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MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

„FiGHT: A (Web page) Quiz that Will Improve Communication between the Doctors and Adolescents Suffering from Eating Disorders and Distorted Perceptions of Beauty“

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Abstract

The master's thesis aims to find ways of facilitating and improving work in the healthcare system by assisting doctors in communicating with patients and providing care to those individuals who require it. The emergence of social networks in society has imposed the imperative that young people look physically appealing. Consequently, eating disorders and psychological problems have occurred among the young population. On discussing the matter with doctors, I have concluded that there is also a language barrier since the patients do not always speak German and cannot effectively communicate the problem they are experiencing. The aim of this master's thesis is to create a webpage (quiz) that would enhance the interaction between doctors and patients between 10 and 18 years old. The FiGHT Webpage is a quiz that contains a range of task types that have been designed in collaboration with the doctors employed at the University Hospital AKH Vienna. The quiz has been designed in such a way that the patients are expected to give honest answers about themselves through play. The answers are saved anonymously in a database that is accessible only to doctors. By analyzing the responses, doctors can give a diagnosis and see how the therapy with patients is progressing. With regard to the specific contributions and innovations of this thesis and the software, the website has been constructed in such a manner that it enables them to deal with negative health trends more easily while playing a game. Solving their problems gives them an opportunity to feel better and realize that their dissatisfaction stems from an unrealistic idealization of the human body. The communication between the patients and the doctors is more efficient as they are reluctant to discuss sensitive topics that can burden them heavily. The patients are given the option of checking the questions they do not know online, instead of having to communicate face to face. This kind of approach relieves them of unnecessary stress and improves communication. When it comes to the novelties, before any work on this topic and website was conducted, the author had done research into whether there is a similar type of website in Austria that would help young people deal with problems of anorexia in such a way. It was concluded that there was nothing in existence of such nature, which encouraged the author to proceed in the direction of making the website. The website is intended for users primarily from German-speaking countries, such as Austria and Germany. The results indicate that the participants who took part in the usability test overall had a very positive attitude and experience when using the webpage. What remains to be done is to offer this software to health institutions in Austria and Germany and see what kind of response it will get from the patients, doctors, and relevant health institutions.

Zusammenfassung

Ziel der Masterarbeit ist es, Wege zu finden, um die Arbeit im Gesundheitssystem zu erleichtern und zu verbessern, indem Ärzte bei der Kommunikation mit Patienten und der Betreuung von Personen, die dies benötigen, unterstützt werden. Das Aufkommen sozialer Netzwerke in der Gesellschaft hat dazu geführt, dass junge Menschen körperlich ansprechend aussehen müssen. Infolgedessen, kam es bei der jungen Bevölkerung zu Essstörungen und psychischen Problemen. Im Gespräch mit Ärzten bin ich zu dem Schluss gekommen, dass es auch eine Sprachbarriere gibt, da die Patienten nicht immer Deutsch sprechen und ihr Problem nicht effektiv kommunizieren können. Das Ziel dieser Masterarbeit ist die Erstellung einer Webseite (Quiz), die die Interaktion zwischen Ärzten und Patienten zwischen 10 und 18 Jahren erleichtert soll. Die FiGHT- Webseite ist ein Quiz, das eine Reihe von Aufgabentypen enthält, die in Zusammenarbeit mit den an der Universitätsklinik AKH Wien beschäftigten Ärzten entwickelt wurden. Das Quiz ist so konzipiert, dass die Patienten spielerisch ehrliche Antworten über sich selbst geben sollen. Die Antworten werden anonym in einer Datenbank gespeichert, die nur für Ärzte zugänglich ist. Durch die Analyse der Antworten können die Ärzte eine Diagnose stellen und sehen, wie die Therapie mit den Patienten verläuft. Im Hinblick auf die spezifischen Beiträge und Innovationen dieser Arbeit und der Software wurde die Website so konzipiert, dass sie es Patienten ermöglicht, beim Spielen einfacher mit negativen Gesundheitstrends umzugehen. Die Lösung ihrer Probleme gibt ihnen die Möglichkeit, sich besser zu fühlen und zu erkennen, dass ihre Unzufriedenheit auf eine unrealistische Idealisierung des menschlichen Körpers zurückzuführen ist. Die Kommunikation zwischen Patienten und Ärzten ist effizienter, da sensible Themen, die sie stark belasten könnten, nur ungern besprochen werden. Den Patienten wird die Möglichkeit gegeben, Fragen, die sie nicht kennen, online zu prüfen, anstatt persönlich kommunizieren zu müssen. Diese Vorgehensweise entlastet sie von unnötigem Stress und verbessert die Kommunikation. Was die Neuheiten betrifft, die Autorin hat vor der Arbeit an diesem Thema und dieser Website recherchiert, ob es in Österreich schon eine ähnliche Art von Website gibt, dabei anderen helfen kann, mit Magersuchtproblemen umzugehen. Es wurde festgestellt, dass nichts Derartiges existierte, was den Autor dazu ermutigte, mit der Erstellung der Website fortzufahren. Die Website richtet sich an Nutzerinnen und Nutzer vor allem aus dem deutschsprachigen Ländern wie Österreich und Deutschland.Die Ergebnisse zeigen, dass die Teilnehmer des Usability-Tests insgesamt eine sehr positive Einstellung und Erfahrung bei der Nutzung der Website hatten. Was noch zu tun bleibt, ist, diese Sofware den Gesundheitseinrichtungen in Österreich und Deutschland anzubieten und zu sehen, wie sie bei den Patenten, Ärzten und den betreffenden Gesundheitseinrichtungen ankommt.

Foreword

As we are witnessing the digital age unfolding in our time, it is becoming increasingly apparent that technology holds the key to introducing positive changes. The FiGHT quiz emerges as an embodiment of such potential—a virtual bridge between young minds seeking solace and guidance, and the medical community striving to provide the best possible care. Its conception and execution underscore the dedication to addressing real-world issues with compassion and creativity. Hopefully, this work can serve as a source of inspiration for researchers, practitioners, and all those invested in utilizing technology for the betterment of healthcare communication and the well-being of our youth. Many thanks go to my parents, Zarko and Olivera, who have supported me since the beginning of my school and university career. I owe my discipline and my success to them. I would particularly like to thank Univ.-Prof. Dipl. -Ing. Dr. Helmut Hlavacs, my supervisor. With his support and enormous commitment, I have achieved my goal. Thank you, Professor! Many thanks also to Mag. Dr. Anna Alexandra Felnhofer, Mag. Dr. Oswald David Kothgassner, and Miss Stéphanie Galliez for their great help in making this project look this good both visually and in terms of content.

Contents

1 Introduction

The technological advancement of society has enabled a great number of sectors to benefit. Since the thesis at hand deals with the field of medicine, it should be noted that a large body of literature has already been dedicated to the analysis of how computer technology has aided the healthcare system. The process of communication between the doctor and the patient can significantly improve if done remotely and a computerized approach can help patients discover what their diagnosis is, as well as the manner in which the patients should proceed with the treatment. The communication between the patients and health institutions can often be automated as a result of using algorithms that help accelerate the process. [4] Computer technology could have a number of different applications in the field of medicine. Cardiology, pulmonary medicine, endocrinology, nephrology, gastroenterology, and neurology are already benefiting immensely from the use of technology as the doctors can have a better insight into the history and genesis of the illnesses that the patients are suffering from. New technologies could also be instrumental in preventing diseases from occurring. [5]

A critical issue that needs to be addressed within the medical field is the fact that eating disorders are becoming a pressing problem in society and that they are being induced by the unrealistic standards set by social media. The distorted image of beauty imposed from the outside can have a destructive impact on the levels of self-esteem of women [43]. Moreover, Instagram in particular has a negative effect on young girls' appreciation of their bodies [34]. Even more specifically, a large body of literature suggests that eating disorders among teenage girls are correlated with their interaction with Instagram and celebrities online [48].

Another crucial aspect of the mentioned problem of eating disorders lies in the fact that the young people who are suffering from such diseases are not willing to share these problems with their doctors, or are simply not motivated to do so [10]. There are often communication problems between young patients and doctors when it comes to sensitive topics in their lives [26].

In addition, one must bear in mind the intercultural nature of Austrian society and the potential problems that can consequently occur. One such issue pertains to the linguistic barrier that exists among patients as they cannot always express themselves appropriately or they do not understand the questions posed to them by the medical staff. Knowing how important it is to fully comprehend the instructions being given to the patients, it is of utmost importance to eliminate such obstacles. Complications can arise

if miscommunication happens and certain authors call for translation tools to be applied. [1] Some would even argue that there is a necessity to use the same language to establish a good relationship with the patients [17] [39]. Although a more thorough discussion of the specific problems that teenagers are facing will follow in the paragraphs that are to come, along with the suggested solution to the described issues, a short explanation of the proposed website and quiz will briefly be laid out.

Namely, the aim of the website and quiz is to help either completely eliminate the emotional burdens suffered by these young adults or at least start a positive process in the teenagers and help them realize that the solution comes from changing their perception and ignoring the falsely construed image imposed by the media, influencers and other users who post filtered and photo-shopped pictures of unattainable and unrealistic body figures. What the website is trying to offer is valid information about the majority of body types that are all inherent to people and are completely acceptable.

The concept of the quiz is such that the users are practically playing a game in which they are answering questions and getting feedback so that they can learn the facts about the human body and test their knowledge regarding whether their own body is what is considered normal. While playing the game, the teenagers have the opportunity to see a number of pictures of body types that they can identify with and feel a sense of relief and comfort knowing that they are not the only ones dealing with certain bodily problems but that there are others who are in a similar position to them. In this activity of answering questions, the users can feel at ease since the game is anonymous, and the insecurities they might be having stay within the confines of the virtual world. Overall, giving the users knowledge and reassuring them that they are not alone and that their problem is actually far less significant than they thought is what the website and quiz are intended to do.

2 The Problems of Teenagers

Teenagers tend to be a sensitive group of individuals who are distinctly peculiar when it comes to their behavior. They are easily influenced by others and can fall victim to advertisements, theories, and trends due to their lack of experience, and, even more importantly, their pursuit of acceptance in society and unstable emotional state. Since they are at an age where their physical features are changing, they are particularly obsessed with reaching goals in terms of physical beauty and they tend to feel dissatisfied with the

disproportion of their bodily features. The sections that follow will delve into some of the complications that teenagers can experience in their interaction with social media and the further addressing of their health problems. [31]

Although social media cover a wide range of platforms that can be said to have a certain effect on young people's lives, it should be noted that the most dominant and relevant ones that impact their lives are Instagram and TikTok, especially with regard to health problems pertaining to anorexia. Research was conducted regarding the influence of exposing young girls to images of thin and beautiful girls. It found that those participants who were exposed to such images felt more dissatisfied with their bodies and were more willing to subject themselves to food deprivation. [12]

Moreover, the Covid-19 restrictions and lockdown led to the massive exposure of children and adolescents to social networks among which TikTok is the most prevalent one, and within that period, when consumers were heavily engaged in watching the content, there was a rise in the presence of anorexia among young people. [37]

There is also a problem of another extreme that often goes hand in hand with the previous one. It has to do with orthorexia, which implies the intense urge to consume healthy food (such as fruit and vegetables) and an obsessive lifestyle that involves excessive exertion of the body to physical exercise, which can lead to burnout and malnutrition. [47]

There are numerous reasons why the communication between the patients and doctors can be problematic and result in a breakdown. Patients often have doubts regarding whether they should disclose information about their health problems due to a lack of trust. Namely, most of them fear that the information they share will circulate among other staff members or that other individuals will get hold of sensitive details. [9] [15]

Furthermore, the patients feel that they are stigmatized because of the prejudice there is towards them and they feel responsible for the situation they have found themselves in [10]. Those who suffer from eating disorders often feel that they are being judged by their relatives and friends for not being genuinely sick, and they are consequently less open to the idea of discussing their health and mental issues with their surroundings, including medical staff [29].

Certain obstacles may occur in the communication process between the patient and the client as a result of numerous factors of which language can be critical. However, the lack of linguistic competence does not necessarily have to be the sole reason why issues may arise. Namely, the reasons can also be connected to coming from a different cultural setting, which implies having opposing values and beliefs and feeling discriminated against. [11]

It is important to opt for telemedicine in cases when the physicians and patients do not share the same language or if the patients do not use the local language at a proficient level. Telemedicine could be an effective means of overcoming a severe problem that could potentially have consequences. It is also important to train the medical staff to use language tools that could aid them in providing adequate advice. [44] Based on the conducted research, it is even possible to achieve better results in the treatment and recovery process of patients if there are no linguistic barriers [33].

3 The FiGHT Quiz as a Means of Overcoming the Problem

As it has been laid out in the previous sections of the paper, there is a negative new trend among teenagers and adolescents concerning eating disorders. Suffering from anorexia and similar health conditions has been brought about mainly owing to the presence of social media and the unrealistic and unattainable standards of beauty that they are promoting. The aforementioned research has shown that images and videos posted primarily on Instagram and TikTok have caused a great number of young individuals to experience high levels of dissatisfaction with their bodies and physical appearance. These young patients often feel uneasy about sharing their problems with doctors or are simply unmotivated to deal with their problems proactively. In instances of immigrants, they fail to communicate their problems to the medical personnel for linguistic reasons.

