

Exploring The User Requirement of Computerized Cognitive Behavioral Therapy for Depressed Adolescents

Atifah Marzuki¹, Siti Fadzilah Mat Noor¹,
Tengku Siti Meriam Tengku Wook¹, Wan Salwina Wan Ismail²

¹*Faculty of Information Science & Technology, Universiti Kebangsaan Malaysia, Bangi, Se-langor, MALAYSIA*

²*Department of Psychiatry, Hospital Canselor Tuanku Muhriz UKM, Cheras, Wilayah Persekutuan Kuala Lumpur, MALAYSIA*

Abstract – Despite being commonly perceived as healthy, approximately 20% of adolescents experience depression. To address this issue, computerized cognitive behavioral therapy (cCBT) has emerged as a potential solution. While cCBT has demonstrated effectiveness in treating depression among adults, its efficacy for adolescents lacks substantial evidence due to challenges in engaging them with the therapy. Thus, this study aims to identify the specific requirements essential for implementing cCBT with adolescents. By conducting semi-structured interviews with five patients, this research not only confirms existing findings but also unveils unique perspectives from the adolescents. Seven factors have been identified which are aesthetic, interactivity, accessibility, therapeutic alliance, exposure, audio, and personalization. The study findings contribute to a deeper understanding of implementing cCBT for depressed adolescents, informing future interventions and therapeutic approaches.

Keywords – Adolescent, computerized, CBT, depression, engagement.

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Corresponding author: Atifah Marzuki,
Faculty of Information Science & Technology, Universiti Kebangsaan Malaysia, Bangi, Se-langor, MALAYSIA


Email: atifahmarzuki@gmail.com

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1. Introduction

According to the World Health Organization [12], mental health problems, particularly depression, contribute significantly to the global burden of illness, accounting for 13% of the total burden. This highlights the widespread impact of mental health issues on individuals and societies worldwide. Following that, approximately 20% of adolescents are dealing with this disabling condition [32], [20]. The high prevalence of depression among adolescents has led to an increased demand for mental health services targeted towards this age group. Adolescents diagnosed with major depressive illness often face various challenges that impact their lives. These challenges include difficulties in academic performance and school attendance, as well as having long-term effects on everyday functioning and disrupt family and peer connections [74]. Additionally, adolescents are more susceptible to experiencing recurring depressive episodes, implying that if left untreated, even symptoms that have subsided over time will most likely return [63], [74]. Aside from antidepressants, evidence-based treatment such as cognitive behavioral therapy (CBT) has been recommended to treat depression in adolescents [43]. However, there are several barriers that hinder the accessibility of such treatments, including a scarcity of trained therapists or psychologists, an insufficient workforce concentrated in urban areas [11], a lack of awareness and stigma surrounding mental health services [9], [26], [49], and the resources and cost required to attend therapy sessions for adequate treatment [60]. Despite efforts to increase the capacity of mental health services for adolescents, the demand for face-to-face counseling continues to exceed the available supply [18]. This has led to the exploration of alternative approaches using information and communication technologies to enhance and expand the capacity of mental health services for adolescents [16], [17], [23].

One such approach is computerized cognitive behavioral therapy (cCBT), which has shown promise in reducing depression symptoms in adolescents. Recent research suggests that cCBT can be as effective as face-to-face therapy in treating depression among this population [31], [71].

Computerized therapies have the potential to address the significant treatment gap in depression; however, studies indicate that their full potential has not yet been realized [1], [23]. Although digital therapies are rapidly evolving, the development of digital therapies specifically for depressed teenagers is relatively limited [50]. In addition, the engagement and adherence to evidence-based digital interventions implemented with adolescents have been less robust [39], [20]. This highlights the need for further research to better understand the needs, preferences, and factors influencing engagement among young people. In order to sustain engagement and adherence, the requirement of an appropriate interface design for cCBT is crucial [33] to ensure continuous engagement towards cCBT. Understanding the requirements of end-users is a crucial step in developing technology-based therapies, as emphasized in human-computer interaction research [27], however, there is currently a lack of studies addressing users' demands and perspectives regarding mental health technologies [32], [76]. While some studies have mentioned difficulties encountered by teenagers during the development of digital interventions, they did not go into detail or reflect on the adolescents' perspectives on these issues [32].

