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Mobile applications for students with ADHD

Eydoxia Kyriakaki * and Anna Maria Driga

Net Media Lab IIT NCSR Demokritos, Athens, Greece.

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Abstract

Mobile applications (apps) are just recently becoming useful tools for people with attention deficit hyperactivity disorder (ADHD). These programs provide a range of features and capabilities for controlling the symptoms of ADHD, increasing productivity, and improving organization. Task management, time management, enhanced focus, cognitive training, self-monitoring, mindfulness, and education are among them. According to research, several mobile apps may help people with ADHD by improving their symptom management, time management, attention, and cognitive abilities. However, the efficacy of certain applications may vary, and more study is needed to ascertain their long-term usefulness. When choosing and incorporating apps into an intervention strategy, individual needs, preferences, and app features must be taken into account. It is advised to work together with medical experts or ADHD specialists for individualized advice on how to use mobile apps successfully. Mobile apps have the potential to significantly help people with ADHD, improve their self-management, and improve their general well-being.

Keywords: Digital Technologies; Mobile Applications; ADHD; Special Education.

1. Introduction

ADHD is referred to as Attention-Deficit/Hyperactivity Disorder. It is a neurodevelopmental condition that starts in childhood and lasts till adulthood. According to Fiks et al. (2016), persons with ADHD exhibit patterns of inattention, hyperactivity, and impulsivity that are more severe and frequent than those that are usual for people their age and developmental stage.

People with ADHD usually have trouble concentrating on tasks, managing their time, and sustaining their attention. They may consistently struggle with activities demanding continuous mental effort, make many careless mistakes, and have trouble following instructions. Especially with repetitious or mentally taxing chores or activities, people with ADHD usually find it difficult to stay focused. They could have trouble planning their workload, managing their belongings, and sticking to deadlines. They could regularly overlook important facts and lose things. Individuals with ADHD find it challenging to concentrate on the activity at hand since they are quickly distracted by outside stimuli like noises or movements. They could have trouble hearing well and paying attention to instructions or directions (Richardson et al., 2017).

Hyperactivity in ADD/ADHD is characterized by excessive and usually inappropriate amounts of physical activity. Fidgeting, agitation, and trouble staying sat might be signs of these in contexts when they are anticipated. Speech volume and pace control may be problematic for those with ADHD. They could struggle to take turns in talks and constantly interrupt others. Additionally, individuals could struggle to participate in activities like reading or independent task completion that need calm and prolonged focus (Fiks et al., 2016).

* Corresponding author: Eydoxia Kyriakaki

Acting without contemplating or taking into account the consequences is referred to as impulsivity. People who have ADHD may constantly interrupt others, struggle to wait their time, and exhibit risky or inappropriate impulsive actions. ADHD sufferers could make rash decisions without thinking about the consequences (Sharma et al., 2019). This might lead to rash conduct, hasty decisions, or a lack of control over improper reactions. They may struggle to wait their turn in discussions or activities and regularly display a feeling of urgency or impatience. People with ADHD may regularly obstruct other people's discussions, occupations, or interests because they are unable to control their impulses to talk or act (Richardson et al., 2017).

It is important to remember that each person's presentation and level of ADHD symptoms may differ. While some may display signs of hyperactivity and impulsivity, other persons may predominantly display symptoms of inattention. All three types of symptoms may exist in certain situations. According to Sharma et al. (2019), ADHD may have a major influence on everyday functioning, including academic achievement, professional productivity, interpersonal connections, and general quality of life. It is often identified by medical specialists based on a thorough review of symptoms, medical history, and assessment tools. The management of symptoms and enhancement of general functioning may be aided by a comprehensive diagnostic and treatment strategy (MacLeod & Green, 2019). Therefore, if you believe you or someone you know may have ADHD, it is imperative to speak with a healthcare provider.