This is where the FiGHT quiz can be instrumental as it addresses all the aspects of the problem and recognizes some of the burning issues of modern-day society. Since the FiGHT quiz is entirely anonymous, the users can overcome their fear of dealing with the problem as nobody knows who is giving the answers to the questions. Through a series of questions that the patients get, they are reassured and taught that they should feel positive about their bodies and have a sense of self-worth. The quiz helps them feel more at ease and encourages them to continue the process of dealing with problems and realizing that they are not alone. The quiz contains written questions tailored to the needs of those users who would have problems speaking to doctors in German as they can always check the meaning of the words/sentences they are not familiar with. The user-friendly and appealing design of the quiz also makes it compelling for young users to engage and keep going toward overcoming their health problems.

3.1 The Quiz Features

Moving on to the more specific features of the quiz, it should be noted that the main idea behind the application is to facilitate the communication between adolescents and doctors and to motivate the patients to feel better. In addition, through the game, they can reduce their worries about their problem and give doctors answers to questions that they might be embarrassed to answer in person.

Each user will receive a unique username and password from the doctor to log into the website. This guarantees that everything is anonymous and that only the patient and the doctor have access to data and answers from the user. When the patients log in (see Figure 1), there is a menu on the left side where they can see the number of points obtained up until that stage, but they also have the opportunity to see which module they are currently on (see Figure 2 and Figure 3).

The website consists of 2 different modules (*the Grundmodul and the Vertiefungsmodul*) and for each module there are carefully structured questions. The questions have been structured together with the doctors from the AKH Hospital and consist of ordinary multiple choice questions, input fields (where something needs to be selected, colored, or just entered as a text), selection questions, slider questions, memory games, time questions and motivation messages.

The first section of the *Basic Module* is called the *Basic Quiz* and it mostly contains multiple-choice questions. When it comes to such question types (see Figure 4), it should be noted that they are a fairly traditional and standard type of assessing the factual knowledge of individuals. The reason why this way of estimating their knowledge was chosen for the very beginning was to keep them in their comfort zone and gradually work towards a more entertaining approach. The questions inquire about the meaning of self-worth and self-concept, which the patients are expected to match with the corresponding definitions. They are occasionally provided with explanations and reminders on what they need to internalize with regard to the key concepts in the field. The questions are intended to be purely theoretical, but they are rather placed in different contexts that would make them more aware of what they actually stand for and what kind of interaction they have had with them to date, as well as how to observe them in the future and improve their view on life. Overall, the test provides accurate information and questions related to self-concept and self-esteem. It effectively assesses the understanding of these concepts and their implications.

The quiz addresses the concept of an inner critic and explores the impact

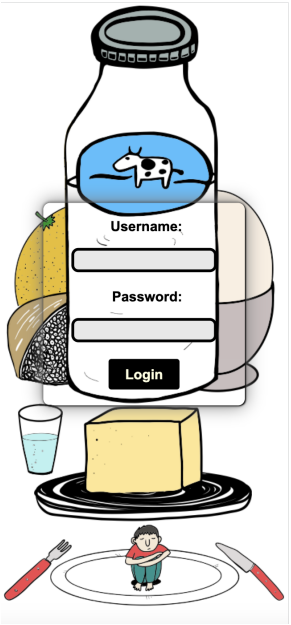

Figure 1: The login page

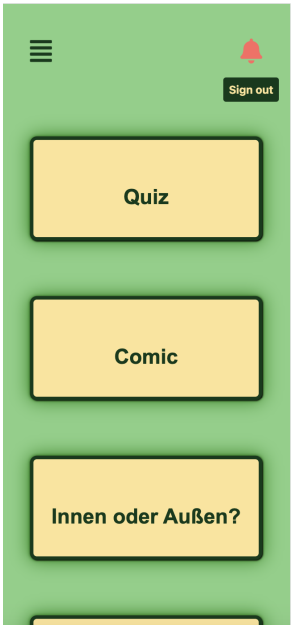

Figure 2: The menu

Figure 3: The sidebar

of unattainable beliefs on self-esteem. It could be argued that it provides relevant explanations for these psychological phenomena. The first part of the quiz starts by introducing the students to the overall idea of the quiz and what it will be focusing on. The author of the quiz goes on the say that the question *Who am I and what am I worth?* is an issue that every person needs to come to terms with at some point in their life. She explains to the patients that the way in which they answer such a question is in correlation with how comfortable they feel with themselves, how well they handle themselves and others, and even how successful they are in school or in their careers.

She also explains that the quiz itself is not so tolerant when it comes to the variety of answers as there is only one correct answer each time. In the further questions, the quiz enquires about the meaning of self-worth (with the possible options of *This is the value assigned to you by other people. This is the value you assign to yourself. This is the intrinsic value every person has. This is the value you hold for other people)* which she distinguishes from self-concept (*This is the knowledge one has about oneself. This is the knowledge that other people have about oneself. Self-concept is the same*

as self-esteem. This is the evaluation of one's own person) by providing a separate explanation of the two concepts and stating that the self-concept (or self-image) encompasses everything we know about ourselves (e.g., *How do I look? What am I good at? What qualities do I possess?*), while self-esteem, on the other hand, arises from the evaluation of these qualities (i.e., *Do I believe that I look good? or Am I worthless?*). She later goes on to say that the question of *How do I look?* pertains to one's self-image and is part of understanding one's self-concept, as it relates to physical appearance. The quiz subsequently tries to bring to our attention the fact that self-esteem, on the other hand, arises from the evaluation of these qualities (*Do I think I look good? or Do I feel worthless?*).

The quiz further clarifies that we have knowledge about various aspects of ourselves and evaluate them. The quiz enquires about the three main areas in which self-concept and self-esteem are divided. The author also sheds light on how these two concepts function in reality and goes on to assert that all individuals possess the notion of how they are in school (or at work) (self-concept) and how they evaluate their performance accordingly. Thus, they may believe that they are not good at math but excel at learning foreign languages. Similarly, different individuals have an idea about their body (appearance, athleticism, dexterity, etc.) and assess it. The social role and social relationships (friendships, partnerships) also play a role in this estimation of who people are. The quiz additionally states that the self-esteem of various individuals is influenced by a number of diverse circumstances and that these determine whether our self-esteem is high or low. The patients are inquired about what these factors are for them. In an attempt to clarify the two main concepts and what they largely depend on, the quiz provides an explanation that self-concept (self-knowledge) and self-esteem (self-evaluation) are primarily influenced by three things: comparisons with others (*What are others doing better than us?*), self-observation (*What have we achieved better in the past?*), and feedback from other people (*What grade are we receiving in math?*). In addition to asking about the veracity of a number of statements, the quiz further provides a clarification of the reason why teenagers typically have lower self-esteem during puberty compared to children (at the elementary school age). It is stated that this issue is in relation to many physical changes that come with puberty. Furthermore, it follows that teenagers are confronted with the challenge of developing their own identity (Who am I?) and that all of these factors can lead to a temporary decrease in self-esteem.

The quiz later asks the patients about the causes of low self-esteem as it is a well-known fact that they feel worthless and evaluate themselves ex-

tremely negatively. An explanation of the matter follows which states that some negative experiences (e.g., receiving negative feedback or unkind comments from classmates) can temporarily lower the self-esteem of these young individuals. However, it is permanently reduced by recurring negative experiences, highly traumatic events, or even illnesses. On the other hand, the quiz also asks the patients to consider the consequences of what low self-esteem can have on their mental well-being and provides clarification of the matter. The consequences of persistently low self-esteem can be severe and they can range from fear of failure and social withdrawal to depression. Moreover, almost all mental disorders are accompanied by self-esteem problems. Interestingly enough, the quiz attempts to contrast the situation in which self-esteem is low and asks about what consequences high levels of this trait have. Once the patients have provided their answers to these questions, they are given further information on the benefits that self-esteem can have on them. As the quiz claims, consistently high levels of this quality can provide us with protection. Possessing this characteristic can enhance the overall well-being of young individuals, life satisfaction, and even their health. Moreover, what can be concluded is that it aids in achieving success in life overall. The quiz also makes a point about the fact that certain individuals tend to have in them a so-called *inner critic* and it inquires about the functions of such a mechanism. The explanation that follows about the inner critic is that possessing a severe version of this trait is a genuine nuisance. It is considered an inner voice that consistently focuses on one's weaknesses, mistakes, and failures. Having this trait can lead to hindering one from celebrating successes and accepting compliments. Moreover, it prompts a person to continually collect evidence in their everyday life to confirm the belief that they are genuinely unattractive, incapable, and worthless. People with low self-esteem have strict beliefs that guide their thinking, feelings, and actions. These beliefs are often unattainable. The quiz asks about which of the statements could be such a belief. A further clarification states the troubling aspect of such generalized beliefs is their unattainability (everyone makes a mistake at some point). This means that a person who holds these beliefs can only experience failure and, as a result, feel worthless. The troubling aspect of having generalized beliefs is their unattainability (everyone makes a mistake at some point). This means that a person who holds such beliefs can only experience failure and, as a result, feel worthless. On completing this section, the patients are told to provide their feedback on the task and if there is anything they particularly liked or something that could be improved. However, this question is in the form of a gap in which the patients are expected to write their answers. It should be

noted that all the questions contain certain explanations, which are referred to as explanation questions (see Figure 11).

As the previous paragraphs have suggested, the image of self-esteem and self-value is exploited in this section of the quiz. This topic is of great significance within the theoretical framework that the thesis is dealing with and is in line with different authors who point out that as a result of being exposed to different kinds of social media and images, the patients' self-esteem and satisfaction with their bodies and themselves as human beings is greatly jeopardized, regardless of the category of society they belong to [34] [48] [43]. The images that they are exposed to are able to render them defenseless as they start to believe that they have no value, which is what the mentioned authors point out.

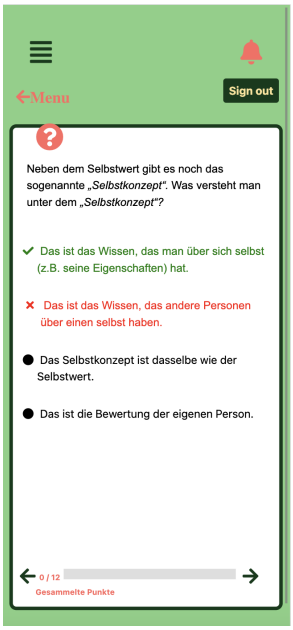

Figure 4: A multiple-choice question

Figure 5: Selection question 1

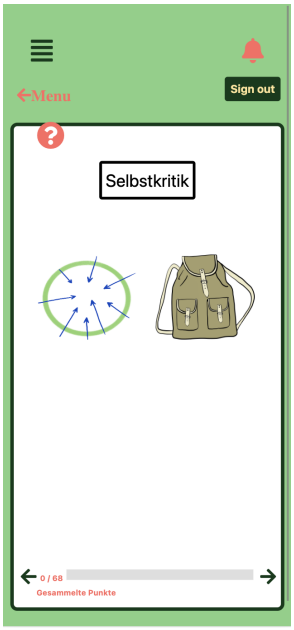

Figure 6: Selection question 2

The next section of the *Basic Module* is referred to as Comic and it contains the selection question type (see Figure 5) that is very common and an integral part of the quiz itself. The question at hand is particularly interesting as it asks the patients to choose the appropriate image once they have been asked a certain question. The pictures they are expected to click

on have been made in the form of a comic and they have an appealing style that makes the game more authentic and less conventional. The whole section has been made using a combination of textual questions, while the answers are in the form of pictures. By clicking on the appropriate one, the patients are assigned points, while opting for the incorrect one is signaled by showing them a red picture frame and textual message that they have committed an error. The patients are asked on a number of occasions to decide how certain people would react in different contexts if their levels of self-esteem were high or low and how this would be perceived by the people who they are interacting with. The users of the application are challenged to think about hypothetical situations that make them consider the importance of self-esteem and encourage them to change their mindset in a positive direction. This section of the quiz starts with an introductory part informing the students what is ahead of them. They are told that they see a comic that depicts a group of students rehearsing for a performance. The story has three different outcomes depending on whether the main character has too low, appropriate, or excessive self-esteem. They are asked to decide on their own how it continues at the respective points. In one of the first questions, the patients are asked about how XY would react if he/she had too low self-esteem. They are also asked how the play would be received by the audience in case the actors had low self-esteem. They are subsequently asked to decide on how classmates would respond to their classmates having an excessively high level of self-esteem.

Similarly to the previous question, the focal thematic point of this section is again their self-esteem, which the covered literature has tried to address on numerous occasions. In line with the mentioned authors [34][48][43], problems of believing in themselves are something that a great number of these patients are suffering from. The approach of the author of the thesis was to encourage them to think logically and come to the obvious conclusion that individuals who lack self-confidence will not do well in life i.e. the tasks that they need to perform daily will suffer as a result and that the environment will be able to sense it, which will additionally impact them negatively. What can also be identified when analyzing this section of the quiz is the fact that it has been personalized to suit the preferences of a younger target audience. The entertaining and youthful design makes it appealing for patients who might associate it with playing games, which is theoretically in according with the personalization approach [21] [13].

In the questions termed *Inside or Outside*, the patients are asked to select either a circle or backpack that represent the ideas of inwardness and externality. This is another instance of the selection question (see Figure 6).

