An App Prototype to Support Driver Learners With ADHD

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Abstract

Having a driver's license can greatly enhance a person's quality of life by opening up opportunities for employment and social involvement. However, the process can be particularly difficult for individuals with ADHD, whose common symptoms, such as challenges with focus, planning, organizing, and task completion, can make it difficult to follow the necessary steps for driver education, including organizing training and preparing for the theoretical exam. Based on existing theories and interviews with driving instructors, we have created a prototype for an app designed to support people with ADHD through driver education. The interviews highlighted key difficulties, particularly with studying for the theoretical test and maintaining structure. The app incorporates features that assist users in organizing and planning their driver's education, as well as interactive tools to help with theoretical learning. The app is grounded in research on the benefits of interactive learning for individuals with attention deficits, as well as studies on how technology can help people with ADHD create structure and reach their goals.

Keywords: *ADHD, Education App, driver education, attention deficits*

Introduction

Obtaining a driver's license can greatly enhance a person's quality of life by opening opportunities for employment and social participation. However, the process can be particularly difficult for individuals with ADHD, whose common symptoms, such as difficulties with attention, planning, organizing, and task completion [1], can make it difficult to follow the necessary steps for driver education, including organizing training and preparing for the theoretical exam. In previous research ADHD is linked to challenges with the theoretical aspects of obtaining a driver's license [2]. ADHD is associated with academic challenges and the symptom of inattention is described as one of the main contributing factors to this [3]. Consequently, difficulties in planning and organizing as well as inattention can be a barrier for people with ADHD to obtain a driver's license.

How can we support individuals with ADHD during driver education, for example by supporting attention and organization? Recently, mobile apps have been developed to support individuals with ADHD in different aspects of everyday life [4,5,6]. Individuals with ADHD have emphasized that phones are a valuable tool for example, due to their alarm function [5]. People with ADHD can be forgetful in daily activities and for example struggle keeping appointments [1]. The alarm function can help people with ADHD manage tasks and time effectively by capturing their attention and helping them actively remember important tasks [5].

Moreover, symptoms of ADHD can vary depending on the context within a given setting, for example signs of the disorder may be minimal or absent when an individual is engaged in activities they find especially interesting, has consistent external stimulation (e.g., via electronic screens) or is receiving frequent rewards for appropriate behavior [1]. Furthermore, presenting tasks in an engaging, game-like format has been reported to improve performance in individuals with ADHD, highlighting the benefits of creating a learning environment that supports skill acquisition and knowledge transfer for students with specific needs [7]. Moreover, the theoretical part of driver education has been shown to be a challenge for driver learners with ADHD [2,8] thus creating a digital platform which incorporate these features can be a valuable tool to support this group with this challenge.

Research on multimedia learning highlights the importance of considering the limited-capacity assumption of working memory [9] and structuring digital platforms in ways that reduce and manage cognitive load (also referred to as working memory load), to facilitate knowledge transfer and prevent cognitive overload [10]. Individuals with ADHD have been found to experience working memory difficulties [11,12,13], therefore, effectively managing cognitive load is especially important when designing digital platforms intended to support this group.

Aim

The objective of this study was to develop a framework that supports learner drivers during their driver education, with a particular focus on individuals with ADHD. The project focused on the importance of structure, user engagement and usability. The aim was to create a framework in the form of a well-structured app which promotes learning and success during driver education for people with ADHD.

Method

Based on existing theory and interviews, a prototype of an app was developed and tested. The prototype was developed in Figma and designed to aid people with ADHD during driver education. The app focused on including features to help users plan and structure their driving education, as well as interactive tools for studying theory.

Participants

Two sets of participants were included in this study. Initially, 4 driving instructors were interviewed to gather information about the challenges individuals with ADHD face during driver education as well as effective ways to aid their learning. The respondents had experience working with students with ADHD and were recruited through a convenience sample. During prototype testing, a second group of six participants was recruited from a convenience sample of students at Linköping University.