2. Utilizing Technology

Any system, piece of hardware, piece of software, or piece of assistive technology that aims to improve the independence and functional capacities of people with disabilities is referred to as assistive technology. There are many different tools and technology in it that are made specifically to deal with the special difficulties and barriers that persons with physical, sensory, cognitive, or developmental impairments must overcome. By allowing users to engage more fully in a range of everyday activities, education, work, communication, and enjoyment, assistive technology aims to promote accessibility, inclusion, and empowerment. By offering support and accommodations to enhance a person's quality of life and well-being, it aims to close the gap between their skills and the needs of their environment (MacLeod, & Green, 2019). The following are some examples and characteristics of assistive technology:

Accessibility: According to MacLeod and Green (2019), assistive technology places a strong emphasis on improving accessibility and inclusion by enabling people with disabilities to engage more fully in everyday activities including mobility, communication, and education.

Customization: Each person's specific needs and skills may be accommodated through assistive technology. It may be modified to suit different kinds and levels of handicap in terms of functionality, features, and interfaces (MacLeod, & Green, 2019).

Support for Compensatory Actions: By offering several ways to carry out activities or obtain information, assistive technology helps people make up for their shortcomings. According to MacLeod and Green (2019), it aims to close the gap between a person's capabilities and the expectations of the environment.

Examples of assistive technology for people with speech and language difficulties include communication aids like simple picture-based communication boards and sophisticated voice-generating equipment. Wheelchairs, walkers, and other mobility aids allow people with mobility disabilities to move about on their own. Both hearing aids and assistive listening devices. These gadgets either increase sound or provide extra auditory assistance to those who are hard of hearing. programs for text-to-speech and screen readers.

These programs translate written text into synthesized audio, enabling access to and comprehension of written material for those with visual impairments or cognitive problems. Computer Adaptive Input Devices. Using keyboards, mouse substitutes, switches, and specific software, people with motor disabilities may utilize computers and assistive technology (MacLeod & Green, 2019).

Software programs or other tools that support people with cognitive impairments may help with memory, organization, time management, and work completion. Systems for environmental management. These systems enable people with restricted mobility to manage their surroundings, such as lights, appliances, and thermostats, via customized interfaces or voice commands. To satisfy the unique needs of persons with disabilities, new advancements in assistive technology are constantly being developed. The goal is to expand engagement in society, foster independence, and enhance quality of life for people with a range of abilities (MacLeod, & Green, 2019).

3. ADHD and Helping Technologies

By addressing issues with attention, organization, time management, and productivity, assistive technology may help people with ADHD (Attention-Deficit/Hyperactivity Disorder). While assistive technology is not a cure-all for ADHD, it may help people with the disorder better control their symptoms and improve their functioning across the board.

Assistive technology may help people with ADHD in the following ways (Wagner & Bratt, 2018):

3.1. Organizing and managing time

Digital calendars and reminder apps are time management tools that help people with ADHD remember appointments, due dates, and obligations by providing alerts and reminders (Wagner & Bratt, 2018).

Task management software may assist people with ADHD in organizing and handle their daily chores and commitments (Wagner & Bratt, 2018). These programs often contain to-do lists, prioritizing, and progress tracking.

Visual schedules and timers may help persons with ADHD better manage their time by giving them structure and enhancing their time management abilities (Wagner & Bratt, 2018).

3.2. Taking Notes and Data Management

Digital note-taking tools: People with ADHD may more effectively organize and search their notes by using programs or software while taking notes. According to Agran et al. (2019), these tools often include capabilities like marking, highlighting, and cross-device synchronization.

Voice Recording Apps: Using voice recording apps may help people with ADHD correctly record and review crucial talks, meetings, and lectures for better memory (Agran et al., 2019).

Using mind-mapping software makes it easier for persons with ADHD to identify connections and create organized outlines because it provides a visual technique of organizing thoughts, ideas, and information (Agran et al., 2019).

Controlling distractions and maintaining focus:

Distraction-blocking apps: By limiting access to distracting websites and apps, these programs help people with ADHD focus and be more productive when working or studying (Wang & Lee, 2018).