In other words, a number of different ideas (concepts/factors) were rated in light of the type of impact they have on self-esteem. Although the concept of the game is different, the selection type of the question was utilized as well as with the previous question. This game is quite abstract and requires a slightly deeper and more serious analysis of the relationship between self-esteem and a variety of other factors inherent in our daily lives. At the very beginning, the quiz informs us that they will display various potential problems and that we can either assign them to the circle or the backpack (by clicking on the image). Choosing the circle indicates that this problem affects self-esteem from within. Clicking on the backpack means that it does not have an internal impact on self-esteem. The concepts that need to be clicked on are the following:

1. *self-criticism,*
2. *punishment,*
3. *exclusion,*
4. *physical illness,*
5. *adverse life events,*
6. *loss of a close family member,*
7. *defeats,*
8. *negative life events,*
9. *negatives self-image,*
10. *physical violence,*
11. *negative relationship experience,*
12. *mobbing*
13. *negative attitude,*
14. *traumas,*
15. *unrealistic goals,*
16. *mental illness,*
17. *exaggerated ideal self,*
18. *self-deprecation,*
19. *criticism from others,*
20. *general principles,*
21. *psychological abuse,*

22. *fears,*
23. *comparisons with others.*

Once they have made their selection of items (concepts) accordingly, the quiz moves on to say that on the next pages, it will display various potential problems and that they can again assign them to the circle or the backpack (by clicking on the image). Choosing the circle indicates that this problem affects self-esteem from the outside and clicking on the backpack means that it does not have an external impact on self-esteem. The last section of this quiz gives similar instructions and tells them that when they click on the image with the circle below the sentence, it means that the sentence affects their self-esteem. Clicking on the backpack means that the sentence has no influence on their self-esteem.

In an attempt to solidify the importance of self-esteem in one's life, factors are listed to show what exactly can have a negative impact on our belief in ourselves. Among other things, comparisons with others, negative attitudes, unrealistic goals, self-deprecation and criticism of others are all tightly intertwined with social networks that try to impose values by emphasizing idealized pictures of people that do not bear a genuine resemblance to reality [31].

In the next section of the quiz called *Beliefs*, which also contains selection questions (see Figure 6), the patients are supposed to identify all the beliefs that have an impact on self-esteem and establish whether they have it or not. In those cases when they would recognize that they do not have it, they were expected to select the monster and feed it with this negative trait, but in those cases when they could not identify with a certain belief, they were expected to click on the backpack. This part of the quiz was created in order to make the patients consider whether they hold onto negative beliefs and to perform a self-analysis and gain a better understanding of themselves. As the quiz states, generalizing beliefs partly guides our thinking and actions. In general, they provide us with orientation, but some of them can also harm our self-esteem. They further instruct us that if we continue flipping through, we will find some of these harmful beliefs. We need to choose the ones we recognize in ourselves (i.e., the ones we also apply) and feed them to the monster. This will help us eliminate these beliefs. Those we do not apply ourselves, we can put in the backpack. The beliefs that the patients are expected to analyze are as follows:

1. *Just don't stand out.*
2. *I'm incapable.*

3. *Life is complicated.*
4. *I don't deserve this.*
5. *Girls must be obedient.*
6. *I don't stand a chance anyway.*
7. *Beauty is pain.*
8. *Everyone is better than me.*
9. *I'm always unlucky.*
10. *No pain, no gain.*
11. *Your worth is determined by the number of friends you have.*
12. *I can't say no.*
13. *Only the beautiful have friends.*
14. *You don't get anything for free in life.*
15. *I don't deserve to be loved.*
16. *Only those who make no mistakes are valuable.*
17. *Women are weak.*
18. *I'm ugly.*
19. *Everyone is smarter than me.*
20. *You have to work hard for money.*

This section of the quiz is intended to try to make the patients realize to what extent they have become sucked into the negative trend imposed by social media that has paralyzed them. The essence lies in identifying this negative trend in them and trying to change it. Throughout this section, what seems to be a dominant strategy of trying to assist the patients is the health belief method [34] [24]. Instead of trying to explicitly urge the patients to immediately revert to a different lifestyle by altering the principles they adhere to, the patients are instructed by asking them questions that are negative and that are expected to slowly change their perception and distance them from a negative mindset that has been burdening them.

Another section of the quiz called *Self-Instructions* also contains selection-type questions (see Figure 6) but in a slightly different way. In this case, it is no longer about concepts but rather sentences. The patients are asked to select three positive sentences that are helpful to them. If they click on the backpack under the sentence, it means that the sentence is suitable for them. In the continuation of the task, they have an alarm clock and they

are requested to enter the time at which they would like to repeat these sentences to themselves. The instructions that are intended to be verbalized by the patients themselves on a regular basis are as follows:

1. *I look good.*
2. *I can do so much!*
3. *I am valuable!*
4. *I am worth being loved!*
5. *I take care of myself!*
6. *I'm proud of everything I've achieved so far!*
7. *I can be proud of myself! I look out for myself!*
8. *I think highly of myself!*
9. *I consider myself!*
10. *I have all the opportunities!*
11. *I think I'm great!*
12. *There's only one of me!*
13. *I like myself as I am!*
14. *I like my body!*
15. *I believe in myself!*
16. *I'm special!*
17. *I am lovable!*

This section is the first concrete stage that is recommended to the patients. Rather than edifying them on the subject and trying to change their theoretical outlook on the situation, the quiz tries to offer specific solutions that would help them boost their confidence and assist them in resolving the problem they are facing. The instructions they are told to say to themselves are in accordance with the nudging theory since answering them encourages developing a positive mindset that they need to incorporate into their lives. It could also be said that the social learning theory is utilized to bring the patients closer to a way of thinking that will benefit them. If they start taking these instructions seriously, they could benefit greatly in terms of their self-confidence and feeling of satisfaction. [40] [19] [46]

In the section of the quiz called *A Question of Comparison*, the patients are asked to provide their own answers (opinions). They are told to write down for three days what or who they compare themselves to. They are

also asked whether these people are mostly worse or better than them. The instructions they are supposed to complete are the following:

1. *I compare myself to...*
2. *This is me: I compare myself to...*
3. *How I feel afterward: very good and very bad.*

The question type that is dominant within this section is the slider question (see Figure 7).

As comparisons with online celebrities are at the heart of the subject matter, the intention of the author of the thesis and quiz was to bring this fact to their attention very clearly. The patients needed to be made aware of the adverse effects of making comparisons with people whose pictures were filtered and unrealistic and that this is generally a detrimental habit that could only harm them [16] [18] [19].

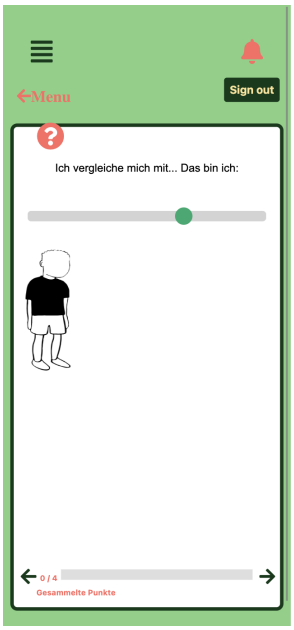

Figure 7: Slider question

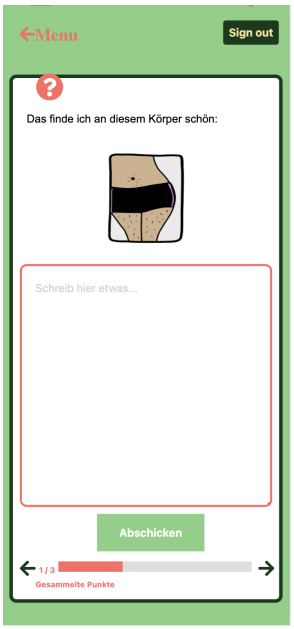

Figure 8: Input field question

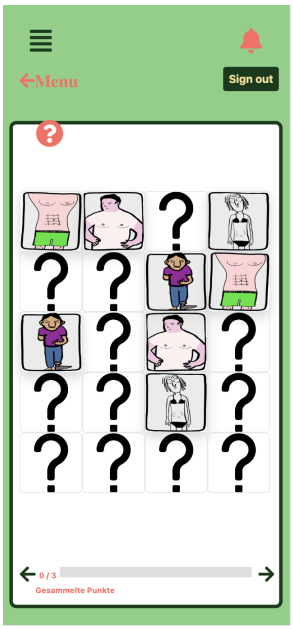

Figure 9: Game memory question

In the *In-Depth Module*, the patients are also asked to write their thoughts on a number of topics. The first section of this part of the quiz pertains to their body, which is referred to as *My Body*. This section is more engaging

as it asks them to participate more actively, rather than purely theoretically. They are asked to quickly stand in front of a mirror where they can see their entire body. They are instructed to look at themselves consciously from head to toe, perceive their body, and then answer the questions. Later on, they are instructed to write about what they notice about their body when looking into the mirror. On completing this task, they are asked to provide a response to which body parts they intentionally pay little attention to. In a similar fashion, they are asked to comment on what they find annoying about their body as well as what they find appealing about it. In addition, they are asked to give their view on the body part that they do not particularly care about. Further in the quiz, they are instructed to find something positive about the annoying traits that they had identified beforehand. In order to clarify the instructions, the quiz provides an example:

1. *What I find annoying about my body: My nose is huge.*
2. *What I find beautiful: My nose has many freckles.*

The quiz instructs the patients to tell themselves that their nose is unique because it has many freckles. Finally, within the same exercise, the quiz tells the patients to write positive feedback for themselves and say it at least once a day. As the respondents are urged to write their answers in the form of sentences (explanations) of their own opinions, the types of questions that are present within this section are input field questions (see Figure 8).

The manner in which the patients are encouraged to change their perception of themselves is conducted in accordance with the nudging and social learning technique as they are instructed on how to improve themselves through positive stimuli [40] [19] [46].

The next part of the quiz is called *Body Memory* and mostly contains questions that are intended to provide entertainment to the patients, although this is not their sole purpose. The intention is obviously to teach them new things about the subject matter, merely in a more visual manner. At the very beginning of this section of the quiz, they are told that every human body is unique. Most media representations of bodies showcase ideals (young, slim, athletic, and fair-skinned people). However, bodies can come in many different shapes and be beautiful in their own way. The quiz invites the patients to play the memory game and discover how many different bodies there are. Naturally, the question type that is present within this section is the memory game question (see Figure 8). Once they have played the game and found out about the variety of body types, they are told that they have now familiarized themselves with the different bodies

and are asked to choose one from the memory pictures and write what is beautiful about it, which would again imply that they need to complete an input field question (see Figure 8).

The patients are asked to come to terms with their bodies and find a way to overcome dissatisfaction by focusing on the positive aspects of it in the hope of encouraging them to see that things are not how they are being presented to them. What was also attempted was to make the game more enticing by introducing questions that are gamified and that make the whole process of completion more enjoyable and not merely monotonous [7] [32]. It could also be added that the personalization technique was utilized in creating this section of the quiz as the patients played a game that was in line with their age and special focus was placed on the entertainment aspect, which is an essential component for making them identify with the content [21] [22].

The section of the quiz called *Self-Presentation* is another one that deals with questions that are selective in nature (see Figure 6). The quiz tells the patients that the way people present themselves and their bodies online does not often correspond to the truth and that image editing software helps in transforming an appearance that is perceived as imperfect into an ideal one. They are told that on the next page, they will find some examples of altered or enhanced self-presentations. Interestingly enough, they are urged to select the ones they have applied to themselves before. Once they have marked the picture that reflects their own actions in the past such as filtering the pictures in such a way that they show more muscles on a person's body, creating a prettier face or a slimmer figure, they are told that the quiz has prepared a challenge for them. As part of the body-positivity movement, more and more people dare to post unedited pictures and present themselves as they are. Furthermore, the text goes on to say that on the next page, they will see some examples of body-positivity representations on social networks and that they need to choose one and try it for themselves.

This section of the quiz is trying to make the students more at ease with themselves as they are already suffering from a number of oppressing factors [31] [12] [29] [37]. This is why they are encouraged to go beyond the barriers and are told to be open to posting real pictures of themselves i.e. to join a growing community of people that have decided to do the same. In addition, it could be said that the nudging technique was used to construct this section of the game as the patients are told to follow the positive trend of not being afraid to embrace their real physical appearance and to feel free to post pictures of themselves, without feeling embarrassed [40] [46].

The type of question that will be addressed is called *Body Posture* and

obviously has to do with exercises in which the patients are expected to actively assume different positions/postures within a time restriction. In other words, the type of question that they are dealing with in this exercise is a timer question (see Figure 10). The instructions of the quiz state that their body has an influence on how they feel and goes on to say that they have prepared 10 different body postures for them. The quiz instructs them to take each of the postures for as long as the timer is set and try to feel deeply what the postures evoke in them. On completing these physical activities, they are urged to pause and reflect on how the exercise went for them. The instructions further tell them that once they have experienced different body postures they should consider which one benefited them the most and for what reason. They are asked to choose from the ones they have tried and that they want to consciously adopt more often in their daily life, which is again a selection question (see Figure 6). They are further asked to write down why they have selected that particular posture, which is an input field question (see Figure 8).

Certain nudging techniques [27] [42] are applied in this section as the patients are instructed to take an active part in performing concrete actions that could spur them into action and help them gain a better understanding of the situation they are in. By performing postures, they can start to feel what some of them can cause emotionally so that they would either stop doing them themselves or perform them if they have a beneficial impact. Furthermore, the social learning technique is utilized as they are expected to mimic and learn from a certain set of behavioral patterns [19].

