-day life and market analysis of mobile applications and digital assistants how they are helping users, what kind of assistance and help they are providing them. In the design phase after all of this was done I conducted semi-structured interviews from students at university of Siegen. To analyze the data I did thematic analysis and from the results of the interviews I created design fiction as a solution.

4.2 Participants

I recruited 6 participants from different disciplines of the University of Siegen and all of them are international students. In this research I will be using fictional names for them. In section 4.1 Design Case Study, I mentioned about the master's projects I did on exam anxiety. I interviewed students from my course so I asked some of them again. I wrote an email to them and explain about this research study I am doing for my thesis and requested them if they want to participate again. I also mention if they know someone who wants to participate in this study willingly they are welcome and that is how I ended up with the following participants.

Participant 1 Haim is a PhD student. He is doing his PhD in Particle Physics and he is being living in Siegen for about 5 years.

Participant 2 Alia is a 24 year old Pakistani student who is studying MS Computer Science, and she is a freshman. She recently moved to Siegen and is living here for 6 months.

Participant 3 Dennis is a 26 year old student from Indonesia and he is studying MS Human-Computer Interaction student and is in his 2nd year of masters. He moved to Siegen last year.

Participant 4 Shreya is a MS Computer Science student from India and she is 25 year old and currently working on her thesis. She is living in Siegen for 2 years now.

Participant 5 Umar is also a student of MS Human-Computer Interaction from Pakistan and is 24 year old and is in his 3rd semester. He came to Siegen in March 2021. He did his 1st two semester online.

Participant 6 Adam is a MS Human-Computer Interaction student from Palestine. He is 26 year old and working on this thesis. He is in Siegen for 3 years.

4.3 Data Collection Methods

There are different methods in ethnography to collect data. For qualitative research observations, interviews, and workshops are used for data collection. For Quantitative Research surveys and questionnaire are used for collection of data. In the following section I will briefly describe about qualitative data collection methods. For this study I did not use observations and workshops, I only conducted semi structured interviews for collecting data.

4.3.1 Observations

When data is being collected by observations, the researcher observe daily life of the users. They observe the behavior, actions and how they are interacting with other people in their day-to-day life. Sometimes researcher follow the respective user in their daily life or sometimes they do it from far away. Observations gives the researcher the opportunity to have information about verbal and non-verbal actions of participants and they get to have a firsthand experience in the participant life. “These understandings are used to generate conceptual/theoretical explanations of what is being observed” [20].

4.3.2 Workshops

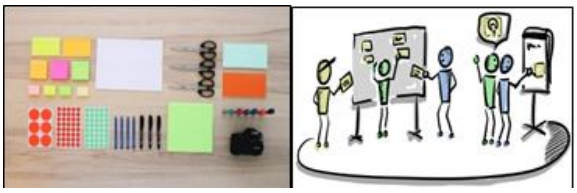

Figure 17: workshop supplies and workshop

When data is being collected by workshop, the purpose of the workshop is pre-defined. Users are given the problems and resources and they are asked to brainstorm and use their knowledge to come up with solutions. They are important in design and research process. “Workshops are

particularly common as a means by which to engage participants in a design process and very often, these workshops will ask participants to contribute constructively to some kind of design or prototyping activity[21].

4.3.3 Interviews

Interviews are the most effective data collection form of qualitative research[22]. They are used to understand and explore the research problem based on user's opinion and experience. "HCI researchers use interviews to help build an understanding of need, practices and concerns, preferences, and attitude of people who might interact with current or future computer systems" [23]. "According to Oakley (1998), the qualitative interview is a type of framework in which the practices and standards be not only recorded, but also achieved, challenged and as well as reinforced" [24]. "The three types of interviews are fully structured, unstructured and semi structured" [23]. Unstructured Interviews are not planned, and it is more like 2 people talking or having a discussion on a topic. "Unstructured interviews are generally suggested in conducting long-term field work and allow respondents to let them express in their own ways and pace, with minimal hold on respondents' responses" [25]. In structured interviews researcher follow a designed guideline and they usually do not ask follow-up questions. "In structured interviews a rigid script is used to present questions in a well-defined order. Although some questions may be skipped, based on answers to previous questions but there is no room for asking questions out of order or for adding questions that are not in pre-defined script" [23]. Semi-structured interviews are also pre-planned, but interviewer have the option to ask follow-up questions. In this way researcher can gather more in-depth information from the interviewee. "If the researcher wants to ask for clarification, add questions or follow interviewee comments then they may take a semi-structured interview approach"[23].