Noise-canceling headphones: According to Wang and Lee (2018), these headphones may assist persons with ADHD focus and study by reducing auditory distractions in busy surroundings.

3.3. Helpful Study Resources

Software that converts written text into spoken words may assist people with ADHD understand what they are reading more clearly and have less problems with reading in general (Wang & Lee, 2018).

Reading aids such as reading guides and highlighters help people with ADHD concentrate on one line of text at a time, minimizing visual distractions and improving reading comprehension and tracking (Wang & Lee, 2018).

It is important to remember that the effectiveness of assistive technology might change depending on personal needs and preferences. Consult with medical professionals, educators, and assistive technology experts who can evaluate requirements and provide advice on the best tools and management techniques for ADHD symptoms (Wang & Lee, 2018).

4. Attention Deficit Hyperactivity Disorder: The Importance of Assistive Technology

By offering tools and ways to control and lessen the obstacles of the disease, assistive technology plays a significant role in helping people with ADHD. Some of the most crucial justifications for why assistive technology is crucial for ADHD are listed below (Wang & Lee, 2018).

Enhancing Focus and Attention: People with ADHD usually struggle to keep their focus and attention. Applications that enhance focus, noise-cancelling headphones, and dedicated workstations that provide an atmosphere more favorable

to concentration are a few examples of tools that assistive technology may offer. These tools help lessen distractions and increase productivity (Wang & Lee, 2018). The ability to plan ahead, manage time effectively, and maintain routines is one of the main issues for people with ADHD. With the help of digital calendars, reminder programs, and task management tools, people can plan their days, create reminders, and track their progress. These tools provide better time management and organization (Wang & Lee, 2018).

Memory and knowledge Management: People with ADHD may have trouble remembering things and keeping knowledge in their heads. Using note-taking software, voice recorders, and digital organizers are examples of assistive technology features that make it easier to effectively collect and organize information. These solutions make sure that important information is readily available, lowering the possibility that people will forget or ignore critical particulars (Wang & Lee, 2018). Different learning styles and preferences may be present in people with ADHD, which has to be taken into account. To address different learning needs, assistive technology offers a range of learning aids, including interactive software, multimedia presentations, and adaptive learning platforms. For those with ADHD, these tools help increase interest, understanding, and memory (Wang & Lee, 2018).

Increasing Independence and Self-Advocacy: With the use of assistive technology, people with ADHD may take charge of their own learning, planning, and productivity. By using assistive technology tools, people may improve their self-awareness, self-control, and sense of advocacy. They actively participate in coping with their ADHD symptoms and achieving their goals (Wang & Lee, 2018).

Enhancing Communication and Social Interaction abilities: People with ADHD may use assistive technology to enhance their communication and social interaction abilities. Applications for social skills training, speech-generating devices, and communication aids may all help people speak more effectively and feel more at ease in social settings (Wang et al., 2018).

Providing structure, support, and adjustments, assistive technology tools may help people with ADHD symptoms feel less anxious and more confident. People with ADHD often feel more self-assured, less irritated, and in control of their everyday life when they have access to resources that assist them manage their issues (Wang, & Lee, 2018).

Importantly, assistive technology should be used in addition to other methods and treatments advised by medical experts. The goal is to create a complete strategy that takes into account each person's unique needs, enhances their overall wellbeing, and helps them successfully manage their ADHD (Wagner & Bratt, 2018).

5. Negative Consequences of Assisted Technology

Despite the fact that assistive technology may aid people with ADHD in a variety of ways, it is important to understand that using it may also come with downsides or challenges. Think about the following potential drawbacks:

Overreliance or Dependence on Assistive Technology: People with ADHD may become too reliant on assistive technology, depending on it rather than learning critical abilities or coping mechanisms to control their symptoms. The use of assistive technology as a supporting tool and the encouragement of the development of autonomous skills must be balanced, according to Wagner and Bratt (2018).