Another section that contains selection questions is called *Moments of Pleasure*. The instructions go on to tell the patients that each of us needs pleasant moments, so-called pleasure moments, in everyday life to create a balance between school and work. On presenting them with a list of pleasant activities that they can indulge in, they are asked to choose (see Figure 6) one pleasure moment from the suggestions on the next page and give it a try. These activities are the following:

1. *listening to good music,*
2. *applying lotion,*
3. *sitting in the sun,*
4. *lying on the grass,*
5. *taking deep breaths and exhaling slowly*
6. *taking a bath,*

Figure 10: Timer question

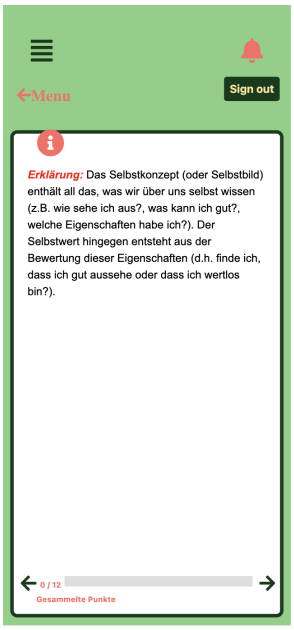

Figure 11: Explanation question

Figure 12: Motivation message

7. *letting ice melt on the tongue,*
8. *taking a hot shower,*
9. *smelling a flower,*
10. *smelling spices,*
11. *walking barefoot across a meadow,*
12. *turning around and kneading something.*

On finishing this task, they are asked to reflect on how implementing their pleasure moment went in practice. In addition, they are told to adjust the sliders (see Figure 7) on the next pages to what suits them best. The options on the sliders are *stressed, relaxed, sad, happy, hopeless, optimistic, negative, and positive.*

This is another section that tries to evoke positive emotions in the patients as it attempts to put them in the right mindset by suggesting things that they might like to perform in their free time. The listed activities represent an alternative to the negativity caused by unhealthy exposure to social media [24]. The nudging technique was used to encourage them to

think about positive content and the social learning technique approach to stimulate them to imitate a certain kind of behavior[46] [19].

The section of the quiz called *Cognitions* contains a number of question types. The most prevalent one is the selection type (see Figure 6). Namely, the instructions inform the patients that Ana is often mistaken for being the best friend of the supporters of the Pro-Ana movement, but in reality, she is the complete opposite. She only cares about herself, pressures, intimidates and can be quite mean. The instructions explain that some typical demands and statements by Ana have been provided. The patients are asked to choose five statements that trigger a reaction, such as a specific thought or feeling in them. The statements that they need to rate are the following:

1. *Do you think you are beautiful enough?*
2. *You will never be able to lose enough weight.*
3. *The other girls are all much prettier and thinner than you.*
4. *Health, pah.*
5. *Being thin is much more important; you can never be thin enough.*
6. *Just don't eat anything.*
7. *Find people who want to be as thin as you want to be.*
8. *We belong together. Without me you are nothing.*
9. *You can't do anything against me, you won't get rid of me.*
10. *I will push you to your limits.*
11. *Being thin and losing weight is a sign of true strength.*
12. *We have shared goals: discipline and self-control, and you will work hard for them.*
13. *Invent excuses so you don't have to eat.*
14. *You will get used to the cold and hunger. That's how success feels.*
15. *I will make your life a living hell if you fight against me or seek help.*
16. *Your friends don't understand you, your family doesn't understand you, no one is as honest and understands you as well as I do.*
17. *Say that you've already eaten.*
18. *Better walk instead, that burns more calories.*

They are then asked to consider why they chose these statements and describe the emotions and thoughts they trigger in them and why. What

follows is a list of questions that they need to reflect on, and these are the following:

1. *Do you think you are beautiful enough?*
2. *You will never lose enough weight.*
3. *The other girls are all much prettier and thinner than you.*
4. *Just don't eat anything at all.*
5. *Find people who want to be as thin as you want to be.*
6. *We belong together; without me, you are nothing.*
7. *Better walk instead; it burns more calories.*

The patients are asked questions with negative content in order to make them conclude how destructive such a mindset can be and that there is an absolute necessity to discontinue with this kind of approach to life.

Afterwards, they are expected to describe the feelings more precisely, such as what the statement triggers in them, and why Ana's statements trigger this reaction in them, which is in the form of an input field question (see Figure 8). What follows is an instruction to think about how they could respond to Ana, how to handle the statements effectively, and how to write down the responses in the corresponding field on the next page. The instructions further ask about how they could reply to Ana and how they could react.

The next section of the quiz is called *Social Support* and it primarily involves questions that the patients need to select (see Figure 6). At the very beginning of this section, the patients are told that they all need support from others from time to time. The text also explains that the type of social support that they need and what is perceived as supportive varies from person to person. Finally, the patients are asked how they can be best supported and what kind of support is important for them. What follows is an instruction to them that they need to press the backpack icon on the left if this type of support is important to them or to press the trash can icon on the right if this type of support is not important to them or if they do not perceive it as support. They further get the statement that receiving support means to them different options that they need to choose from. Once they have completed this task and made their decisions on what getting support means to them, they get further questions and instructions. Namely, they are asked which kind of support they can receive only through the Pro-Ana community online, and which not. They are urged to press left if they mainly receive this support from their offline friends and family

and to press on the Wi-Fi icon on the right if they mainly experience this support online. The type of support listed for them to choose from is as follows:

1. *being hugged,*
2. *others taking time for me,*
3. *getting immediate responses to my messages,*
4. *being able to talk about everything,*
5. *receiving recognition, getting likes, follows, and retweets,*
6. *being able to ask someone for help anytime,*
7. *talking about secrets,*
8. *not being alone, having someone who's just there,*
9. *being empowered,*
10. *being understood,*
11. *being part of a larger group,*
12. *not experiencing judgment,*
13. *feeling needed,*
14. *being attentively listened to.*

Once they have completed this part of the section, they move to the page where they get advice on what to do. They are told to consider the alternatives for the support they currently receive from the Pro-Ana community, such as how they could also get support from their offline friends and family. They are also asked what they could change to no longer rely on the Pro-Ana community for support and are provided with examples. For instance, they are told that meeting someone with similar issues and looking for offers of self-help groups led by therapists/educators for those affected could be a good solution to their problems. They are also instructed to write down these considerations in the text field on the next page.

This section aims to make the patients embrace the necessity of being supported by others on this journey. If they remain closed and unwilling to share their problems, they will have difficulty overcoming it. In other words, they are encouraged to take into account the advice of people around them who wish them well. Therefore, making positive references can be said to fall under the nudging technique [40].

The final section of the quiz contains a large number of diverse question types. This section is called *Recognizing and Dealing with Emotions* and the

textual messages that the patients encounter tell them that there are various strategies for dealing with negative emotions (such as sadness or anger). The text further explains that some are good because they can help dispel the unpleasant feeling, and one feels better afterwards. In a similar fashion, the text explains that other strategies are less favorable because they can potentially amplify the bad feeling. Subsequently, the patients are told to classify the given approaches as good (+) strategies by pressing to the right and unfavorable (-) strategies by pressing to the left. The strategies are as follows:

1. *Accepting the feeling without wanting to change it.*
2. *Not showing anything outwardly.*
3. *Waiting for it to pass or get better.*
4. *Taking several deep breaths and trying to relax.*
5. *Starting an argument.*
6. *Isolating oneself.*
7. *Reflecting on the reasons for the feeling.*
8. *Convincing oneself that it's not as bad as it seems.*
9. *Crying when the tears come, allowing oneself to express their emotions.*
10. *Repressing the feeling.*
11. *Giving up and doing nothing at all.*
12. *Attempting not to think about it.*
13. *Trying to think about something beautiful or pleasant.*
14. *Expressing the feeling openly and talking about it.*
15. *Hitting a pillow.*
16. *Screaming loudly.*
17. *Trying to make the best of the situation.*
18. *Seeking help and talking to others about it.*
19. *Engaging in an enjoyable activity.*

The patients are further told that some strategies are more helpful in certain situations than others and that the quiz will list all the favorable strategies to better handle negative emotions. They are told to review them and try to apply them in their daily life when they are feeling sad or anxious (see Figure 12). These strategies are as follows:

1. *Accepting the feeling without wanting to change it.*
2. *Taking several deep breaths and trying to relax.*
3. *Reflecting on the reasons for the feeling.*
4. *Crying when the tears come, allowing oneself to express their emotions.*
5. *Trying to think about something beautiful or pleasant.*
6. *Expressing the feeling openly and talking about it.*
7. *Trying to make the best of the situation.*
8. *Seeking help and talking to others about it.*
9. *Engaging in an enjoyable activity.*

In the final section, the patients are once again encouraged to be active in this battle and not to despair. They are explicitly told about the necessity to rise above the problem, which can be done by contacting relevant personnel who are there to assist them. These specific pieces of advice fall under the nudging technique and social learning approach [40] [19] [46].

3.2 The Users, the Task and the Feedback

The target group for this application is adolescents 10-18 years old. This specific age group has been chosen due to the fact that it is one of the most affected groups by social networks and patients ranging from 10 to 18 years of age are most frequently sufferers of eating disorders [36] [35].

The correlation that exists between the age of social network consumers and the patients with eating disorders makes this age category relevant for inclusion. In communication with the doctors, I have learned that it is a great challenge for them to give patients tasks to do for the next visit because they often forget, are not motivated enough, or are embarrassed to talk openly about their problems.

That is why I have come up with the idea of how to attract our target group and to improve the work of experts in this field. Young generations use phones and computers to a much greater extent compared to adults, and that is why my aim was for the patients to improve their health and mental state through play and entertainment. The world of entertainment that they are so heavily immersed in on a daily basis and the number of games that they play should reinforce their desire to actively participate.

What the users are expected to do is complete a set of different types of questions. These questions are not only devised in such a way that they elicit the answers but also to educate them on what the most appropriate

manner of proceeding with their illness would be. As they provide answers, the remaining tasks are waiting for them and they are always unlocked and activated for them to complete. In the process of completing their tasks, they are also encouraged to keep going by means of reminders.

Feedback is one of the most significant aspects of taking part in the quiz. They receive it in the form of points and guidance on their future steps. It is considered absolutely vital for them to understand that the instructions are given to them by specialized and qualified staff on what they need to do to improve their health and that the quiz is not merely an automated game intended to entertain them.

4 The Utilized Techniques — Creating the Online Quiz

FiGHT is meant to be a webpage that allows the users to take part in a game-like quiz that would make them feel more at ease and give them the chance to learn new things, feel greater comfort when dealing with eating disorders, and understand the medical personnel to a higher degree. The means of achieving these goals are through the application of a number of techniques that can make the recovery process more effective. Before delving into more specific techniques, a short overview of the steps needed to construct the quiz will be given.

The first step implied defining the kind of quiz that was going to be made, which was, in this case, an assessment quiz. The second step dealt with deciding on which sorts of questions to include. The ones that were utilized in this quiz were multiple choice questions, memory games, drag and drop, selection questions, slider questions, and input field questions. The questions needed to be made appropriately, without complications and negation, with clear instructions and an adequate choice of words. One of the steps also included devising appropriate answers that would act as distractors for the patients. One of the last stages had to do with the manner in which the patients would receive feedback. The final stage consisted of designing the slides in terms of the font and colors as well as checking what the quiz would look like on a mobile device or computer screen. Once the quiz was complete, it was tested by the author to see whether it works properly i.e. to assess whether there were any faults and if it would be appealing to the users. On closer inspection, the author found that there were no elements of the quiz that were not working and her assumption was that it would be embraced by the patients due to its numerous benefits.

4.1 Gamification and Nudging, Game-Based Learning

The primary purpose of gamification lies in the fact it has the capacity to improve the motivation of the users [42] [27]. One of the elements that was utilized in the construction of the FiGHT quiz is assigning points to the users for their involvement in the game and their provision of correct answers. Another element of the gamification technique that was used in the FiGHT quiz was the inclusion of feedback. The users have the opportunity to see the accuracy with which they have attempted to answer the questions and what is advisable to do in their situation [46] [40].

In addition to gamification techniques, nudging techniques were also relevant for the improvement of the FiGHT app. What is implied by a nudging technique is the incentivizing of a certain type of targeted behavior. This could imply the promotion of eating regularly through some questions that would encourage the patients to think about the benefits of eating large quantities of food and not obsessing with their bodies. [2] [6]

In summary, it could be stated that gamification and nudging have multiple purposes and some of them include encouraging users and providing feedback, simplifying tasks, and helping them decide between two paths.