Developing effective mental health interventions requires careful consideration of the needs of the intended users [41]. It is essential for interventions to be easy to use and perceived as useful by their users [5]. Involving young people in the design process ensures that their needs and perspectives are taken into account. Involving young people in the design process not only helps to gather their input but also empowers them by demonstrating that their thoughts and voices are valued [32]. Therefore, the aim of this study is to acquire and analyze the needs and requirements of adolescent patients to facilitate their engagement with computerized therapy. By understanding their needs and preferences, interventions can be tailored to better meet the unique requirements of this population and enhance their engagement and outcomes in mental health treatment.

2. Background

Currently, there are several technology-based therapies targeting adolescents [58], with the majority focused on cognitive-behavioral theories [47].

However, many of these interventions aim to replicate the experience of face-to-face therapy, often incorporating elements that may not be necessary or effective in a digital context [63]. Like face-to-face CBT, patients are required to interact with cCBT interface continuously until the end of the therapy. Therefore, success of a patient to complete a therapy is determined by their continuous engagement towards cCBT [15]. As stated by Schnall *et al.* [62], it is critical that patients are actively engaged in the use of technology, which may be accomplished entirely via the design of technologies that are viewed as usable and useful. Discontinuation of therapy can occur due to various factors, including a lack of understanding of how to use the software, intrusive or repetitive questions, a need for personalization in mental health advice, and a lack of motivation to interact with the program [53].

Most existing cCBT programs tend to share similar features [63]. When designing digital interventions, two important aspects to consider are usability and user experience, as highlighted by Hourcade J.P. [24]. Adolescents have distinct needs, capabilities, and motivations compared to adults, and therefore interventions designed for adults are often not suitable for teenagers [75]. Although most programs are "age appropriate," this customizing is frequently done at the content level. That is, while the systems may cater to teenagers' needs in terms of examples and reading levels, much of the same design ideas and interaction methods seen in adult programs remain [63]. A study done by [17] found that many young people liked a simple, uncomplicated design that offered plain, direct, unambiguous, and "straight-to-the-point" assistance when they or others were in distress. Some teens, on the other hand, believed that a gamey, enjoyable, or amusing setting may entice those who would not otherwise identify that they require or seek assistance [28]. The need of a nonthreatening, normalizing, and non-pathologizing approach was emphasized. Despite variances in favored style, there was widespread agreement that young prefer information that makes them feel good and helps them cope with difficult situations, with a focus on immediate impact rather than future outcomes [17], [76]. They also expressed a desire for freedom of choice, including the opportunity to select and choose interventions, and express a desire for assistance in various challenges or needs, such as bullying, relationship issues, self-harm, suicide, and other mental health issues.

Accommodating personal learning styles and preferences can enhance engagement in cCBT through the usage of multimedia, such as audio and video, makes the therapy more engaging and accessible to users [67].

Audio-video was preferred simply to take the consumers' attention away from reading and give them a break [36]. Incorporating elements of persuasive design, such as progress monitoring, individualized feedback, and customized information, can create a more meaningful user experience [46]. Additionally, gaming characteristics such as following a narrative and incorporating visual imagery and virtual characters, have been recommended to enhance learning and engagement in cCBT [18], [30]. These elements can make the therapy more interactive and immersive for adolescents. It is also found that unfamiliarity with the programs and a lack of understanding on how to use them are barriers to initial cCBT use [57]. Additionally, addressing the barriers of unfamiliarity with the program and a lack of understanding on how to use it, adolescents suggested including aids in the cCBT program, such as video tutorials and picture explanations. These aids can improve ease of use, particularly for younger adolescents and those with low health literacy. To enhance the simplicity of use, researchers have found that reducing the amount of text, improving navigational directions, and shortening therapy modules are associated with improved adherence [74]. By streamlining the content and providing clear instructions, users can navigate the cCBT program more easily and stay engaged throughout the therapy.