4.4 Interview guideline

An interview guideline has sets of questions which are designed to gather information according to the topic. A consent form is also included in the interview guideline to ensure that all participants sign that form and to establish trust that their identity will be stayed anonymous if any information is being used. Participants also have the right to withdraw their consent from using any information. The Consent form I used for my participants is given in Appendix A.

For this research I divided the interview guideline into different parts. At first, I asked basic questions about participants.

1) Are you a student and what you're studying please?
2) If you are a student do you live alone or with someone else?

Figure 18: Basic Questions

After basic questions I asked participants about their point of view on anxiety in general. Their experiences with anxiety, the symptoms they experience and how they prefer to deal with it.

Questions about Anxiety in General

3) First I would like to know about your general thoughts on anxiety?
4) Do you have any experience with anxiety?
5) Do you think you get anxiety due to certain situation or when you are in certain environment?
6) What goes through you mind when you are feeling anxious?
7) What are symptoms you experience when you have anxiety?
8) What are your thoughts on dealing with anxiety?
9) When you are dealing with anxiety, do you want to be alone or do you prefer to be around people?

Figure 19: General Questions about Anxiety

Later, getting to know about anxiety in general I asked participants if they ever thought of taking help professionally. Out of 6 participants only 1 participant did. The detailed discussion is going to follow in the analysis in the next chapter.

Dealing with Anxiety via Professional Help

10) Have you ever taken professional help when dealing with anxiety?
11) If yes then how do you feel about that?
    I. Did you feel comfortable talking about your feeling in front of professional?
    II. Did you notice/feel changes in yourself?
    III. Were you happy/satisfied with the results?
12) If no then why you did not seek help?

Figure 20: Professional Help Questions

Then there was a part where I explored for information on technological artifacts. Whether it was mobile applications, wearable devices, or digital assistants, all participants have used technological artifacts..

Dealing with Anxiety via Technological Artifacts

13) Have you ever tried using mobile artifacts like apps & digital assistants when dealing with anxiety?
14) If yes how do you feel about that?
    i) Did you feel/observe any improvement after using them?
    ii) Using these artifacts gives you the feeling of companionship like you are living with someone or you are not alone?
    iii) Do you think after using these artifacts do you need a human figure when dealing with anxiety or not?
    iv) Do you think the fear of being judged was less when you were practicing with the artifact?
    v) In your opinions what was missing in them?
    vi) What features you think are must for these technologies to have.
    vii) What practices (yoga/meditation) in your opinion are necessary to be in an app/device?
    viii) Do you think these apps/devices are improving the lifestyle and mental health?
    ix) What are the positive aspects of using these technologies?
    x) What are the negative aspects of using these technologies?
    xi) What are the privacy concerns you have while using the technologies?
15) If no then why?
    I. Did you know that you can take help from these artifacts?
    II. If you didn't have any information about that, did you like the idea of seeking help from them?

Figure 21: Technological Artifacts Questions

After understanding their perceptions on anxiety, how to deal with it and on technological artifacts, I asked participants how they imagine their future to be. What kind of advancements they see in terms of technology while dealing with anxiety.

Future Oriented Questions

16) If you know someone who is dealing with anxiety, would you recommend them to use these artifacts?
17) In your opinion, in near future, people will attract more towards technological help or in person help from professional? [why one over the other and vice versa]
18) 50 years from now, what do you think would help you regarding social support to cope with anxiety?
19) Imagine yourself in 2050/2060, what kind of advancement will be there in technology that helps you adequately to cope with anxiety?"
20) How do you imagine a future to be, to reduce anxiety in the population
21) Do you have any question or Comments?

Figure 22: Future Oriented Questions

Chapter 5

Results

In this chapter I will present the results of the interviews I conducted with 6 participants Haim, Alia, Dennis, Shreya, Umar, and Adam and they all are students at university of Siegen. The focus of this research is to understand student's perspective on using technological artifacts when coping with anxiety. I used MAXQDA for the analysis of the interviews. MAXQDA is a world-leading software for qualitative and mixed methods data analysis[26]. I uploaded all my interviews on the software and then made codes for analysis and used color tags for each code and highlighted related data with their respective color tags. This helped me in analyzing all the data and coming up with results. Results will be presented in 4 sections. In the 1st section the findings abouts anxiety in general will be presented. Later I will discuss about dealing with anxiety by receiving Professional help and dealing it by using technological artifacts. In the end I will show results of how participants are imagining the future and the improvement in technology in terms of coping with anxiety.