Procedure

All participants were informed about the purpose of the study, that their contribution was anonymous, that they could withdraw at any time and signed an informed consent. The interviews were performed in person and recorded. The interview questions examined the driving instructors' experiences teaching students with ADHD. They focused on key traffic situations to practice, challenges related to attention, risk assessment, and impulsivity, and how these differ from neurotypical learners. The questions also addressed instructional adaptations, use of digital or technical aids, and needed resources. Additionally, they explored how instructors evaluate progress, student feedback, and the impact of individual backgrounds on learning. Finally, instructors were asked to share successful examples and offer further reflections.
The Figma prototype was tested using a test protocol in which participants were asked to navigate the prototype, for example, by being instructed to locate specific features. Participants in the test session completed a pre-questionnaire with background questions related to their studies and driver education, followed by a post-questionnaire evaluating the prototype, including aspects such as ease of use.

Design Process

Based on the interviews and previous literature two personas were created, the personas represent typical examples of individuals with ADHD which the app is aimed at supporting. Based on the identified needs in the interviews and based on the personas, broad and open design goals were formulated. The design goals were then specified and refined. Based on the interviews as well as previous research, the design goals and the personas, user scenarios were designed to illustrate challenges and situations the user group, driver learners with ADHD, may encounter during driver education. From these scenarios, functional requirements were identified, based on potential solutions for each scenario and how these solutions could be implemented, and addressed through features in the prototype. Based on the design goals and functional requirements, an initial basic prototype was created in paper format. The paper prototype was tested in a workshop setting, where one new user evaluated various design features according to a test protocol. Following this, a more detailed prototype was developed in Figma.

Results

The prototype design was created based on three overarching design goals: structure, organizing features, engaging design, and accessibility. During the interviews, the driving instructors emphasized that students with ADHD often face difficulties related to the theoretical test, planning, structure, and the ability to take initiative in starting and completing tasks. Based on the goal of structure, the design should aim to minimize cognitive load and reduce the risk of the user becoming distracted or losing focus. Based on the goal of organizing features, the prototype should include features that support the user in planning and organizing their driving education. The goal of engaging design is to help the user maintain both focus and motivation. Regarding accessibility, the design should be easy to use and accessible for all users.

The Prototype

To design a structured application that minimizes cognitive load and reduces the risk of the user becoming distracted or losing focus, the layout was kept simple, with minimal information presented in each feature. In features where more information was necessary, bullet points were used to present the content clearly. The simple and structured design was also developed with accessibility in mind, ensuring that all users can navigate the application easily without becoming overwhelmed or distracted.

To aid the user with planning their driving education features like notifications, scheduling, a to-do-list and feedback from the driving school or driving instructor was included in the design (Figure 1). The notifications help the user remember plans connected to driver education such as driving lessons and when to study for the theoretical test. In the scheduling features the user can get an overview of planned lessons and which days the user is planned to study for the theoretical test. With the feedback feature, users get a clear view of what they need to work on to improve. The to-do list allows them to organize tasks and prioritize what to focus on and in what order. Theory content is divided into smaller goals with clear endpoints for each step. Users will receive encouragement and feedback upon completing each sub-goal and be able to visually track their progress in real time.

Figure 1. Organizing features. On the left: Teacher responses, today's to-do list, and calendar. In the center: Study plan, including available study days and preferred days for more intensive study. On the right: Teacher feedback from each driving lesson and its content.

To create an engaging design, the prototype includes a game feature (Figure 2). In this feature the user can study for the theoretical test in a quiz-style format and answer theory questions, match traffic signs to meanings as well as act in simulations of traffic situations. The prototype also includes a feature where users can challenge other users in the quiz. The came feature incorporates a point system to track performance and progress in the game, the progress can be shared with other users.