Adolescents have unique characteristics, such as poor concentration levels and a desire for quick gratification, which emphasize the importance of capturing their attention right from the beginning of the computerized therapy program. To achieve this, the program should have a visually appealing and easy-to-follow interface that is activity-based [35]. The value of an attractive interface that employs color and images, as well as the opportunity to customize the interface, was stressed in research [32]. Their research also highlights the need for computerized therapy programs to offer something novel or distinctive to stand out and attract adolescents. Culturally relevant programs [15], the use of relatable characters and language, and content customization depending on user preferences, has been found to increase adolescent engagement and satisfaction [74]. Elements of local contexts [61] are prone to increase continuous engagement towards cCBT, thus, cultural factors should be taken into consideration to ensure continuous engagement towards cCBT.

Providing support throughout the program completion process has been shown to improve adherence and treatment outcomes. A body of studies has supported the significance of 'shared variables,' such as the working alliance, in achieving beneficial treatment results in traditional face-to-face therapy [37].

Treatment support has also been found to be a moderating element impacting therapeutic results and engagement [23]. Similarly, in technology-based therapies, treatment support plays a moderating role in influencing engagement and therapeutic results. Therapeutic support can enhance engagement and motivation to use technology-based therapies, and it is likely to have a positive impact on future utilization [21]. Recognizing that users perceive the computer as a social actor suggests that interfaces that promote collaboration and connection can facilitate the formation of collaborative relationships and a sense of connection between patients and the computerized therapy itself [34].

3. Method

The study obtained ethical approval from the National University of Malaysia Research Ethics Department. Data was collected using a semi-structured interview method. In order to define and examine technology usage and design for users with mental disorders, qualitative methodologies were used in this study [4]. Participants were five adolescents (20% male and 80% female) aged 17-19 years who are currently undergoing cognitive behavior therapy sessions in National University of Malaysia Medical Center, Kuala Lumpur. Since the participants were underage, both the health facility and their parents were involved in the informed consent process. Parental information papers and consent forms were provided to the participants, and signed consent forms were obtained before their participation. The interview was conducted individually using a semi-structured interview guide, which ensured consistency and comparability of data across sessions. The interview guide included a list of questions and topics to be addressed, allowing flexibility for relevant discussions that deviated from the guide when appropriate [7]. The questions used in the semi-structured interview were validated by experts prior to the user requirement study (Table 1). Expert validation is a valuable method for assessing the content validity of surveys conducted quantitatively. Lynn [40] suggests that a minimum of five experts should rate items on a scale to determine content validity, while a more reliable determination can be achieved with ten experts. Content validity can be assessed through face-to-face interactions and expert evaluations, using validity indices and percentage agreement [25]. Items that received agreement from at least 80% of the experts were included in the instrument. This approach of determining content validity through expert validation is widely used and considered to be reliable for demonstrating the content validity of an instrument.

Validation is an essential process, particularly when developing instruments to measure constructs in the context of the concepts being studied [10]. Without proper validation, there is a risk of using unreliable or invalid data, which may lead to incorrect conclusions or the need for revisions in future studies. In this study, validation and review of the instrument were conducted with five experts using an online questionnaire before engaging with users. In this study, validation and review of the instrument were conducted with five experts using an online questionnaire. The choice of an online questionnaire as the data collection method provided several advantages. It offered flexibility to the experts, allowing them to complete the questionnaire at their preferred time and place. The online questionnaire also included links to existing computerized therapies, which served as references for the experts. This feature allowed them to gain a better understanding of the context and provided them with examples to support their suggestions or comments on designing computerized therapies for adolescent patients.

The inclusion of such references enhanced the quality and relevance of the feedback provided by the experts.