5.1 Thoughts about Anxiety in General

All participants I was interviewing were international students at the University of Siegen and have been living in Siegen. Few participants recently moved to Siegen and have been there for 6 months to a year. The others have been in Siegen for 3-5 years. Almost all participants told me that they have suffered anxiety at some point in their life. They told me that they experienced it when they were in a certain environment that made them nervous. Dennis mentioned that: *"I think it's part of our lives now whenever we feel we are facing some uncertainty or we are stressed out I think that's normal to feel anxious."* Anxiety is natural and it can get triggered by anything be it small or big and if these triggers are ignored then it can get chronic [27]. Anxiety triggering may be different for different people. Some get it when they in the exam center or when being asked to speak in front of people. It is also very common in students because they are home sick as many students live alone these days and are away from their families. Shreya

said: *"I think its common in young adults especially people moving to different countries or cities. It can be very overwhelming to face the cultural difference, environmental difference, climate changes. Also, when you just go on your own after living with your family for so many years. So* due to *that people can very easily get anxiety. It is something that people should take seriously and not just dismiss as mood swings."* Two participants also mentioned that their anxiety also got triggered because of Covid-19. We were in lockdown for more than a year and staying in all day long without having any extracurricular activity was one of the main reasons for anxiety. Shreya told me *"During Covid when I am alone and stay in my room for too long and don't talk to a lot of people and have nothing to do then I start missing home. Sometimes it is very depressing and overwhelming as well."* As a human being we tend to think of the worst scenarios when we are anxious and that turns into getting even more anxious about something. Haim underlines this: *"I think about the worst that can happen in that situation and that also makes me more anxious."*

As all of them suffered from anxiety most of them also have similar symptoms for example panic attacks, cold hands/feet, increased heart rate, feeling nauseous and going black and not knowing what is happening around. When I asked them about their experiences of dealing with anxiety 2 out of 6 participants said they want to be with their partners. The rest of them said they prefer to be alone. Haim mentioned that when he is anxious he tries to play games with his mind to distract himself. He mentioned as I quote: *"I think of the worst situation and then train my mind to unthink all those thoughts. Then I try to think of the positive outcome that can also happen. I also try to think 'okay if the worst of worst happen then what'. So, I try to play these mind games."* Adam also mentioned that when he knew he's getting anxious, he tries to go back and to think of the reason that what triggered his anxiety and in that way he kind of gets the closure and tries to avoid all those things that caused it. Anxiety is also not something you can deal with on your own and if you know that it is getting prolong and you need professional help that one should consider seeking help for it. On getting help when your anxiety is not under control, Alia said: *"If someone is dealing with it on a large scale then they should definitely think about taking professional help because it is not something you can be able to manage on your own."*

5.2 Dealing with Anxiety through Professional Help

Professional help is important when someone is dealing with anxiety on a chronic level. Doctors and therapists can understand what you are going through, and they can help a person in overcoming it. Out of 6 participants I interviewed only one participant named Haim who took help from a professional. Haim told me he tried professional help a couple of time and it has helped him in some ways what made him happy as he noticed improvements: *"Getting professional help from experts helps you a lot. They gave you some tips but in the end it is your struggle and you must deal with it on your own."* He told me that it takes time to open in front of someone and to talk about your anxiety but you will get comfortable after some time as you have already made up your mind: *"It takes a moment to come out and break the barrier but, in your head, you are prepared because you are going there for help."*

I also questioned my other participants about professional help when they were experiencing anxiety. They all had the same rationale for not seeking outside assistance: they did not consider it was essential or that they could handle it on their own.. Dennis and Umar both mentioned that they have thought about it: *"Actually no, because I didn't think it was urgent but have thought about it."* According to Adam, he did not think about it because of the accessibility: *"I am trying to remember why I didn't go to it because there is a free therapist at the university but I didn't believe it would be really helpful or that there would be a language barrier."* Cultural reasons are also a main factor people shy away from going to therapists. They had and still seem to have this fear that if they go to a therapist people in their surrounding will think they are crazy. But now people are taking it seriously so they do consider therapy. People know that by going to therapist they will get better but the stigma around mental health and seeking help is very much alive. "clients can perceive therapy as stigmatizing while still having a high quality alliance with their therapist, and in doing so they may be able to achieve positive outcomes from any given session[28] ". On cultural aspect Umar mentioned: *"There is not a specific reason, but I can say the place I am from there people don't consider it to be a very good option to go to any therapist. It seems you are not mentally stable. Mental health was not a serious topic there. In our culture or because of our culture we never go to any therapist. But as time is changing people are getting aware about this. Currently, it is changing but if you go back, there's nothing like that. If you go to any therapist, people say you are crazy and stuff like that that's the reason we don't go to a therapist."*