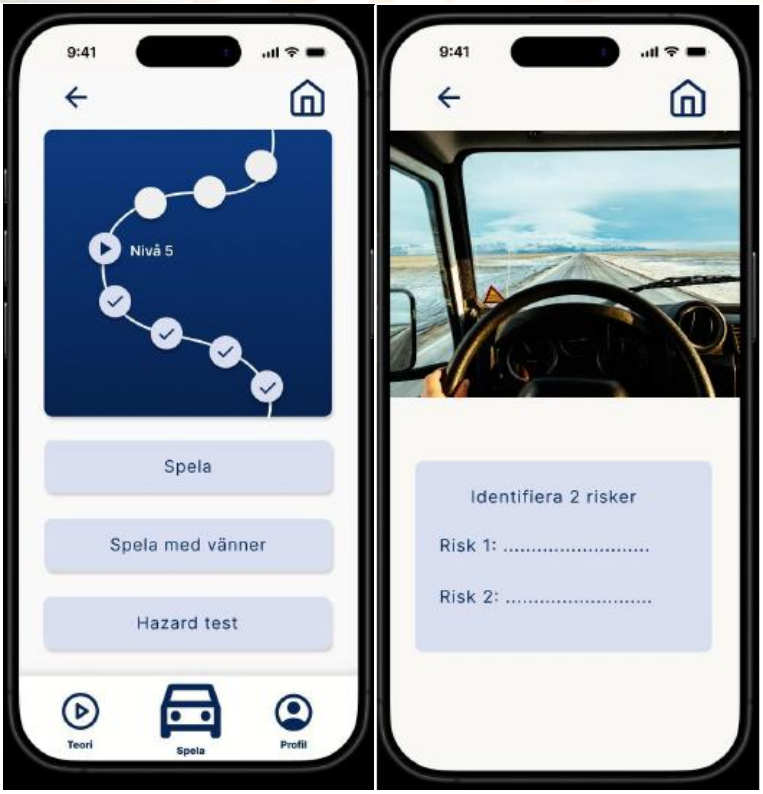

Figure 2. Gaming feature. On the left, the options are Play, Play with friends, and Hazard Test. On the right, an example of a Hazard perception test.

Testing Usability

The evaluation-test indicated that the prototype was considered useful for driver education and that is was a usefull way to structure the education process. The evaluation-test also indicated that the content for example feedback from the drivning instructors was easy to understand. Test users also said that the prototype was easy to use and navigate and that it had a clear structure.

Discussion

The objective of this study was to develop a framework that supports individuals with ADHD during their driver education, addressing known difficulties related to attention, organization, and motivation. Building on both previous research and qualitative input from driving instructors, a prototype of a mobile app was developed. This prototype aimed to support users throughout their driver education process, particularly focusing on the theoretical components, which have been shown to be especially challenging for learners with ADHD [2,8].

The prototype was developed with three primary design goals in mind: structure and organizing features, engagement, and accessibility. These goals were directly informed by both the scientific literature and interviews with driving instructors, who consistently emphasized that their students with ADHD often struggle with structuring their studies, initiating tasks, and maintaining focus. To address these issues, the design focused on minimizing cognitive load—an important consideration given the known working memory challenges among individuals with ADHD [11–13]. As a result, the app features a clean, uncluttered interface with minimal text and uses bullet points to present key information clearly and concisely.

Accessibility was prioritized to ensure that all users, regardless of ability, could navigate the platform with ease. Furthermore, engagement was promoted through the incorporation of gamified learning tools. These include interactive quizzes, sign-matching tasks, and simple traffic simulations aimed at helping users study for the theoretical driving exam in a dynamic, reward-driven manner. A point-based system was also implemented to encourage motivation and offer feedback on progress, reflecting previous findings that consistent rewards and engaging content can enhance performance and focus in individuals with ADHD [1,7].

Additionally, the app includes features that support planning and organization, such as a personalized calendar, a to-do list, and study planning tools. These features help users break down their driver education into manageable steps, supporting executive functioning and reducing the cognitive burden often associated with organizing and completing complex tasks.

The initial evaluation-test of the prototype, conducted with a small group of students, suggested that the app was considered easy to use, clearly structured, and helpful in supporting the learning process. However, this test should be interpreted as a pilot usability assessment rather than a conclusive evaluation. Further testing with a larger and more representative sample, particularly including individuals from the target group (i.e., learners with ADHD), is necessary to refine the app and ensure its effectiveness.

It is also important to note that the interviews that informed the prototype were conducted with driving instructors, meaning that the perspectives of actual learners with ADHD were not fully captured in the design process. For future development, it will be essential to include these end-users to gain deeper insight into their lived experiences, preferences, and needs. This user-centered approach would help ensure that the app not only addresses theoretical challenges but also aligns closely with the realities of learners' daily lives.

Conclusion

The prototype developed in this study represents a promising tool to support individuals with ADHD in navigating the complex process of driver education. By combining structured design, accessible features, and engaging learning tools, the app offers targeted support that addresses core difficulties faced by this group. Future iterations should build on this foundation by incorporating direct input from ADHD learners and conducting extended usability and efficacy testing. Ultimately, such digital tools could play a key role in making driver education more inclusive, manageable, and effective for individuals with ADHD.

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