The engagement factors and attributes derived from the literature review conducted prior to the study, ensuring that they were relevant to the context of computerized therapy for adolescents. During the validation process, experts were asked to rate the importance of each attribute. If the majority of experts agreed on the importance of a particular attribute, it was considered validated. The results of the validation, as presented in Table 1, showed that all attributes were rated as important, except for characterization. The finding that 60% of adolescent psychiatrists disagreed with the use of characterization in computerized therapy for adolescent depression suggests a divergence of opinions on this attribute. One expert explicitly stated that they did not perceive characterization as playing a significant role in therapy. Other experts also expressed doubts about the inclusion of characterization and how they could contribute to engaging adolescents with computerized therapy.

Table 1. Validation of core factors

| Engagement factor | Attributes | Validation (%) | |
|----------------------|--|----------------|----------|
| | | Agree | Disagree |
| Therapeutic alliance | Virtual therapist/agent [56], [63] | 100 | 0 |
| | Characterization [54] | 40 | 60 |
| | Frequent response/follow up [51], [56] | 100 | 0 |
| | Praise/reward [69] | 100 | 0 |
| Personalization | Customization [13], [14], [22] | 100 | 0 |
| | Tailoring [9], [22], [56], [64] | 100 | 0 |
| Exposure | Introduction at the beginning of the program [6], [72] | 100 | 0 |
| Interactivity | Collaborative [54] | 100 | 0 |
| | Responsiveness [51] | 100 | 0 |
| Aesthetic | Novelty [3], [45], [48] | 100 | 0 |
| Audio | Narration [3], [48] | 100 | 0 |
| Accessibility | Simple layout [56], [59], [73] | 100 | 0 |
| | Easy navigation [44], [55], [59], [68], [73] | 100 | 0 |
| | Tracking/saving [13], [73] | 100 | 0 |
| | Flexibility [44], [68], [73] | 100 | 0 |

Before conducting the interview, participants were asked to use an online CBT program called MoodGYM as computerized therapy has not yet been implemented in Malaysia.

This was done to provide them with firsthand experience of computerized therapy and to enable them to compare their experience with face-to-face therapy.

By using MoodGYM, participants could gain a clearer understanding of their needs and preferences when it comes to computerized therapy. MoodGYM (Figures 1 and 2) is a well-known online CBT program that has been developed by Christensen, Griffiths, and Korten [8]. It has been proven effective in preventing and treating mild to moderate depression in randomized controlled studies [42].

It has also been the topic of research [19], [65]. MoodGYM consists of five modules, each containing 29 activities and assessments. It also includes an interactive game and resource downloads. Participants were given the opportunity to engage with the different components of MoodGYM and explore its features and functionalities.

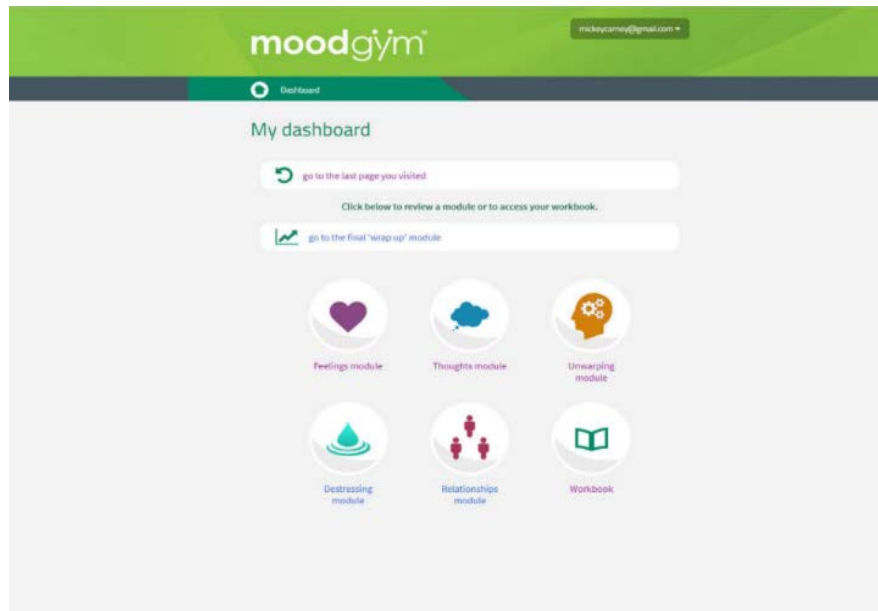


Figure 1. Screenshot of MoodGYM.