5.3 Dealing with Anxiety through Technological Help

We are living in a technological period where we have access to technology all the time. Nowadays we have mobile applications for almost everything. When it comes to anxiety there are also multiple applications and devices available in the market as discussed in chapter 5 Market Analysis. These technological artifacts are helping users in dealing with anxiety to some proportion. I asked participants questions about theses artifacts and what is their experience with these artifacts. Almost all the participants have used some or the other artifact when they were going through anxiety. Alia mentioned that: *"I used an app called "Headspace", it is for calming yourself down. Sometimes when you are dealing with anxiety you tend to wake up in the middle of the night and have trouble falling back asleep so I used this app for that purpose."* Shreya also talked about Headspace and she mentioned: *"I have never tried any wearable devices but there is this app called Headspace that I have tried. I used that for meditation."*

These technologies are helpful and people observe improvements as well. While talking about improvements and observing differences after trying these apps Adam mentioned that: *"Honestly, yes when I made it a habit at the beginning to try to do it for long time, yeah I felt it every day that there was improvement in a lot of ways. It helped me with focus, with being more mindful and a lot of these factors that contributed to my health for a while but afterwards it was hard for me to stick to it so I searched for other methods to try to incorporate into my life without technology being necessary in my daily life."* From my participants experiences these artifacts help and you will see improvements but you must keep using them in a long run. You cannot expect to see the difference right away. They act like a great distraction in moments when you are going through anxiety. Alia said *"Not right away, it's a tool that you have to spend a lot of time with, then maybe you start seeing any difference. It acts like a center of attention and helps you to divert your attention."*

While talking about dealing with anxiety and people's opinion on how they prefer to be, as in alone, with their partners or with their friends, it was a 50/50 ratio. I asked participants about how these technologies are affecting the human connection and Alia mentioned: "*I prefer to be*

alone when I am dealing with anxiety but an application can never be a replacement for a human figure." We cannot rely on these technologies all the time to get help. Shreya said: *"In my opinion these applications are like self-help books. They cannot completely help you in a way a professional can, they are not yet there. Most of the time people are depressed because of the lack of the human connection/contact. Then we use an app which again increases the distance between humans."* As Shreya mentioned these artifacts are self-help guidance for us and so I asked what they thought were missing in these applications, what practices from their point of view are necessary to be in these artifacts that will be helpful.

Following are the suggestions participants gave which will be helpful for users:

1. *"A reminder to take a break from daily activities and practice some exercises just to distract your mind from your daily routine."*
2. *"An AI Robot where a two-way conversation is possible, so that you don't feel lonely."*
3. *"Maybe there can be a possibility where you can directly connect with your doctor, like for example you can put your symptoms and the app connects you with a doctor and you can have a meeting or appointment with them. In this way you can save the hustle of looking for a good therapist and save your time and energy of going out there."*
4. *"Improvements graphs even though its hard but to tell me how much progress I made. I felt that when I am going through something and I am using the improvements feature and I am not seeing any improvement then later this technology shows me that oh you made a huge improvement then it will motivate me to keep doing more."*

On one hand if these technologies are helping users and have positive impact, there are also negative aspects of these technologies. So I asked the participants what positive and negative effects these technological artifacts have on us.