Accessibility and affordability: Some assistive technology tools and gadgets may be out of reach for individuals who may benefit from them but cannot pay the associated expenses. Disparities in opportunity for people with ADHD may come from access restrictions to essential assistive technologies (Wagner & Bratt, 2018).

Learning Curve and adaptability: Developing successful use of assistive technology aids may need patience, perseverance, and adaptability. Some individuals with ADHD could struggle to use and integrate new technology into their daily routines, or they might get frustrated at first while getting used to the tools (Baumgart & Law, 2018).

Technical Problems and Dependence: Assistive technology aids are prone to technical problems, compatibility problems, and software changes that might affect how well they work. When technological problems occur, dependence on technology may offer challenges that frustrate or disturb everyday living (Baumgart & Law, 2018).

Stigmatization and Social Difficulties: When using certain assistive technology tools, people with ADHD may feel stigmatized or singled out, especially if they stand out or draw attention. In particular in educational or professional environments, this might have a detrimental effect on self-esteem or lead to social problems (Lahm et al., 2019).

While assistive technology may aid in managing distractions, it's crucial to be mindful of any possible diversions or misuses that might result from the device itself. For instance, excessive usage of software functions or digital devices may lead to unintentional diversions or technological abuse (Lahm et al., 2019). Individual Variability: Not all ADHD sufferers will benefit from assistive technology. Because each person's experience with ADHD and its symptoms is different, what works for one person may not work for another. When choosing and using assistive technology, individual needs and preferences must be taken into consideration (Lombardi & Larron, 2018).

It's crucial to think of assistive technology as an addition to all-encompassing ADHD treatment techniques and interventions. Regular review, continuing assistance, and a well-balanced strategy that includes various approaches and supports are crucial for ensuring its optimum and suitable usage. In order to solve any possible issues or drawbacks related to the use of assistive technology, collaboration with healthcare experts and specialists in the field may provide direction and support (Lombardi & Larron, 2018).

6. ADHD apps for mobile devices

For symptom control, organization, and productivity, digital or mobile apps made for people with ADHD may be very helpful. These programs provide a range of features and capabilities designed specifically to meet the needs of people with ADHD (Parker & Jessel, 2016). One kind of digital ADHD program focuses on time and task management. To help people with ADHD adhere to schedules and meet deadlines, these programs usually contain timers, alarms, and reminders. Users may create task lists, set priorities, and divide activities into manageable phases. These apps help users better manage their time and lessen procrastination by using visual indications and alerts (Parker & Jessel, 2016).

Applications in a different category are those that emphasize focus and attention. To draw in and keep users' attention, these apps make use of strategies including gamification, interactive activities, and audiovisual stimulation. They could provide exercises that improve the brain's ability to block out distractions and sustain focus. These programs provide an organized and encouraging environment for people with ADHD to develop their attention skills by including elements like progress tracking and incentives (Parker & Jessel, 2016).

Digital apps may also help with information management and memory. These programs often provide note-taking features that let users write down and arrange information in many forms, such text, audio files, and photos. Some programs enable users to view their notes from many platforms thanks to cross-device syncing. These technologies make it easier for people to save and retrieve important information, which reduces the risk that important information will be neglected or ignored (Baumgart & Law, 2018).

Additionally, there are online tools for controlling ADHD medication. These programs may remind users to take their medications, track drug compliance, and provide details on prescription regimens and any side effects. They help people maintain a regular medication schedule, ensuring the best symptom control (Parker & Jessel, 2016).

Digital tools may also support ADHD sufferers with their social and emotional needs. Some programs include tools for introspection, mood tracking, and emotional control. These programs might include guided mindfulness exercises, mood diaries, and journaling prompts. They help people with ADHD become more self-aware, regulate their emotions, and see patterns that have an impact on their wellbeing (Parker & Jessel, 2016).

Even while these digital tools may help persons with ADHD, it's important to take into account each person's preferences, needs, and the unique qualities of each app. To choose the most suitable apps for personal use, it is advised to research several possibilities, read user reviews, and speak with healthcare experts or ADHD specialists. Additionally, to treat ADHD symptoms successfully, the use of digital apps should be integrated into a complete approach that also includes other techniques, therapies, and support networks (Parker & Jessel, 2016).