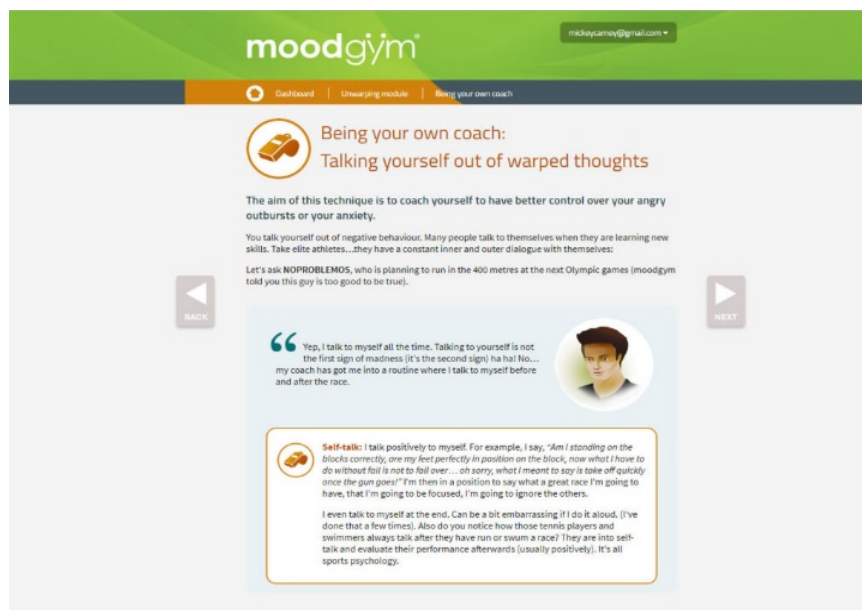


Figure 2. Screenshot of module in MoodGYM

The first module of MoodGYM, the feelings module, where users are exposed to a collection of characters that depict a spectrum of functional and dysfunctional thinking patterns, was made a test subject since they had all attended a few therapy sessions. Additionally, the participants were asked to choose and complete one homework assignment of their preference from the program.

This allowed them to engage with the interactive exercises and activities within MoodGYM. During their use of MoodGYM, the participants' user experiences were recorded using the Windows 10 Xbox screen recorder.

This recording method allowed for detailed analysis of the participants' interactions and patterns of engagement with the program.

After completing both the feelings module and a homework assignment, the participants were interviewed to gather their thoughts and insights on the usage of computerized cognitive-behavioral therapy (cCBT). The interviewer used a set of interview questions as a guide, which included prompts to elicit more information from the participants as needed. The interviews were recorded and later transcribed verbatim, ensuring that the participants' responses were accurately captured.

Thematic analysis was used to examine the data. This is a flexible qualitative analysis approach that enables the detection of response patterns within the data. Thematic analysis was chosen for this study as it provides a comprehensive and in-depth understanding of the participants' opinions and perspectives on the topic under investigation [4]. During the analysis process, the transcribed interview data, as well as any other relevant data, were thoroughly reviewed and coded. Codes were assigned to specific segments of the data that represented meaningful concepts or themes.

These codes were then organized into broader themes and sub-themes, capturing the key ideas and patterns emerging from the participants' responses. This allowed for the identification of common patterns and variations in the participants' experiences and perspectives regarding the usage of cCBT.