It should be noted that game-based learning is not identical to gamification, although there is a certain degree of overlap. Although the discussion about game-based learning is mostly related to a classroom setting, some of its characteristics have been incorporated into the FiGHT quiz. Namely, raising motivation is one of the key components of this technique and it has been incorporated into the quiz. Although the patients are not competing with each other, they are doing this with themselves since they are encouraged to provide correct answers so as to move on to the following levels of the game. Another element of this technique is the inclusion of the participants. The patients oftentimes feel like they are not understood by the environment and, therefore, excluded. By answering questions that are tailored towards them and that deal with problems they deeply identify with, they have the feeling that there are individuals who can actually help them and pinpoint the exact issues that are burdening them. Another characteristic of the game-based learning technique that is also relevant to the FiGHT quiz is the student (patient in this case)-centered approach to teaching/learning. In the context of the quiz at hand, this means that the patients feel involved in the process of resolving their problem as they are being asked relevant questions that are crucial for their well-being and they feel as if they are the genuine focus of the whole process. [7] [32]

4.2 Personalization and Social Interaction, Social Learning and Social Comparison Theory and the Health Belief Model

What is understood by personalization in a technological context is the tailoring of a webpage to meet the needs of a specific group of people it is targeting. The personal aspect of the quiz may lie in the fact that its creator is trying to establish a connection between the patients and the graphic design of the quiz. In the case of the FiGHT quiz, it was essential to choose a background that is appealing, cheerful and inviting for young users aged 10 to 18. One aspect of using social interaction in the game is connected to choosing the right set of questions that the patients can fully identify with. In the open-ended questions, the patients are expected to briefly describe their opinion of an issue that is likely to be part of their life. Posing the right questions that they can relate to and providing feedback makes the interaction between the patients and doctors more intense and meaningful. [14] [13]

The social learning theory implies the process of adopting a manner of behaving by observing the way other individuals behave in certain situations [19]. The mentioned theory can be said to refer directly to the way that the patients have developed their bad habits since they were exposed to images, videos and instructions on how to be slim. They had the opportunity to see how these models live, so they acquired these patterns of behavior. However, in an indirect manner, the social learning method is integrated into the website as the FiGHT quiz itself is trying to promote a lifestyle where young people should feel satisfied with their physical appearance and not obsessed with what they eat and how many calories they are gaining. The site encourages patients to overcome their problems by providing explanations to the multiple-choice questions integrated into the website. By reading the instructions and learning something new, they subconsciously become reassured that their old lifestyle, unobsessed with eating, was the right way. What goes hand in hand with the mentioned theory is the social comparison theory which states that individuals assess their own worth and value in relation to others. Young individuals who lack self-confidence seek validation and imitate the desired trends set by society. [16] [18] In an attempt to be accepted by others, they exert themselves to rigorous diets that could be regarded as starvation [8].

However, if the process is reversed and if the webpage manages to change their mind and impose a different ideal that they will emulate, the negative trend can be overcome. A very relevant model that lies at the heart of

the webpage and the overall approach of the involved doctors and creator of the webpage is the health belief model. At the crux of the model is the assumption that individuals adhere to certain health practices in accordance with their system of beliefs [21] [24].

Similarly to the social learning approach, it could be said that the health belief model plays a role in both a positive and negative way. One of the main reasons why the patients found themselves in this situation in the first place was the fact that their opinions were negatively influenced by social networks. It is up to the doctors and creator of the webpage to change their mindset and instill a new set of beliefs that will trigger a different approach to eating.

5 Webpage Development and Architecture

At the beginning of the development stage, it was necessary to choose the adequate architecture for creating the FiGHT quiz with which all the requirements will be easily met. The vue.js framework was used for front-end development, which includes everything that the users have the opportunity to see on their screens in the browser and interact with. On the other hand, the back-end refers to those components of the quiz that the users cannot see. This segment allows it to work, as well as all the necessary functions and data transfer, which is done with node.js. Each request from the user in the front end will be sent to the back end via the CRUD REST API. With the help of the CRUD HTTP methods, the users get back the data that they have requested from the PostgreSQL database in the front end. Axios was used to send HTTP requests from the front end to the back end and execute the CRUD Operations. The visual appearance of the architecture can be seen in Figure 13.

5.1 Vue.js, Node.js, and Postgres

In the following section, the three types of technology stacks that were utilized will be discussed.

When it comes to the front-end side of creating the quiz, it should be noted that vue.js has been chosen since it allows the creation of complex applications in a simple and fast manner. What this means is that the front-end code can be divided into components that can later be reused. In other words, the state changes are synced to DOM updates so the focus can be on the logic instead of the DOM operations. Vue.js, along with other frameworks like React and Ember, utilizes a virtual DOM. Instead of

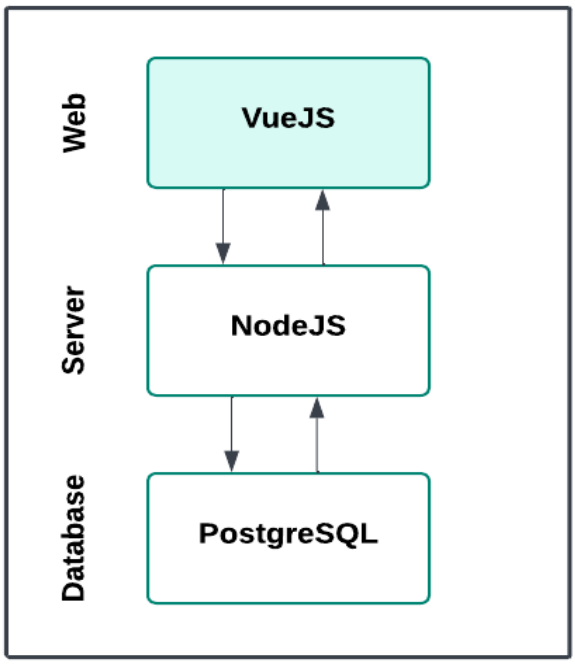

Figure 13: The visual representation of the architecture

directly modifying the actual web page, a copy of the web page is created in the shape of JavaScript data patterns. When a certain number of changes are necessary, they are implemented within these patterns first. What follows is that the modified patterns are compared to the original ones. The last modifications are then applied to the real web page, allowing for optimized and faster updates. Moreover, it can handle projects of all sizes and it is versatile and efficient. It has the IPA for the needs of the developers and allows the users to utilize the Vue Dev Tools and the Vue Command Line Interface which enable the smooth management of projects. What is more, it allows developers to create single-page apps from scratch using Web pack but it can also be used as a library. Only the pieces of the library that are necessary can be imported. Its reactivity is also an advantage as setting the variables updates the interface.

Another advantage lies in the fact that it has thorough documentation as well as the fact that it is cross-platform, as the syntax for websites can

be used for mobile apps. What makes it convenient to use is the libraries and frameworks it has compiled. It also facilitates the activity of rendering web pages. One more characteristic of vue.js is data binding, which makes it possible to change the styles and perform class assignments. Another trait would be customizing elements known as components. They can be designed once and used multiple times in various parts of the HTML. Vue.js also gives us the option to perform transitions and animations to HTML elements when they are added, updated, or removed from the web page. It also allows the creation of computed properties, which can automatically calculate values based on changes to UI elements. This eliminates the need for additional coding. It also offers HTML-based templates that connect the web page's DOM with the Vue instance data. Another characteristic would be watchers, which are applied to data that is subject to change. Watchers tackle data changes without requiring additional event handling, simplifying and speeding up the code. [38] [41] [23]

On the other hand, node.js allows simple scalability both horizontally and vertically and it does not pose a difficulty to master. It is a full-stack Javascript and is utilized as one programming language which provides good performance. It also has a large community of users who keep developing it. It can cash single modules as well as provide the liberty to create software. It enables developers the opportunity to cope with more requests at the same time as well as to customize it in accordance with the requirements. It is a widely used tool suitable for various project types. Within node.js, an application runs within a single process, avoiding the creation of new threads for each request and blocks are prevented. It can manage thousands of simultaneous connections using a single server, with no bugs involved. Furthermore, it integrates new ECMAScript standards, eliminating the need to wait for users to update browsers. NodeJS is specifically useful when a client initiates a request from the application's client side. The request travels to the server, where calculations and validation processes occur. Once completed, the server sends back a response. It operates web applications outside of the user's browser, serving as an open-source, cross-platform environment. It is particularly valuable for constructing applications with high I/O demands, such as video streaming and online chat platforms. It offers high performance, asynchronous processing, and efficient handling of concurrent connections, making it a popular choice for various development projects. Its compatibility with different platforms and familiarity with JavaScript contribute to its widespread adoption. [28] [22]

Postgres introduces a method that tackles complex objects by using a flexible type system. It allows users to define new columns for relationships,

establish new operations on these columns, and devise fresh ways to access data. This approach works well for relatively straightforward complex objects. However, for more intricate objects, particularly those with shared sub-components or multiple layers of nesting, Postgres suggests employing procedures to define them. These procedures will be optimized by storing pre-compiled plans and even pre-calculated responses for retrieval commands. Triggers and rules are incorporated as commands with "always" and "on-demand" settings. These commands are efficiently supported through enhancements to the locking system. This rules system is advantageous when multiple rules could potentially apply in any situation. The process of recovering from crashes is facilitated by avoiding the overwriting of data. This system is considerably less complex in relation to the technology in existence, supporting time-based access and versions with ease. The primary expense of the storage system lies in the need to store data pages in stable storage when a transaction is performed. Postgres employs background processes known as "demons." These demons efficiently use idle processors for various tasks. Crucially, all these objectives are achieved without making any alterations to the existing relational model. [45]

5.2 Development Phase

During the development phase, the initial steps were to collaborate with my supervisor and doctors from AKH Clinic to define the functionalities that the website ought to have in order to cover all the needs of the users who will be utilizing this webpage. It was important for the doctors to clearly define the features they wanted to be on the page, which would motivate users and help them overcome their issues. They helped me a lot in getting the initial impression and idea of what to implement, as well as in the content of the site. All the questions, texts, and task types were carefully structured and written by the doctors. Subsequently, by means of using the Balsamiq Tool, I created the first sketches of the website's layout. This tool was instrumental for both me and the doctors to get a first impression of how the site would look, what functionalities it would have, which colors we would be using, and what its structure would be. We also had to pay special attention to ensuring that the design is suitable for all devices – computers, tablets, and phones. What followed afterward was the implementation phase. As was mentioned in the previous section, vue.js, node.js, and Postgres were utilized for the website implementation. The code is available at this link: https://github.com/lalick94/fight/tree/master.

It consists of the backend and frontend folders. First, all the necessary

tables were created in Postgres for the website and they were populated with data – the users, the structured questions for users provided by the doctors, multiple-choice answers for the questions, etc.

The example table shown in Figure 14 illustrates the *"quiz_questions"* table.

Data Output | Explain | Notifications | Query History

	id [PK] integer	question character varying (500)	explanation character varying (5000)	instruction character varying (5000)	question_category character varying (5000)	module_category character varying (5000)	type character varying (500)	instruction_image character varying (500)
1	1	Was versteht man unter dem ...		Die Frage <span style="font-styl...	QUIZ	GRUND	MC	selbstbewusst.GIF
2	2	Neben dem Selbstwert gibt es...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
3	3	Welche der folgenden Fragen ...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
4	4	Welche der folgenden Fragen ...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
5	5	Wir haben ein Wissen zu vers...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
6	6	Unser Selbstwert wird von ver...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
7	7	Welche der folgenden Aussag...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
8	8	Manche Menschen haben ein...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
9	9	Welche Folgen kann ein niedri...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
10	10	Welche Folgen kann ein hoher...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
11	11	Viele Menschen schleppen ei...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
12	12	Menschen mit einem niedrige...	<span style="color:red;font-styl...		QUIZ	GRUND	MC	[null]
13	13	Nehmen wir an, XY hat einen ...	[null]	Du siehst nun ein Comic, das ei...	COMIC	GRUND	SELECTION_2	comic_feedback.GIF
14	14	Wie glaubst du, kommt das T...			COMIC	GRUND	SELECTION_2	[null]
15	15	Selbstkritik	[null]	Auf den nächsten Seiten werde...	ZUZUORDNEN1	GRUND	DRAG_DROP	innen_$.png
16	16	Bestrafung	[null]	[null]	ZUZUORDNEN1	GRUND	DRAG_DROP	[null]
17	17	Bloß nicht aus der Reihe tanz...		Verallgemeinernde Glaubenssä...	ZUZUORDNEN2	GRUND	DRAG_DROP	monster_$.png
18	18	[null]	[null]	Wähle drei positive Sätze aus, d...	ERINNERUNGALARM	GRUND	ALARM_DRAG_DROP	[null]
19	20	Gegenstand des Vergleichs: N...		Schreibe drei Tage lang auf, in ...	AUSFUELLEN	GRUND	INPUT_FIELD	fisch.GIF
20	21	Ich vergleiche mich mit...			AUSFUELLEN	GRUND	SLIDER	[null]
21	24	Das fällt mir an meinem Körp...		Stelle dich in einer ruhigen Min...	QUESTION	VERTIEFUNG	INPUT_FIELD	spiegel.PNG

Figure 14: Quiz_questions Table

Subsequently, the development of the backend followed, where the Postgres database was connected to the backend and the endpoints and methods were created to manage the database and deliver information to the user on the front-end. Figure 15 shows examples of some defined endpoints.

Finally, the frontend was implemented, in which the tasks are fetched from the database to be visible to the user. Care was taken to ensure that the structure is visually appealing to the user and responsive across all devices (PC, tablet, phone). The code snippet shown in Figure 16 illustrates an example of a multiple-choice task.

6 Usability Testing (What It Is, Its Elements and the Types)

The following section pertains to usability testing i.e. the way that it is defined, how it works in practice and why it was chosen for the purposes of this work, the elements and types of this process, as well as how it was conducted in this very instance of the given master's thesis.