Positive Aspects

1. *"First being anonymous. No one can judge you. That is the thing that diverts your mind. Another thing is that it will make you feel like you are not the only one in that situation. There are many people who are suffering from the same thing so you will feel like 'I am not the only one."*

2. *"Accessibility is a very good part, that it is available every time. I don't have to take an appointment at the doctor to consult."*

3. *"You can find different ways to distract your mind and in that way, you will feel refreshed."*

4. *"People who meditate will see changes and a different version of themselves."*

Negative Aspects

1. *"If you use these apps or spend more time on these apps then you will get addicted and get anxiety from them."*

2. *"Lack of human contact and these apps are increasing distance between people trying to connect to each other."*

3. *"It keeps you in your room and disconnected from the world."*

Another major negative aspect in general is data privacy issues, when it comes to using technology people are concerned about their data being misused. These days putting information on the internet is not always safe especially when it comes to using applications as users will be asked for permissions to access their gallery, photos, microphone, and contacts. When being asked about privacy concerns Adam said: *"Yeah, my concern was always data privacy, especially when you are talking about something privately and you don't know where this information is going exactly and how it is being processed."* Sometimes users get vulnerable when they are sharing their personal experiences and they want to be anonymous because they do not want that piece of information to be linked back to them. So, staying anonymous is important. Alia mentioned that *"the identity is not kept anonymous and whatever I am saying or using it for can be linked back to me. These applications require users to be vulnerable and they need to be assertive that everything I do on this application is secure."*

These days we also see that there are many small apps which ask users to login via Facebook or Google account and accessing our data through them. Shreya thinks that in that way they are misusing our data and as I quote: *"Generally professionals have the agreement that they are not supposed to share any information and it stays between the patient and therapist. I think nowadays it is very easy to leak somebody's information online. Apps like Facebook, Google they are taking our data, they have access to our contact list, gallery etc. basically everything. So, we do not know what they are doing with the data and it can be misused. For example, if you open any smaller app, they will ask you to login via Facebook so again they are sharing data and it is kind of being misused."*

5.4 Dealing with Anxiety in Future

When thinking about the future I hope people will be comfortable talking about anxiety. That they do not feel anxious and hopefully do not have the fear of being judged. I asked my participants how they wish the society will be in future and Haim said: *"I want to be among people who are positive towards anxiety and also want to surround myself with people who give you the same energy."* Alia also hoped that people will be getting the help they need and as I quote: *"Anxiety would hopefully have gotten a lot better. 50 years ago, these things were never spoken about and now we have come to a point where people are talking about it as real issues*

they are facing. So, 50 years from now I hope people will be comfortably talking about this and getting the help they need." When we talked about the future and how professionals will be dealing/talking about it I got some great insights from participants. Dennis said: *"I think professional help will merge with technology."* Umar mentioned: *"I think professionals are also moving towards technological help as we are in technological era and therapists are creating their own applications and giving therapy online."*

When it comes to dealing with anxiety in the future, participants came up with some ideas of how they are imagining it to be. Shreya said she is imagining *"people meeting their therapists via Hologram or having a 3D model of therapists in front of you while you both are at different locations. Medicine coming your ways in a vacuum or something."* Pets are also considered to be a distraction. Whenever you are stressed or feeling down you can go and play with your pets. They can change your mood instantly. But having a pet is also a great responsibility and we must make sure to take care of them. To deal with this Dennis gave us the idea of Robotic pets: *"Maybe there will be personal assistants everyone will be using to cope with it. People like to be around pets as they help in dealing with it so maybe in future, we might have robot pets as well."*

Chapter 6

Design Fictions

Episode 1
Eva

From the very young age, Eva loved to dance. Every time a song started playing, she would get up and started dancing. Her friends and family described her as a kid who is born for dancing. After seeing her dancing her mother decided to enroll her in dance class. She started going to dance class and learn all about dancing from a very young age. The more she learned about dance, the more she wanted to do it. She used to perform in school and was always ready to perform. She also started taking parts in competitions and enjoyed being in the center of attention. As the years went by, she learned many dance styles and won many competitions. Apart from being excellent at performing, she also enjoyed school. She was always a good student.

She grew up watching dance videos and it became her passion. She always thought of studying dance and pursuing dance professionally. When she was in high school, she decided to look for schools that offer degrees in dance and found Manhattanville College in New York. This college was everything she ever dreamt of, and she applied in the college. For the admission, the requirement was to send a video of herself performing. After waiting for a few weeks, she got an email from her dream college that she got accepted and they were willing to offer her a scholarship. She could not be happier that after years of performing and competing in different competitions she was finally able to study what her passion was. When she got accepted, she told her parents, they were also very excited for her to go to New York and study.

