Developmental Evaluation of an e-Counselling and Learning Application for Parents of Children with Attention Deficit Hyperactivity Disorder

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Abstract. Attention deficit hyperactivity disorder (ADHD) is a common mental disorder among children and adolescents. In Austria, approximately 5% of children and adolescents have ADHD, which includes 89,000 children. This paper describes our approach of developmental evaluation of a smartphone app designed to support parents of children with ADHD. We conducted usability tests and interviews involving eleven parents and four children iteratively. Although the general feedback was positive, the high number of identified optimizations highlights the importance of user testing.

Keywords: Developmental Evaluation · Application · ADHD

1 Introduction

1.1 Attention Deficit Hyperactivity Disorder

Attention deficit hyperactivity disorder (ADHD) is one of the most common mental disorders among children and adolescents [1]. With a prevalence of approximately 5% [2], approximately 89,000 children in Austria meet the diagnostic criteria for ADHD. The main symptoms are attention deficits, hyperactivity and impulsivity [3], which result in increased daily stress and dysfunction in family life [4].

Occupational therapy can make an important contribution to improving symptoms in daily life, independent of medication [5]. However, there is a lack of occupational therapy and support in the home environment in Austria. Apps could provide effective,

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low-threshold access to professional guidance. Yet, the existing apps for ADHD are mainly aimed at assessing or treating symptoms [6].

Thus, the aim of the project is the development of an app with evidence-based occupational content and tips to support parents with ADHD-diagnosed children in everyday life.

1.2 Description of the Initial ELSA Prototype

Navigation through the interface is facilitated by a home screen, a burger menu in the right-hand corner and a bottom navigation bar. The home screen displays graphical icons for three sections: Home, School, and Leisure. When starting the application, users assess twenty everyday situations with a Likert scale (never - very often). According to the answers, an individual selection of recommendations is provided. Each tip consists of an instructional text and a video, which shows the situation and application of the tip. A lexicon gives background information. Printable templates (e.g. checklists), a list with contacts (e.g. hospitals) and an online forum for exchange are embedded. The burger menu provides sub-categories such as "profile", "statistics" "settings" and "legal notice". Users are accompanied by an avatar, which goes through five stages of evolution.

2 Methods

This developmental evaluation was conducted iteratively throughout the development of the application. Parents of children with ADHD and their children participated in the research. Ethical approval was obtained.

Parents evaluated the app on a smartphone provided under the observation of a researcher. As part of the usability tests, the participants used the think-aloud method [7].

Subsequently, they were asked questions in a semi-structured interview. In this iterative process, the findings from interviews were fed back to the development team, who adapted the app. The systematic data analysis was conducted according to the content structuring qualitative content analysis by Kuckartz [8].

3 Results

A total of eleven parents of children with ADHD and four children diagnosed with ADHD participated in the study. The results of the user feedback and the changes to the first prototype version are as follows:

Two of the initial questions required revision to make them self-explanatory. The slider to answer the questions was not recognized as such, which resulted in the addition of a short demo animation. A further problem occurred when reinstalling the app after removal from the home screen. This issue was rectified by saving the answers and taking the user directly to the home screen.

Since not all participants could clearly comprehend which tips had been selected for them, colors were introduced to mark the selected tips and headings such as "especially interesting for you" and "also interesting for you" were added. Some participants stated that the texts should stand alone. Therefore, the texts were adapted to stand-alone texts that complement the videos.

To establish comprehensible connections between the various parts of the app, terms that appear elsewhere in the app were connected via hyperlink to the lexicon. The templates were made more attractive and appealing. The prototype version merely allowed downloading all templates at the same time, which was adapted to enable the selection of templates. The contact addresses appeared as a list, which did not clearly indicate the option of selection. This was solved by using a different, more intuitive design. The options "structure of the app" and "about us" were added in the burger menu including general app information.

All participants liked the design of the avatar except for one child who preferred a more realistic avatar. Two other children wished for more than five evolution stages of the avatar and one child would enjoy a game to play within the app.

4 Discussion

The feedback during the iterative development process shows the importance of involving the target group in this ongoing process. When including users in this process their needs can be met better [7].

As expected, a few technical problems that occurred within the app had to be overcome. Some feedback showed that not all functions were obvious or self-explaining. Feedback concerning the wording stressed the importance of precise wording that is understandable to non-specialists.

In the future, the app should be accessible and meet the needs of a wide variety of users. It should be intuitive, clearly structured and easy to use. Recent literature stresses that the likelihood of siblings or parents of a child with ADHD also having ADHD in the range from 10 to 35% [9]. Therefore, the app was adapted to offer even more structure, shorter text passages and ready-made templates.

We encourage parents to adapt the tips to their needs and family life. The app is not intended to replace therapy. It shall provide low-threshold assistance for families while waiting for occupational therapy treatment or in addition to it.

5 Conclusion

This study highlights the importance of target group involvement in the development and evaluation, as this allows requirements, performance and usability issues to be captured.

Results show that every person has individual needs and ideas on how the app should look. The next step in this project is testing the final version of the app.

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