The importance of usability testing lies in the fact that users who are completely new to the websites can genuinely distance themselves from the

Figure 15: Endpoints Example

website and have a more objective impression of it. They can demonstrate to the observers what they find confusing in performing the tasks they are required to do on the website. They can also show the creators of the website what kind of bugs they have encountered in the process of utilizing the website. Some other positive sides of applying usability are checking whether our prototype is functional or not and ascertaining if the expectations of the websites are met. In addition, they can assist us in pinpointing problems that might occur in cases when flows are intricate or even in instances of less significant faults on the site. Ultimately, in the broadest terms, usability testing serves the purpose of providing people with a user-friendly website that they would genuinely like to use. [3] [25] [20] [30]

When it comes to the elements of usability testing, three of them can be listed, of which the first one is the facilitator. What is referred to by this element is the person in the testing process who plays the role of guiding the participants and in doing so, the facilitator is there to instruct them, respond to any questions they might have, and continue by following up with some additional inquiries. What the facilitator needs to ensure is that he or she does not have an impact on the responses provided by the participants and that these answers are valid and a genuine reflection of what the participants truly think about a certain product. In remote unmoderated testing, instead of having the facilitator, it is possible to conduct this by means of utilizing an application as a substitute. [3] [25] [20] [30]

```
<div v-if="question.type === 'MC'">
  <p  class="text" style="text-align: left;" v-if="question.counter === 1">{{ question.info }}</p>
  <p  class="text" style="text-align: left;" v-if="question.counter === 4" v-html="question.explanation"></p>
  <p  class="ins" style="text-align: left;" v-if="question.counter === 2" v-html="question.instruction"></p>
  <img v-bind:src="`images/assets/${question.instruction_image}`" v-if="question.instruction_image && question.counter === 2" class="image_quiz_mc">
  <p  class="mc-text" style="..." v-if="question.counter === 3" v-html="question.question"></p>
  <img v-bind:src="`images/assets/${question.question_image}`" v-if="question.question_image && question.counter === 3" class="image_quiz">
  <ul class="answer-list" style="..." v-if="question.counter === 3">
    <li
      v-bind:class="getClass(answer)"
      v-for="(answer, idx) in question.answers"
      v-bind:item="answer"
      v-bind:index="idx"
      v-bind:key="'answer'+ page + idx"
      @click="checkAnswer(answer)"
    ><i class='fas fa-check icon' v-if="answer.correct"></i>
      <i class='fa fa-times icon'  v-if="!answer.correct && answer.correct !== undefined"></i>
      <i class='fas fa-circle icon' v-if="answer.correct === undefined"></i>
      {{ answer.answer }}
    </li>
  </ul>
</div>
```

Figure 16: Frontend Code Example

The next element that will be discussed pertains to the tasks themselves. What needs to be made sure of is the fact that they are realistic and that they can successfully be completed in real-time. Taking into account their nature, it could be concluded that they can be either specific or, in the other extreme, they could have less strictly defined questions, making them open-ended. An integral component of the tasks themselves is the wording, as it can have an impact on how the questions and instructions will be comprehended and interpreted, so the final outcome and their performance are also susceptible to the manner in which the sentences are formed. The way in which the instructions can be provided to the participants is in two ways – orally and in written form. A way of ensuring that the participant and facilitator are on the same page is to ask the participants to read the instructions not only to themselves but also out loud so that the pace could be tracked more efficiently. [3] [25] [20] [30]

The participants are the third element within testing usability and they would ideally need to be realistic users, which implies that they are already involved in utilizing the same product or possibly they could share similarities with the target users. What is often case significant to apply as an approach to testing is to try to engage the participants to think aloud so that the process would be more transparent and so that the facilitators would have a clearer insight into what the thinking process of the users is and what their thoughts are on the matter. [3] [25] [20] [30]

When dealing with any software and its functionalities, it is customary and logical to test what has been created from a number of perspectives.

One of the manners in which such tests could be performed is by means of including real people who are expected to interact with the tested product and establish the way that the participant responds to using it. The mentioned testing can be done in ways that may simply include observing recorded video material but it can also imply the application of more serious equipment such as eye-tracking or other sophisticated methods of monitoring one's behavior and assessing their perceived levels of satisfaction at a particular point of using the websites. Regardless of the chosen means of testing a certain piece of software, it must be noted that it is an absolutely essential stage of evaluating the experience of the users and that taking measures of testing into account can be instrumental in achieving success with a website. What needs to be made clear is the fact that the users are monitored while they are doing specific activities, and this can be conducted in two ways. One is if the observer is physically next to the user, which would make this observation in-person, whereas another means of achieving this is if the observation process is conducted remotely. The main focus of usability testing lies in the attempt to estimate what poses a problem for the users and has a negative impact on the user experience. In addition to the two mentioned types of usability testing, it should be said that there are two more – moderated and unmoderated. In the first one, the facilitators are present and they have the role of asking the participants additional questions whereas the second one does not imply the presence of a facilitator. One more way of distinguishing between the two types of testing is the distinction between qualitative and quantitative testing. As the very name implies, the difference between them lies in what the focus of the testing is. When it comes to the qualitative type, which is more widespread in this field, it should be noted that the main aim is to gather information regarding how the product is utilized by the users and what kind of issues may occur in the stage of user experience. With regard to the quantitative type of usability testing, it is obvious that the main emphasis lies in the metrics that are compiled in order to comprehend how the user experience is running, the two major metrics being the time spent on a task as well as the success of such tasks. [3] [25] [20] [30]

6.1 Usability Testing in the Thesis, the Included Questions and Explanations

For the purposes of the thesis in hand, a total of 5 users were chosen to take part in usability testing. They were chosen in such a way to represent different branches, not only the IT sphere. The testing was conducted in

person, but before being given an online questionnaire by the author of the thesis, they were first provided the opportunity to take an in-depth look at the website. On doing so, the test users were given 2 types of questions that were incorporated into the questionnaire – open input field questions and scale questions, where they were expected to rate the website on a scale of 1 to 5. The type of testing that was conducted was qualitative usability testing and it was remotely moderated. The questions that the users were asked to provide answers to were the following:

1. `Let's get acquainted. I'm Alexa. And you are?`

   From the analysis of the questions, one can conclude that they were targeted at different aspects of the site. If we start from the first one, it is apparent that it serves the purpose of establishing the identity of the participants. The name is provided so as to make the process a bit more personalized and engaging.

2. `Nice to meet you, Max Mustermann. So tell me, how old are you?`

   Moving on to the second question, the users are asked about their age. This is a significant step in the process as age and experience are important factors in determining the way the website will be perceived by different individuals of varying ages, but who are adults.

3. `Max, what is your occupation?`

   The participants were asked about their occupations to establish what people of diverse backgrounds would have to say about the nature of the website and how they deem it. It was important to ascertain whether the respondents could clearly conclude about the main purpose of the website and whether the information laid out on the website was clearly indicative of the author's purpose or if it was unclear what the aim of the designer was. In case the respondents have experience in the IT area or are involved in using relatively similar software in the workplace on a regular basis, this would lend weight to their answers.

4. `Ok. What do you think, what is this webpage intended for? Tell me what you understand about the information on this page.`

   A question of particular importance was the one pertaining to what the respondents thought of the intentions of the webpage. What makes this question so relevant is the fact that the users should easily be able

to identify the purpose of the page and quiz so as not to quit instantly and misunderstand why they are engaging with the software. They need to be able to know what kind of content they are accessing and understand that what they are utilizing is there to provide genuine assistance and directions on how to overcome the issues that are burdening them.

5. `Now, what do you think, does the website appear professional and trustworthy?`

   When it comes to the respondents' reactions to the website's level of professionalism and trustworthiness, it should be stated that this question was considered particularly significant by the author. The degree of seriousness of the matter at hand is such that the users of the website need to see that they can trust the website as they are providing sensitive information about their bodies. Although they are asked to play a game and find out new information as well as provide data about themselves in a light-hearted manner, primarily in accordance with their age, the teenagers will expect to be reassured that their answers are anonymous and that they will be given serious consideration. They need to know that all the information that they disclose will be dealt with professionally and confidentially, which should bring them closer to resolving their health concerns.

6. `Is the website clear or is the structure too complex?`

   Another question that was deemed important was the one pertaining to the very structure of the website and quiz. It goes without saying that completing the tasks or trying to follow a certain flow of questions needs to run smoothly and be user-friendly so that the participants can easily engage with it, and find it useful, enjoyable, and pleasant to complete. Logically, depending on the level of satisfaction with the webpage and quiz, the users would be willing to utilize it more and, even more importantly, recommend it to other teenagers who are struggling with the same problems. Success among the users could significantly help suppress this growing problem among young users.

7. `Did you find some content mistakes or have difficulties browsing? Was the language too difficult to understand?`

   In addition to the content being professional and enjoyable, it also needs to be done accurately, without any mistakes in the language or inconsistency. Flaws that might appear in some of the scripts could

naturally be detrimental to the success of the webpage and quiz, so it is essential to eliminate them on time and instill a sense of professionalism. In a similar fashion, it was necessary to know whether there were any difficulties navigating the website. An important aspect of the whole process is to have the users fully focused on the content as it is obvious that younger respondents have a short concentration span and that any problems that might hinder navigating the website and quiz quickly and efficiently could also lead to them losing interest in the content regardless of its quality. Therefore, it is absolutely vital that the flow of information and questions they are expected to interact with is running smoothly and without any significant hindrances and delays so that they would feel excited while participating in the completion of the quiz and learning more about their issue from the website. The language also has to be simplified so that it would be understood by users who are not native speakers of German and make the process user-friendly in every sense.

8. `If you could change one feature, which one would it be?`

   Another important question that the respondents were asked to address is whether they would change any features by replacing them with some other ones or simply removing them from the site and quiz. It is important to comprehend if the users truly find pleasure in interacting with the content or whether they have any issues with the choice of functionalities that they have or would like to have at their disposal.

9. `Are pictures and animations as important as text for you?`

   The next question has to do with the significance of the pictures and animations as opposed to the text itself. What makes this issue particularly relevant to look into is the fact that a visual representation of content can often be more effective than doing this in a textual manner, especially when trying to cater to a younger audience. Textual content can often feel uninviting and it requires more patience and a deeper interest on the part of the user than merely seeing photos and immediately identifying with what is being presented. Once the teenagers see a picture of the body type they have and are dissatisfied with, they can instantly relate to the matter and this is how their interest in the topic will be kept.

10. `What do you like best about this website?`

Once the users identified some of the characteristics that they did not prefer, they were also asked to state what they found pleasure in. This type of question was important to ascertain what feature was the pivotal one in the whole webpage and quiz and whether all of the respondents identified the main strengths. This question is instrumental in determining whether the software is going in the right direction and if it is recognizable for the same qualities by different individuals.

11. `Do you think this webpage can be useful in healthcare and can help young people feel better about their eating disorder problem?`

    This question is one of the crucial ones that asks about the essence of the webpage and whether the participants thought it could play its role in solving the problem of eating disorders. This question directly asks whether the participants believe it is successful or not.

12. `Describe anything missing that you would need to fully interpret the interface.`

    This question is one that enquires about any components that might be missing on the webpage. The feedback that the users provide for this question is invaluable as the creators of the software can get an idea of whether the respondents find it incomplete in any way and whether there is any feature that would improve the quality of the webpage.

13. `Would you recommend this application to patients suffering from eating disorders and those who have concerns about their eating habits and body?`

    The 13th question was included to see whether the participants were generally satisfied with the overall webpage and whether they believed future patients and doctors would be willing to utilize this to a more serious extent. This question was the real litmus test that would give us a more conclusive idea of whether the participants thought it was worth going down this path.

14. `Do you think that this webpage will be used in Austria and Germany massively by health institutions in the near future?`

The given question was asked to determine their honest opinion on whether what was constructed actually has the chance to be realized in the near future. This was an essential question that, similarly to the previous one, tried to establish whether they genuinely believed in the created software and if it would be embraced on a larger scale by the German-speaking community.

6.2 Usability Testing Results

In this section of the thesis, what will be analyzed are the responses to the questions provided by 5 participants. As the testing that was conducted was of a quantitative nature i.e. with a fairly low number of participants (5), it should be made clear at this stage that a greater focus will be placed on the content of the answers rather than the number of answers. No statistical data will be provided and the answers themselves will be considered more relevant. It should be noted that the participants who took part in the testing spanned from 24 to 35. It is apparent that the covered age group does not correspond to the target audience that the paper is aimed at. However, the participants were still relatively young and their answers could be interpreted as relevant since they are at an age when they can still relate to the aesthetic and bodily concerns they had as teenagers and adolescents. Although a group of teenagers would have been more suitable, such a group of individuals could not be obtained for the purposes of this study. However, the author of the thesis believes that the answers provided by the mentioned participants can still serve as valid and relevant data that can assist the author and other researchers in getting an insight into what kind of impression the participants had of the webpage and quiz. Sara, Dunja, Ivan, Ena, and Stefan were the participants in the testing and their age was 28, 25, 35, 27, and 24 respectively. A total of 14 questions were given to the participants and the analysis of each of them, along with statistical data, will be discussed in the following section.