4. Result

All the participants reported they had no prior experience with using cCBT for depression and were never exposed to this kind of intervention. However, one participant, an 18-year-old female, mentioned that she is currently using a mobile application for anxiety. Seven core themes have been listed which are: therapeutic alliance, personalization, exposure, interactivity, aesthetic, audio, and accessibility. These core themes were identified based on the literature review conducted prior to the study, and they were further validated by experts as seen in Table 1. Table 2 provides sample responses from the participants, illustrating their perspectives and experiences related to these core themes.

Table 2. Themes and sample responses within the data

| Themes | Sample responses |
|----------------------|--|
| Therapeutic Alliance | 'It is possible to develop a sense of companionship with the program. It does give a bit of sense of empathy and genuineness' (Male, 18 y.o) |
| Personalization | 'I feel like we need both personalized and generalized feedback in case the personalized ones did not work. It is different for everyone and if the advice does not work, they might feel frustrated' (Male, 18 y.o) |
| Exposure | 'I think it is better to have like a one-page tutorial at the beginning of the program. Maybe something like the whole page darkens and points at things to show how it works' (Male, 18 y.o) |
| Interactivity | 'I would love if the program had more interactions rather than just reading and do quizzes' (Female, 18 y.o) |
| Aesthetic | 'I prefer the cCBT to have more colorful interface design' (Female, 17 y.o) |
| Audio | 'Since I am partially blind, I prefer if the program has audio or narrations' (Female, 18 y.o) |
| Accessibility | 'I wish there would be less texts and the texts should not be too small and cramped' (Female, 17 y.o) |

4.1. Therapeutic Alliance

The participants in the study emphasized the importance of developing a sense of partnership or what we called a therapeutic alliance with the cCBT for them to engage and adhere to the intervention. They expressed that the program should not be too passive or computer-like, but rather have some human touch and demonstrate empathy as it will feel like the program can relate with their problem and is able to help them get out of it. They also expressed that it is possible for them to develop a sense of companionship with the program if the program features are delivered according to their need and preferences. The participants reported that cCBT has the potential to offer a sense of empathy and genuineness in helping them recover from depression. They also reported that with cCBT, they found reassurance in knowing that there is something to rely on and support them, especially in situations where access to psychiatrists or therapists may be limited or when they experience social anxieties.

Most of them agreed that adding a virtual therapist or agent to the program would be helpful and can encourage their engagement with the cCBT. While they acknowledged their ability to use the program on their own, they expressed the need for guidance and someone to talk to during certain moments. One patient even noted that if you want to get better it will be nice to have someone to guide you through the process. The virtual therapist or agent was seen as a means to enhance interactions and develop a therapeutic alliance between the program and the user. Participants emphasized that the virtual therapist or agent does not necessarily have to be in human form, but it should be able to engage with the user and respond appropriately. They believed that the presence of a virtual therapist or agent would make the cCBT experience more comfortable and less detached. Furthermore, participants highlighted the importance of personalization in conveying empathy effectively. They expressed that the cCBT should not be too generic, as a personalized approach would facilitate a stronger sense of empathy and connection with the program.

4.2. Personalization

The participants highlighted that cCBT must be personalized to the user for them to maintain their engagement with the digital intervention. They expressed that personalization should apply to both the content and responses of the program. This includes customization options such as themes, text size, sound, and the type of virtual therapist used. Participants felt that personalization plays a significant role in establishing personal relevance.

They preferred a more personalized program that included more questions and detailed explanations within the modules. They believed that a generic program would make it difficult for them to relate to their own experiences and issues. However, it was also acknowledged that not everyone may prefer a fully personalized program. One participant suggested that the program should provide both personalized and generalized feedback. This would ensure that if the personalized advice did not work for a particular individual, they would still have access to more generalized guidance. This approach would help prevent frustration and potential discontinuation of the program when the provided advice does not yield the desired results.