After moving to New York, Eva got super busy with her school and adjusting in the new city. She has never been to New York before. Moving to a big city like that was overwhelming for her as she herself was from a small city. In the start it was very exciting going to university every day, meeting new people and follow her passion. She got super busy with school and juggling between classes and practices, she did not get much time for herself. Workload from school and

living alone made her very anxious. It got to a point where she knew all that burden was affecting her body and mental health. Even though she had to practice every day and she knew she would not have time for another activity in her schedule she started looking for meditation and online yoga classes which are only offered on weekends. She found an interesting online school “Namaste Online Yoga Center”. She enrolled herself in yoga class and incorporate yoga in her life. After attending classes for few weeks, Eva started feeling different and she realized that mentally she was in a much better place than before, and all of this was happening because of her yoga routines.

Episode 2
Melissa

Melissa and her twin sister Makayla were close since childhood. They were each other’s best friend from playing in sand at beech to deciding each other’s prom dresses. They always confide in each other and knew that they both had each other’s back. Makayla was an avid reader since childhood and loved to read books but on the other hand Melissa did not like reading and therefore, she found her interest in games and computers. From a very young age her dad used to buy games for her and bought her a computer because he saw how passionate she was when it came to technology. From early childhood computer and technology fascinated her a lot. She decided to study computer science as it was her passion.

After finishing her studies, she got a job in a big tech company where she started her career as a computer scientist. She was independent, her work life was great, but she felt anxious most of the time. She could not wrap her head around why she was having anxiety; she had an amazing twin sister and parents who supported her in every way possible. One day at work while she was doing research for her project, she found mobile applications which help in dealing with anxiety. She downloaded one of the applications and started practicing with that. After practicing on and off for like a month she felt like this was not helping her in the way she wanted. Whenever she felt alone or in a mode, to talk to someone, she would use the conversational assistant feature of that application, but she did not feel connected to that, and it did not make her feel better. One day she read a blog about an online yoga school “Namaste Online Yoga Center” and how they were helping people who were dealing with anxiety. She thought this would be a great

opportunity as they offered classes on weekends and in that way, she would be able to regularly attend a class.

After trying so many things she decided to create her own platform "Peace of Mind" where people could interact in a way they wanted. Melissa asked few of her friends who were doctors and professionals in therapy and asked them to give free consultations for her platform's users. Here the users have the leverage of expressing themselves. They can stay anonymous and share their experiences. If they are feeling alone and have no one to talk to they have the advantage to talk to someone over the platform. It also has a hologram feature where users wear a [1]VR Goggles set [29] and go into their own imaginary world. They can decide what they want to do there, they have many options to choose. If they feel lonely and wants to talk, they can have a one-to-one conversation with someone who is in a completely different place.

Episode 3
Hailey

Hailey is a behavioral scientist and has spent her entire life studying humans and their behavior in a certain situation. She was interested in human cognitive behavior to understand the human mind and psychology. She got a degree in behavioral science and decided to help people. For her graduate program they were asked to give small sessions in schools and colleges to educate students about behavioral science. Hailey and her partner Jay decided to do small workshops with students where they would give scenarios to them to see how they would react in that specific situation. Her passion for understanding human behavior grew when she experienced how students were reacting differently to certain situations.

After finishing her studies she decided to continue giving these lectures and conducting workshops because one day, after giving a lecture in a high school, a student named Eric came up to her and told her how her lectures are helping him. Later, she was doing a workshop on anxiety and got insights from students about what they do while dealing with anxiety. She was also guiding them about what they can do better and how it will help them. One student told her I

[1] https://www.amazon.de/-/en/Glasses-Virtual-Reality-Experience-Comfortable-HD-WHITE/dp/B09TZX1G8R/ref=sr_1_4?keywords=vr-brille&qid=1652097987&sprefix=VR%2B%2Caps%2C119&sr=8-4&th=1

like to play video games because they keep me occupied for some time and then eventually, I will forget what was causing me anxiety. Similarly, some students mentioned they like to run or bake, or some said they journal their thoughts and it helps them. A group of students told her they use mobile applications like Calm or Headspace because they offer meditation music, and they listen to it and practice with it.