When it comes to the 1st question, it carries no particular significance other than the fact that it tried to enquire about the identity of the people taking part in the testing. The participants were acquaintances of the author and they were individuals who were willing to assist in the process of conducting this research. They are all currently citizens of Austria i.e. they are physically located on the territory that is relevant for the given research and they all speak German, in addition to their own native languages. This is one important factor to consider as the webpage was made in such a way that it facilitates the process of communication with the doctors especially

for non-native users. As can be seen from Table 1 and Figure 17 all the participants were from ex-Yugoslavian republics, predominantly including Serbia and in one instance Croatia.

No.	Question 1: Let's get acquainted. I'm Alexa. And you are?	Nationality
1.	Sara	Serbian
2.	Dunja	Serbian
3.	Ivan	Croatian
4.	Ena	Serbian
5.	Stefan	Serbian

Table 1: The participants' names and nationalities

The 2nd question was considerably more relevant than the first one as it gave an insight into the exact age of all the participants. As it has been suggested previously, the participants were individuals who did not match the age group of the target group, which ranges from the age 10 to 18, when individuals are particularly sensitive about their physical appearance and when their bodily insecurities are overly pronounced. Even so, the age of the participants spanned from young adults in their twenties, including one participant in his thirties (see Table 2 and Figure 18). Although the difference between the target audience and the participants is not negligible, the participants were still not too old to forget the time when they had their own concerns. It could be argued that the age of the participants certainly suggests that they are more mature, conscious, and serious about assessing their own bodies and, even more importantly, the reality of the world they live in and they can make a more accurate assessment of the tested software. Notwithstanding, they are not highly detached from the world of social media and they are aware of the trends that are being imposed on young individuals. The fact that they do not exceed the age of 40 implies that they are probably active users of social networks themselves and that it is possible for them to relate to the hype that is created in the media and among influencers about the importance of having aesthetically pleasing bodies.

The 3rd question is indicative of how the working lives of these individuals are relevant to the given webpage and how competent they are to assess it. Of the 5 participants, 2 of them were IT developers, which implies that they were familiar with what a webpage is expected to look like and

Figure 17: Nationality of the participants

the possible flaws it might contain (see Table 3 and Figure 19). Frontend software developers have experience with working in a team with individuals who perform quality assessments and regularly receive feedback on the issues that occur in their code. This is why they are particularly significant participants who do not observe the webpage merely as end-users but also as creators of similar software. One of them is involved in transportation and logistics and is likely to be dealing with relatively similar software on a daily basis in which she needs to insert relevant data into tables and track the availability of trucks and other vehicles at specific times. In other words, as a user she has a great deal of experience with the technical side of what the end result of a webpage should look like and whether it is fully functional and operative, but obviously not as much as the two participants who are professionally engaged in the field. When it comes to Ivan, the self-employed entrepreneur, he is also partially involved in the field of IT, but only in the capacity of an end user, similarly to Ena. He does not create his own software but has experience in utilizing it as an end-user. In his profession, he interacts with his own clients and uses features of programs to track his sales of products and the items he has in stock. He also uses software to order new goods from his distributors, which is an integral part of his daily

No.	Name	Question 2: Nice to meet you. So tell me, how old are you?
1.	Sara	28
2.	Dunja	25
3.	Ivan	35
4.	Ena	27
5.	Stefan	24

Table 2: The participants' age

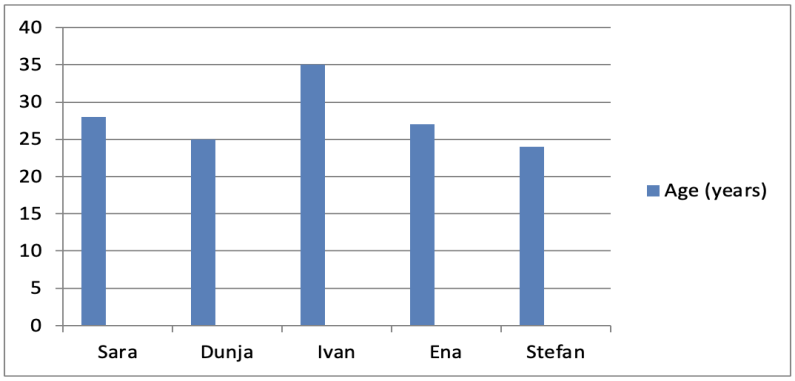

Figure 18: The participants' age

activities.

Dunja is in the field of data analytics, which means that she is not actively involved in creating software but is rather heavily immersed in using it herself as she needs to utilize different features to make calculations and interpret the obtained data in tables. As can be concluded, although not all the participants are directly engaged in the field of IT, they all have the opportunity to use different software in the workplace to conduct their activities.

The 4th question, which enquires about the intentions of the webpage and the patients' understanding of the content, gives an interesting insight into the matter as it seems to suggest that all of them managed to identify what the content was aimed at. All the answers are variations of the idea that the webpage was created to assist young users who have health issues and concerns (Table 4). Sara emphasizes the fact that users of the webpage have weight problems which correlate to psychological issues. Dunja suggests

No.	Name	Question: 3 What is your occupation?
1.	Sara	IT
2.	Dunja	Data Analytics
3.	Ivan	Civil Engineering
4.	Ena	Transportation and Logistics
5.	Stefan	Student and IT Developer

Table 3: The participants' occupation

that the users feel dissatisfied with their bodies and consequently lack self-confidence and that the webpage in hand, along with the medical staff, can aid them on this path. She obviously recognizes the importance of the role of the doctors who are involved in the process as well, not merely the webpage. Ivan also notices that the webpage is not intended only for one side of the paradigm but is rather used as a complementary tool to assist both the patients and the doctors, who will have a better understanding of the problems if the webpage is utilized. The patients are involved but so are the doctors. Ena interpreted the task in light of the absence of self-esteem that the patients are experiencing during this rough time that they are going through, which is definitely a key component (result) of not having a certain body type. Ivan highlights both sides of the process and recognizes the fact that the software in hand has the potential to prevent diseases. The analysis of Stefan's answer suggests that his interpretation is a bit more general. He states that the webpage is not solely intended for children but adults as well, implying that even older users can benefit from it, which is an accurate estimation of what the website can actually do. Stefan seems to be aware of the broader application of the webpage as he feels that even adults may have insecurities regarding their physical appearance. Another significant aspect of the matter that he points out pertains to how they will feel about their situation in the future. He notes that they will have a more optimistic view of life and the problems in question are of an everyday nature, rather than being excessively burdensome.

As can be concluded, the intention is mostly identified as trying to help both sides in this process (especially the patients) to overcome both physical and mental hardships.

The 5th question brought to our attention the fact that all the partici-

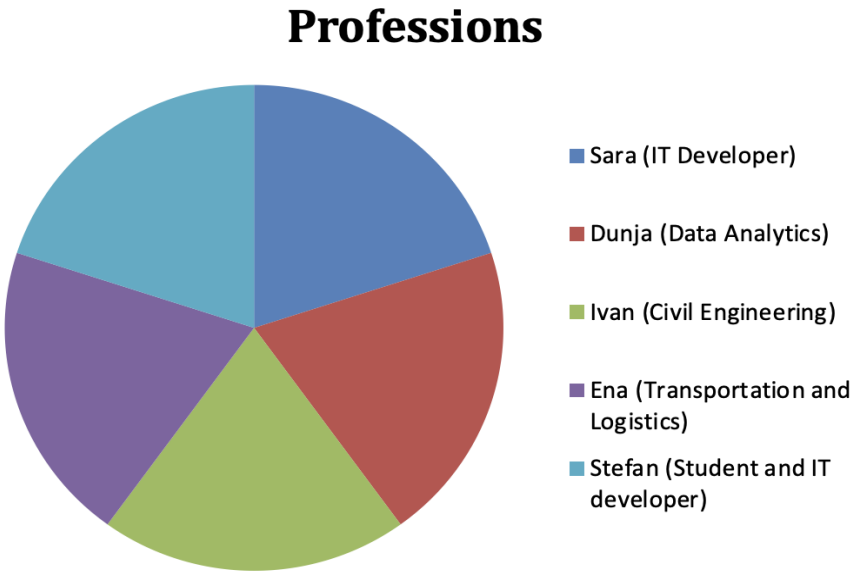

Figure 19: The participants' profession

pants responded with the highest mark (4/4) regarding the level of professionalism and trustworthiness of the webpage and the service and content they interacted with (Table 5). This shows that those individuals who were both professionals in the IT industry, as well as those who had a different type of interaction with webpages, looked favorably upon the created content. Assuming that the participants of the testing had a reference point to compare the webpage to, it can be concluded that they found it at a satisfactory level, which is an encouragement for the author of the thesis that what she has created is perceived to be as being of high quality.

Question number 6 indicates a trend identical to the previous one (Table 6). Namely, when asked about the clarity and level of complexity, the results showed that there was a unanimously positive opinion about how the structure was devised and organized since all the participants marked number 5 on the scale. All the respondents stated that the structure was appropriate and that the level of complexity of the webpage was not excessive. This kind of feedback additionally lends weight and credibility to the very concept of the webpage and suggests that it was created in an orderly and logical manner that was appealing and unobtrusive to the respondents.

In line with the previous question, question number 7 revealed that no faults in the content could be identified and that the language was not

No.	Name	Question 4: What do you think this webpage is intended for?
1.	Sara	This website is intended for people who have a problem with accepting their own body weight and who have psychological problems because of it.
2.	Dunja	The quiz helps patients regain their self-confidence.
3.	Ivan	This website is intended to help doctors and patients find easier solutions for disease prevention.
4.	Ena	This webpage is intended for younger people who suffer from a lack of self-confidence.
5.	Stefan	It is a website to help sick children and can be used for adults as well, to help them out with everyday problems, and to look on the brighter side.

Table 4: The intention of the webpage

complex to follow (Table 7). There were no faults regarding the speed of loading, improper redirection, breakage, too many illustrations, etc. This kind of information is very optimistic for the creator of the webpage as it was reviewed by people who were either professionally involved in coding their own software or were experienced users of computer software that they use on a daily basis for work purposes. If we take a closer look at each answer, we see that three of the participants stated that there were no mistakes on the webpage.

However, two of them stated that the structure was appropriately thought of and that it did not pose a problem for them to interact with the content, as well as that it was comprehensible and entertaining to complete (Sara).

No.	Name	Question 5: Now, what do you think, does the website appear professional and trustworthy? (0-4)
1.	Sara	4
2.	Dunja	4
3.	Ivan	4
4.	Ena	4
5.	Stefan	4

Table 5: The level of professionalism and trustworthiness

No.	Name	Question 6: Thank you. Is the website clear or is the structure too complex? (0-5)
1.	Sara	5
2.	Dunja	5
3.	Ivan	5
4.	Ena	5
5.	Stefan	5

Table 6: Complexity of the structure

Stefan had a similar response and said that the webpage was simple and completing it was not problematic.

Question 8 made it clear that there was definitely some space for improvement when it comes to the existing features (Table 8). Sara pointed out that the feature of Innen oder Ausen was somewhat of an issue, and that she was not particularly satisfied with it. On the other hand, Dunja stated that she was not certain whether the answers she had typed manually were sent, so her suggestion would be to include some kind of confirmation as proof that the content that was written was actually sent to the doctors. Considering the fact that the patients would like to deal with their health issues and concerns, she claims that it would be advisable to reassure them that the answers actually get through to the doctors who can read them and offer help, which seems like a valid and relevant observation that should be taken into account in further research. Ivan emphasized the professional nature of the webpage and did not make reference to any issues with the existing features, nor did he suggest that some features are missing. When it comes to Ena and Stefan, they stated that the webpage was sufficient on

No.	Name	Question 7: Did you find any content mistakes or have difficulties browsing? Was the language too difficult to understand?
1.	Sara	No, I did not find any errors on the website. The site is very easily structured and easy to use. The content of the site is also understandable and very interesting.
2.	Dunja	Haven't found any mistakes. The language is easy.
3.	Ivan	I didn't find content mistakes and the language is simple.
4.	Ena	No. No problems with the language.
5.	Stefan	I have not found any mistakes in the content, everything was pretty straightforward and easy to use and understand!

Table 7: Content mistakes, browsing experience and language

its own i.e. that it was straightforward to utilize and that it was overall well made.

Question 9 suggests that all the patients found the pictures and animations more significant than the text itself, which implies that a great amount of such content that was included in the webpage was the right choice as the vast majority of it was in the form of visual content (Table 9). One can assume that the inclusion of such material was beneficial as it made the content more relatable and gripping to younger generations, whereas the sole and exclusive use of text would probably have made the webpage less engaging for the users. Seeing actual pictures presumably makes them identify with what they are experiencing as they instantly understand what

No.	Name	Question 8: If you could change one feature, which one would it be?
1.	Sara	Although all features are very helpful and useful if I have to change one feature, that would be the "Innen oder Außen?" feature.
2.	Dunja	When you have to manually type answers, I was not sure if my answer was sent, so maybe some confirmation about that.
3.	Ivan	I think this website is very professionally done. I haven't seen any difficulties.
4.	Ena	Everything is great.
5.	Stefan	I wouldn't change any feature, it is easy to use.

Table 8: Changes to the content

kind of bodily issue is being discussed.