4.3. Exposure

The participants expressed the need for exposure to the cCBT program before engaging in the modules. They believed that this exposure would provide them with a clear understanding of what they can expect to achieve and the outcomes they can attain by using the program. This exposure would also serve to increase their motivation to engage with the program. Participants emphasized the importance of having an introduction to CBT at the beginning of the program. They felt that this introduction should provide information about depression and explain how CBT works in addressing depressive symptoms. This would help them develop a better understanding of the therapeutic approach and its potential benefits. Additionally, some participants suggested the inclusion of a short tutorial at the beginning of the program to familiarize them with the functionalities and navigation of the cCBT program. This tutorial would address any potential confusion or challenges they might encounter when using the program, ensuring that they feel more comfortable and confident in engaging with it.

4.4. Interactivity

The participants emphasized the importance of interactive and non-linear cCBT programs. They found linear interaction to be restrictive and lacking in empowerment, which could lead to disengagement from the program. They expressed a desire for collaborative interactions, where they have the freedom to explore and work within the program according to their preferences. Providing limited options or a predetermined path was seen as less appealing to them. The responsiveness of the cCBT program was also highlighted as crucial for maintaining engagement. Participants preferred immediate responses or feedback from the program, as it allowed them to share their feelings and concerns in real-time.

They believed that timely feedback made their interactions with the program more meaningful and relevant to their needs. One of them expressed a preference for more interactive functions, such as games or videos. These interactive elements were seen as engaging and enjoyable, providing a break from traditional text-based content and enhancing their overall experience with the program.

4.5. Aesthetic

Patients suggested that the interface design should be straightforward and purposeful, specifically aligned with the principles of cognitive behavioral therapy. It does not necessarily mean the interface design should be colorful and have lots of graphics. Instead, the use of multimedia should be balanced and optimized. Patients expressed a preference for a clean and uncluttered design that is easy to navigate and understand. They believed that a simple interface design would make it easier for them to engage with the program and focus on the therapeutic content. It's important to note that patients did not necessarily advocate for a colorful or graphics-intensive interface. Rather, they emphasized the need for an interface design that is user-friendly and supports their engagement with therapeutic content. By prioritizing simplicity, cCBT programs can create an interface that is accessible and conducive to effective engagement for adolescent patients.

4.6. Audio

Adolescent patients emphasized the significance of audio usage in cCBT programs, particularly in the form of narration. They expressed that having narrations in the program positively impacts their engagement with the therapy. According to their feedback, narration adds emotional depth to the content and enhances the sense of empathy between the program and the user. Participants highlighted that empathy and genuineness cannot be effectively conveyed through text alone. They emphasized the importance of audio in creating a more immersive and empathetic experience. By incorporating narration, cCBT programs can enhance the emotional connection and engagement of adolescent patients, making the therapy more impactful and relatable. By utilizing audio effectively, programs can enhance therapeutic impact and facilitate better engagement with the therapy content.

4.7. Accessibility

Adolescent participants stressed the importance of accessibility in cCBT programs.

They emphasized that the program should be user-friendly and easy to navigate, even for those with low computer literacy. Simple and concise language was preferred, as it ensures clarity and reduces confusion. Participants also mentioned the need for visible functions and options, allowing them to easily understand and interact with the program. Flexibility was another key aspect highlighted by the participants. They expressed the desire to have freedom in choosing their own path within the program, rather than being restricted to a predetermined sequence. This flexibility allows users to engage with the content in a way that suits their individual preferences and needs. Participants also appreciated the inclusion of tracking or saving functions in the program. This feature allows them to monitor their progress over time and provides a sense of continuity and control. Some participants noted that they may not be able to complete all activities in one sitting, and having the ability to save their progress and return to it later was seen as beneficial. By considering these aspects, cCBT programs can enhance engagement and provide a more inclusive and effective therapy experience for adolescents.