There was a group of students who told her about a platform called "Peace of Mind" and how they got consultation there from professionals. One student told her she likes to play with pets but they are not allowed in her dorm therefore she uses this platform where she has the advantage to play with pets of her choice at any time. Another student mentioned that she lives alone and likes to talk to someone when she is feeling anxious and that with the help of this platform she can easily have a one-on-one conversation with someone and that it is completely anonymous. Hailey liked the idea and decided to check it out. She started using Peace of Mind right after the workshop for few days and was very intrigued. She contacted the creator and told how fascinated she was by the idea and offered to help in consultation. Melissa told her that they are always looking for more people and that they have therapists and consultants who offer users their help. With her expertise as behavioral scientist she could touch a bigger spectrum and offer help not only with anxiety but with other areas as well. She told her friend Jay who was working with her in grad school in assignments and was also intrigued by the idea and decided to join her.

Episode 4
Peace of Mind

When Peace of Mind was ready, Melissa asked few of her friends from her online yoga class to try it out over the weekend. When they met in the next yoga class they were all so excited to tell her how good her work was. Fatima told her "Because of language barrier I never go to therapy because I do not feel confident speaking in front of someone but with Peace of Mind, she could get her consultation at home". Eva told Melissa that with her busy schedule of school and dance practice she has no time to meet her friends or talk to someone but with Peace of Mind she can do it. She told her "The other day I had a rough time at practice and I wanted to talk to someone

to vent out about how I was feeling and I used Peace of Mind and the person I talked to was very nice. She listened to everything and calmed me down. She said that she does not know much about dance and that she understands that it is the stress from school and everyone goes through it". After talking to her I realized I am not alone in this, every student goes through it.

Hailey and Jay had an alumni dinner at their grad school and at the dinner Jay told Hailey how much he is enjoying giving consultations to people. Jay told Hailey that he got feedback from a 15-year-old boy who was bullied in school and that he was scared to tell anyone about that. With his help and encouragement that boy who was being bullied reported them and now he is doing much better. When Melissa went back home for holidays her parents told her how proud they are of her for creating Peace of Mind and how it is helping so many people. Melissa got overwhelmed and said "When I hear from people how much my platform is helping them it just gives me so much peace." When they were exchanging gifts Makayla got a custom made "Peace of Mind" wall art for Melissa and hugged her and said "I am Proud of you".

Chapter 7

Limitation

As my topic of research is anxiety and how to deal with it, so finding participants was a little bit challengeable because I was looking for a specific target group who are going through anxiety and have experience with technological artifacts. There were participants who agreed to talk about it but at the last moment they quit and refused to give interview. There were participants who said: yes, we have experience with anxiety but have never used any technological artifact. There were participants who said they are not comfortable talking about their anxiety so they refused to participate. I had anticipated these kinds of things might happened so I was prepared accordingly. When I was recruiting participants, I asked more students than I intended to so that even if someone could not participate, I would have enough participants for data. After the interview, one of my participants told me that he got overwhelmed about discussing certain things that he had a hard time dealing with it and talking about it brought back memories of it. As I knew this participant so to relax and calm him down, I started talking to him about his thesis and other projects to distract him mind. These are the things that can happen so we should be very transparent about the risks and communicate them properly in advance. According to ethical guideline in research "if they experience adverse reactions, unexpected effects, or changes in clinical status, ensuring appropriate treatment and, when necessary". [30]

Chapter 8

Discussion

In this study I research about how to deal with anxiety with technological artifacts. Everyone has a different way of dealing with it. Some people deal with it by isolating themselves while others prefer to be in someone's company they are comfortable with. My focus was to find out how students these days deal with it. Finding the right target group was a bit difficult because finding participants who have experience with anxiety and take help from technology as well. I conducted semi-structured interviews from participants with diverse background and get their point of view. I designed an interview guideline in a way to ask them about anxiety in general, what are their thoughts on dealing with professional help and dealing via technological artifacts and in the end I asked them about future oriented question regarding anxiety.

8.1 Anxiety in general

Participants share their general thoughts on anxiety in times like these everyone occasionally suffer from anxiety and now is the time we should normalize it and get help if we know this is out of our hand and we cannot deal with it on our own. It can occur when someone is put in a situation where he/she does not feel comfortable, in an exam center or to speak in front of people. Everyone has different triggers and it can be big or small and can happen anytime. Just like triggers everyone experiences anxiety with different symptoms. Shivering, restlessness, headaches, Sweating, nausea, and panic attacks are the common one's students experience. One of the participants mentions a good point that whenever he/she is feeling anxious he/she will start to think of the worst that can happen in that situation, all the things that can go wrong and then he/she will train their mind to start thinking about every positive aspect of those feelings and then try to focus on them.