The 10th question is an open-ended one and serves as a valuable source of information as it deals with what the respondents considered the highlight and most enjoyable aspect of it (Table 10). When analyzing the answers of the five participants, we see that the responses vary significantly, although they are not in stark contrast with each other. Starting from Sara, she states that the webpage in question is concise and that it offers content that is beneficial and useful. In addition, she asserts that the answers are compiled in an unobtrusive and entertaining manner and that the illustrations play an important role in the whole process of interacting with the webpage and they also help maintain a high level of interest in completing it accurately and until the end. Dunja points out similar features of the webpage and highlights that it is the simplicity that she particularly found pleasure in, along with appealing animations that made the experience exciting to use. When it comes to Ivan, he explained that the most significant and enjoyable aspect of the webpage was the concept and structure. In other words, the

No.	Name	Question 9: Are pictures and animations as important as text for you? (1-yes, 2-no)
1.	Sara	1
2.	Dunja	1
3.	Ivan	1
4.	Ena	1
5.	Stefan	1

Table 9: The importance of pictures and animations

idea of creating a webpage that would help young patients resolve their problems in a creative and visually appealing way seemed to be the highlight of the software. What Ena particularly enjoyed was the fact that she had the opportunity to do a knowledge test in which there was only one correct answer. One can assume that what was appealing about this test was the fact that she could actually learn something new about the subject matter of health rather than getting answers that would suggest how everything is undefined, vague, and acceptable. Learning new facts pertaining to the human body which tell us what is healthy behavior and appearance and what is not gives us a more tangible insight into the human body and certain actions that have a benevolent and detrimental impact. Finally, Stefan similarly concludes that the most pleasant aspect of interacting with the created software lies in the fact that the animations were appropriately used and that they had a pivotal role in making the website worthwhile and pleasant to complete.

To conclude, the fact that all the participants found genuine pleasure in completing the quiz that was visually pleasing to the eye and answering questions that were interesting, edifying, condensed, to the point, and relatable to younger generations of people seems to be the underlying idea of their responses and the essential characteristic that they all made reference to.

Regarding the 11th question, which has to do with whether the webpage has the potential to be a useful tool in the healthcare system, all the participants were unanimous in providing a positive response (Table 11). For this question, Sara stated that the great advantage of utilizing this approach was the fact that all the quizzes created by the author could be instrumen-

No.	Name	Question 10: What do you like best about this website?
1.	Sara	The website is very concise but at the same time with very interesting and useful content. What I like most is that the user's answer is obtained in an interesting way, without boring the user. Also, the illustrations are excellent and keep the user's attention while filling in the answers.
2.	Dunja	Very easy to navigate and has nice animations. It is not boring.
3.	Ivan	I think the structure and the concept are the most important things on this website.
4.	Ena	That there is a mini test or "knowledge" check with one correct answer.
5.	Stefan	I do think that animations (pictures) play a big role here.

Table 10: The best feature

tal in helping people overcome their eating disorders. When it comes to Dunja, she points out that it is necessary to use this webpage in order for young individuals to feel better about themselves and another major benefit lies in the fact that they have the opportunity to complete the quiz in an anonymous manner so that they can feel at ease and not have the feeling of being judged. Ivan confirms his agreement with the statement given in this question and further emphasizes that the concept is a revolutionary step forward. Ena gives suggestions on the context in which such a webpage could be utilized. Stefan focuses on the fact that the colorful design of the webpages is bound to make it appealing for the patients and suggests that the right combination of colors can be an important factor in determining the success of the webpage.

No.	Name	Question 11: Do you think this webpage can be useful in healthcare?
1.	Sara	Absolutely! All the quizzes are of great importance and they can greatly help young people with eating disorder problems.
2.	Dunja	Yes, it points out a good way to think about yourself. Besides, it's good that it's anonymous because it's easier for people to answer questions honestly.
3.	Ivan	Definitely. A big step forward.
4.	Ena	Yes! They can even read this when they are waiting for a doctor's appointment.
5.	Stefan	Yes, especially for children since it is pretty colorful.

Table 11: Application in healthcare

With regard to the 12th question that had to do with any missing com-

ponents, questions, or data that would be helpful in making the webpage more effective, the responses seemed to indicate that nothing, in particular, could be highlighted as lacking on the webpage (Table 12). What the answers suggested was that the respondents were satisfied with the degree of completion of the created software. The answers were simple variations of the overall satisfaction with the webpage. Sara stated that even on closer and longer inspection of the webpage, she could not identify any aspects that make the content incomplete and believes that everything that could be contained within a helpful tool for teenagers and other young adults seeking aid has been appropriately included. Stefan also provides a slightly more complete answer stating that the implementation of the structure was adequate and that the time and effort invested in the webpage were obviously high and sufficient. The three remaining respondents briefly explained that they could not identify anything specific worth noting, which clearly implies that the webpage was appropriate and complete in their view. Dunja did not provide her answer to this question presumably owing to the fact that she had previously stated her response within the question pertaining to the faults of the webpage. The assumption is that, in her opinion, the content was complete and asked enough questions but her previous remark was that she thought a confirmation note of some sort would have been welcome in cases when providing her own written answers.

The 13th question deals with whether the respondents would recommend the webpage to young people and other individuals suffering from similar eating disorders and they were asked what makes the webpage unique in relation to the existing ones. The explicitly positive responses should not come as a surprise bearing in mind that the previous feedback was predominantly positive (Table 13).

All the participants had something specific to say about the peculiarities of the webpage that distinguish it from other ones in existence. Sara stated that she would highly recommend the website to all those people who are in need of any professional help in the mentioned field, regardless of their age. What she emphasizes as a key feature of the webpage is that it is new and entertaining and she does not believe that there is a similar application to it on the market. Playing a game, as well as learning and getting professional feedback simultaneously is what sets this webpage apart from other ones. Dunja says that she would recommend it and points out the fact that what distinguishes this website is its convenience.

Having the opportunity to play and get accurate information from specialists in the field is an obvious advantage of the webpage. Ivan would also gladly share this webpage with all patients who are suffering from eating

No.	Name	Question 12: Describe anything missing that you would need to fully interpret the interface problem.
1.	Sara	Despite a lot of thinking, I think that nothing is missing and that all important aspects are covered by this website.
2.	Dunja	X
3.	Ivan	I didn't find anything to say about it.
4.	Ena	Nothing!
5.	Stefan	It seems to be implemented properly and much time was invested in it.

Table 12: Missing element

disorders and he comments that what makes this webpage so peculiar is the pleasure the users derive when doing the quiz. He is not familiar with any other such medical aid for young people, which is additional confirmation that the webpage is truly special and different. In addition to recommending the webpage to other users, Ena emphasizes the fact that patients are at complete ease when doing the quiz, which is very encouraging in a world where teenagers are judged based on their imperfections. Stefan would also recommend this webpage and as a key feature of it he highlights the fact that it is visually appealing and that the users are immediately drawn to it and find it enticing.

To sum up, an overall conclusion regarding what makes this software unique and worthy of recommending to other users is its entertaining and convenient nature that could genuinely help the users overcome their problems, especially if we bear in mind that having fun is an integral part of young people's lives.

The 14th question inquires about the genuine likelihood of applying the webpage in the future, for which the respondents had various types of answers (Table 14). Although a very similar question had already been asked (question 11), the focus in that instance was whether the webpage could be

No.	Name	Question 13: Would you recommend this application to patients suffering from eating disorders and those who have concerns about their eating habits and body?
1.	Sara	I would definitely recommend it to anyone who has insecurities about this issue and it doesn't matter how old they are. The quiz is completely new and fun to use and it is useful because people get help from professionals.
2.	Dunja	I would recommend it! It is convenient convenience because we get feedback about serious topics without going to the doctor.
3.	Ivan	I would. It was interesting doing the quiz. I have never done anything similar to this.
4.	Ena	Absolutely! I think that this quiz is different because you can do it when you are relaxed and you won't be criticized by anyone.
5.	Stefan	I recommend this quiz. I think the animations look interesting and this is what makes it different. Also, it is fun to do and useful.

Table 13: Recommending the webpage

used in healthcare, whereas the emphasis in question 14 was how likely it would be to see such a webpage in the near future. Sara was optimistic about utilizing such a webpage and said that introducing this and similar software among young people in the future is highly likely as younger generations are fully immersed in the world of computers and mobile phones, so seeking help in such a format would be a realistic and desirable option, but the only question is whether doctors and other institutions would be willing to join. Dunja is also hopeful that such software could be more seriously utilized by a greater number of users as it would make the medical field function more smoothly and efficiently. Ivan has a slightly less optimistic view on the matter. Although he had praised the webpage and was satisfied with what it has to offer the patients, he is still not convinced that the utilization of such a webpage will reach its full potential in the near future. As the main reason, he states that he doubts that doctors might have reservations about giving feedback and this reluctance might be owing to the fact that they will never surely know whether the people on the other side of the quiz are real patients or if they are unserious users who are simply curious and decided to pass their time by doing some random quizzes online. In other words, the fact that the patients and doctors cannot communicate face-to-face might not always lead to the best results as nobody will fully understand the seriousness of the problem, so it could be perceived as a waste of time by the doctors. All in all, Ena believes that the webpage is a creative and convenient tool that both the patients and the doctors would not hesitate to use in the future because it is user-friendly and genuinely helpful in resolving eating disorders and that both sides would clearly and easily see the beneficial aspects of it. When it comes to Stefan, his previous answers seem to suggest that he was satisfied with the webpage on the whole. However, as regards the future it has, he is unsure of the path that this and similar webpages will have, stating that it is up to hospitals to determine whether the results of such a practice will be fruitful and effective in reality. In other words, he believes it is better to test it and see if the majority of youngsters, doctors, and official institutions would be willing to put their trust in this kind of software, but this would, in his view, be greatly dependent on the obtained results.

The responses to this question indicate that the participants have mixed feelings about the future application of the webpages. On the one hand, a certain number of them are generally optimistic about the future of this webpage whereas some of the respondents have realistic concerns about whether a serious matter such as this one could be dealt with efficiently if approached through entertaining software. The real doubt was whether it would be em-

braced by both ends of the process and society as a whole as serious enough to be introduced by institutions.

6.3 Future Implications and Actions

The webpage in question has been tested by a small number of users, which is probably the greatest shortcoming of this thesis. What remains to be done is to explain the benefits to a certain number of institutions of using such a webpage. It would then be up to the authorities to start informing patients of the existence of such software. Once they have been notified, they need to start using it and see if they like it. Doctors will obviously have to be involved in the whole process of providing feedback. Once a certain period of time has passed, it would be advisable to give the patients and the doctors a follow-up questionnaire similar to the one analyzed in this thesis to see their reactions and responses to the webpage. When the results are obtained, the next step would be to see if a large number of them are satisfied or not and what would need to be changed. However, before any of the mentioned steps are taken, it would be wise to take into account what the participants of this test have remarked. An in-depth view of the webpage reveals that using confirmation notes would be a good option to consider. The observation of one of the participants that the webpage could be used in the waiting lounge before having an appointment with the doctor is also a very realistic option that would need to be put forward to health institutions.

7 Conclusion

The consulted research indicates that eating disorders are a very present problem in the society we live in. Young people are predominantly suffering from such health issues and there is an apparent correlation between this age group and the group that is heavily exposed to social media, where food deprivation is indirectly being promoted. Since these young individuals often feel discomfort when having to deal with their health problems and communicating with doctors, who they often do not understand in face-to-face communication due to language barriers, the need for a tailored webpage (quiz) that would help them resolve their problems in a relaxed, user-friendly, encouraging, entertaining, efficient and professional manner seems to be the solution. One such quiz was created for the purposes of this master thesis using a variety of question types that were given to a number of five participants to complete. The point of the webpage (quiz)

No.	Name	Question 14: Do you think that this webpage will be used in Austria and Germany by health institutions in the future?
1.	Sara	Yes, because young people are used to spending time on their electronic gadgets and I think the way the quiz is made is very similar to what they already like. I think the real question is if doctors and hospitals will be open to the idea.
2.	Dunja	I think it will be used soon by a large number of people and hospitals will see that there are a lot of good sides.
3.	Ivan	I don't believe that too many people will use this in the near future. The doctors will be a bit skeptical because they can't know if these are real teenagers or if someone is joking with them.
4.	Ena	This is a creative, user-friendly, and helpful tool and the children and doctors will start using it soon. That's what I think.
5.	Stefan	Hospitals first need to test this webpage. If the results are good, everyone will use this in the near future.

Table 14: Future application

was to be equally edifying, informative, entertaining, and helpful for both the users and the doctors, taking into account that the language is simple to understand. Once the participants had finished interacting with the given software, they were provided with a list of questions to answer regarding the quiz they had previously been asked to complete. The usability testing stage was performed in a qualitative manner and remotely moderated by the author of the thesis. The participants, who belonged to different professions, some of which were in the IT field, provided their answers to the questions about their level of satisfaction with the created software. On analyzing the compiled responses, the answers indicated that the respondents were highly satisfied with how the webpage was working and did not have any major complaints regarding its features or structure. A certain number of them believed that the webpage (quiz) stood a chance of becoming a significant part of the medical system in the future while some of them had certain reservations as to whether a quiz would be taken seriously in the fight against eating disorders. A further step that would need to be taken is to try to get more people involved, especially health institutions, and try to establish what kind of response they would have to applying this kind of approach to dealing with this pressing issue in society. Once their feedback is obtained and if it ever enters the healthcare system, new and more comprehensive research would have to be conducted in order to see whether it is yielding the right results and whether the patients and doctors believe it is a sustainable solution.

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