5. Discussion

The user requirements analysis conducted in this study aligns with previous research on engaging adolescent patients with cCBT for depression. The identified gaps in existing interventions and the importance of factors such as cognitive capacity, motivation, and empathy are consistent with previous findings. However, there are some varied opinions from the patients. These opinions have been considered and studied. We also confirmed that the limited cognitive capacity of cCBT users does affect their engagement and experience when using the intervention. It is known that a patient who is suffering from depression has a temporary limitation of their cognitive capacity which makes them have difficulties in processing things compared to a normal person. This is also redeemed as crucial in the study of engagement with cCBT. In this study, we also found that user motivation and the level of empathy being delivered in the cCBT also play important roles in engaging adolescent patients with the cCBT. As highlighted in previous studies, there are distinct differences between designing interventions for adult and adolescent patients. This is due to the differences in cognitive capabilities and preferences in adults and adolescents. Existing cCBT often disregard this factor and implement the same design for adult patients in cCBT for adolescent patients. In comparison to adults, the presentation and treatment of depression in young individuals differs [29].

The assumption of adapting traditional interventions to digital platforms without considering the unique characteristics and preferences of adolescents may hinder engagement and effectiveness. It is crucial to explore and leverage the specific features and capabilities of technology systems to develop interventions that effectively engage and support teenagers. This age group's unique technologies have mostly gone undiscovered. There has been relatively little study on the challenges faced by individuals with mental illnesses in using digital therapies and the potential facilitation methods to overcome these barriers [2]. Adolescents often appreciate interventions that are delivered via technology that they already use, according to Ranney *et al.* [52]. As a result, it's critical to keep studying cCBT for depression in adolescents so that engaging and successful programs can address this public mental health need [38].

The recent research [66] into a mental health intervention for self-harming teenagers emphasizes the importance of involving adolescents with lived experience in the design of interventions, particularly for program acceptance [21]. Given the complexities of the elements that influence program engagement, implementation research must go beyond analyzing program acceptability to investigate how effectively the program responds to the target audience's individual needs and preferences. While visual appeal was highlighted as important for program use, functionality and self-management potential were considered equally or even more important for sustained engagement [57]. The program's relevance and presentation of information were also key factors in capturing the interest of young people. However, it should be noted that adolescents may have varying perceptions of what constitutes the right approach [17]. This information is critical for determining how programs should be designed to optimize engagement and effectiveness, as well as what constitutes excellent execution [70]. However, there has been little study on young people's perceptions of computerized mental health programs, which could be utilized to increase the relevance of such programs for youth. This would involve exploring a wider range of digital alternatives and tailoring interventions to specific youth populations. By promoting engagement and addressing individual preferences, digital mental health programs can better serve the diverse needs of young people [17].

6. Conclusion

Our research provides valuable insights into the specific needs and preferences of adolescents regarding cCBT to enhance their engagement with the therapy.

Adolescents prefer a user-friendly interface that is simple, straightforward, and aesthetically appealing to them. Interactivity is also crucial to keep them engaged throughout the therapy process. They also require support and motivation to progress through the therapy and stay committed until its completion by incorporating features that foster a therapeutic alliance between the user and the cCBT. It is crucial that the therapy is relevant to the adolescent's specific goals and needs. This can be achieved through personalization of both the content and interface of the cCBT. Usability is another important aspect to consider, as the cCBT should be accessible and easy to navigate for adolescents. It should provide options and features that help them familiarize themselves with the program and reduce mental effort. By addressing these specific requirements and considerations, cCBT can better meet the needs of adolescents and enhance their engagement with the therapy, leading to more effective mental health treatment outcomes.

Overall, adolescents have shown positive reactions towards cCBT despite its novelty, indicating their willingness to accept this form of mental health care. However, sustaining their engagement with the program can be a challenge. It is important to address this challenge in order to ensure the effectiveness of cCBT for adolescents with depression. Nevertheless, it is not impossible for them to achieve a positive engagement when using cCBT. The findings of this study highlight the significance of engagement as a core factor in the success of cCBT for adolescents. Involving the adolescents themselves in the design of the intervention is crucial to enhance their engagement and make the program more effective. Furthermore, the study suggests the need for more detailed research on gender bias and the usage of language in digital interventions. Understanding these factors can help improve the design and effectiveness of future interventions for adolescents with depression.

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