8.2 Dealing with Anxiety via professional help

When a person is enduring with anxiety and they see that they cannot get it under control by themselves then they should certainly consider professional help. When he/she does not get the help they need after a point it gets very serious. So it is very important to get the help in time. Getting the professional help that is needed help a lot. Therapists are trained to give the help that a patient needs. They have theoretical and professional knowledge about what he/she is feeling and they have experience in that spectrum on how to help them.

8.3 Dealing with Anxiety with technological help

With the evolution of this technological era people can now get help with the technological artifacts. There are many applications and digital assistants that are designed to help people in the comfort of their room or home. I have personally used some of the applications available for mental health and anxiety which I discussed in market analysis. After using them for some time I experienced difference myself, how journaling about your thoughts can help you keep track of your thoughts or doing meditation for 5-10 minutes made a huge difference in my body. When it comes to technology there are many mental health and wellness artifacts available that people use in their day-to-day life. Most applications provide the opportunity to do meditation, yoga, and helps the users to maintain a journal and help them to relieve all the stress of their day. But to see the progress and results users' needs to do it regularly to start seeing difference. All the digital assistants available in market help to give the feeling of companionship to users. If someone is feeling alone or live alone they can use them. But that does not mean that they can replace human companionship because after some point he/she might need a human figure to talk things out. When he/she has access to these artifacts and to use them the user is required to give certain information. In these modern times when you put your information online, it always comes with having some concerns abouts privacy.

8.4 Anxiety in Future

As I discussed in the start that there was a time when people do not talk about anxiety and do not consider it a serious mental health issue but as time has progressed and people now have awareness about it. So 50 years from now I am hoping for the world and the society to be more acceptable towards it. There will be no gender biasness when dealing with mental health related problems. Hopefully, it can be added in curriculum so that students at young age are taught about it and whenever they experience something they will have knowledge about it how to deal with it. Therapist will be using technology and in cooperating it with their practice, people have access to online consultations they do not have to take appointment and then wait for it, they can get help in their comfort zone. I do not see anxiety going away any time soon as technology advances, thus the world should be more acceptable towards it and normalize it.

Chapter 9

Conclusion and Future Work

Anxiety is something everyone goes through occasionally and everyone has a different way of dealing with it. Some people choose to be with someone the feel comfortable with and knows they are safe in their company. There are people who quarantine themselves and seek for shelter in technology. Fortunately, we are living in the time where technology can provide us the help we need. If someone is alone and need some to talk to they can use digital assistants for communication or platforms where you can talk to someone. If someone had a bad day they can do yoga/meditation with mobile applications. As these days where most people have access to technology they can get the best out of it. With the progress in technology I am certain that in future people will be dealing with anxiety differently. Maybe everyone has their own personal assistant who will help in coping with anxiety, having robotic pets to play with whenever you are feeling anxious or to have access to your therapist's consultation via hologram.

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Appendix A

Declaration of Consent

I _____, declare that I voluntarily agree to participate in this research study.

I declare that:

1. I am aged 18 years or older and my participation in this interview is voluntary.
2. I have been fully briefed on the nature of the study and I have read the information sheet explaining the research project and my role in this project.
3. I have full knowledge of how the information collected will be used.
4. I fully understand that this interview is conducted to gather information for academic work.
5. I fully understand that there is no obligation on me to participate in this study.
6. I fully understand that if I have the right to decline to answer any question or to end the interview without having to explain or give a reason.
7. I am also entitled to full confidentiality in terms of my participation and my personal details.
8. I have had sufficient time to read and consider this consent form.
9. I have had the opportunity to ask any questions related to this study, and any additional details I wanted.
10. I understand my personal details will not be revealed to people outside of this project.
11. I have read and understand the explanation provided to me.
12. I have been given a copy of this consent form.

I wish to check over all the data extracted from the interview to ensure that I am happy with its content (If yes the data will be sent to you and you have a week to review it).

- ❑ Yes
- ❑ No

Participant Signature _____ Date: _____

Master Thesis

CONFIRMATION

Hereby I confirm that I have composed the present thesis independently. I only have used the sources and means specified in this thesis. Especially from the internet, I only have used the denoted references. I have taken note of the section in the examination regulations concerning attempts to cheat.

I confirm that the electronic version of the thesis which I deliver is identical to the printed version with respect to the content. I agree that an electronic version of the thesis will be stored for purposes of inspection of plagiarism.

_____ _____

Date Signature