7. Applications for ADHD

A popular task management tool called Todoist allows users to create and organize to-do lists, set deadlines, and get reminders. It offers features like prioritizing, subtasks, and teamwork, allowing people with ADHD to manage their duties and stay organized (Russell & Barkley, 2019).

A music app called attention@Will offers carefully chosen tracks that are intended to improve attention and concentration. By listening to a variety of instrumental music suited to their particular tastes and attention needs, people with ADHD are able to boost their productivity and reduce distractions (Gupta & Sharma, 2021).

With the flexible note-taking app Evernote, users may make and organize notes, take voice recordings, write down ideas, and store online content. It makes it easy for people with ADHD to access and retrieve information by providing seamless synchronization across devices and powerful search features (Bergman et al., 2016). Forest: Forest is a cutting-edge productivity app that uses gamification to help users stay focused and reduce distractions.

Users create a schedule and a virtual tree that develops as long as they don't use their phone or close the program. People with ADHD may be motivated to stay focused by the visual depiction of concentrated time it gives (Bar-Haim et al., 2015). A complete task management tool called MyLifeOrganized allows users to build and arrange tasks, set priorities, and make nested lists. To help people with ADHD break down difficult activities and successfully manage their time, it provides reminders, due dates, and time estimations (Russell & Barkley, 2019).

The popular meditation and mindfulness software Headspace offers guided meditation routines and mindfulness activities. In order to help people with ADHD manage their attention and emotions, it offers an organized method for calming down, releasing tension, and improving concentration (Cavanagh & Millings, 2013). An app called Medisafe was created to help people with ADHD follow their medication schedules. It delivers refill alerts, tracks adherence, and gives medication dosage reminders. According to Martinez-Pérez et al. (2015), it may help maintain a regular medication schedule and ensure effective symptom control.

It is crucial to understand that different people may respond differently to these apps in terms of effectiveness and fit. When choosing and using certain programs, it is advised to research them, read user reviews, and take into consideration one's own tastes and needs.

Working with medical experts or ADHD specialists may provide extra advice on how to choose the best apps for personal usage (Parker & Jessel, 2016).

8. Mobile technology-based ADHD treatment

It is feasible to include mobile applications (apps) into comprehensive therapies for people with ADHD. Apps may assist people in managing their symptoms, organizing themselves better, and being more productive when used appropriately. According to Coghill & Seth (2011), the following are some examples of mobile apps that may be utilized as therapies for ADHD:

Task Breakdown and Organization: Apps may help persons with ADHD organize their tasks, set priorities, and effectively manage their time. Task management programs that include to-do lists, reminders, and calendars may assist organize daily tasks and lessen procrastination and neglect (Coghill & Seth, 2011). Apps may provide resources for time management, planning, and time-blocking techniques. These characteristics may help people with ADHD manage their time, focus on their tasks, and minimize distractions. By setting reminders and leveraging productivity tools, people may boost their productivity and fulfill deadlines (Kollins et al., 2019).

Among other strategies, gamification, interactive workouts, and audiovisual stimulation may be used in apps that aim to improve focus and attention. These programs may provide organized activities that grab and hold users' attention, helping people with ADHD become more focused and able to concentrate (Van Dyke & Priest, 2008).

Some software programs provide cognitive training activities that concentrate on certain mental processes affected by ADHD, such working memory and attention. These exercises may aid people in developing their cognitive skills and enhancing their capacity to focus, recall information, and carry out activities more effectively (Kauer et al., 2012).

Self-Monitoring and Feedback: Apps with self-monitoring tools let users keep tabs on their development, actions, and routines in relation to ADHD. Data may be represented visually to show trends, advantages, and places for development. This self-awareness may help people develop self-regulation techniques and a better understanding of their symptoms (Kauer et al., 2012). Apps that emphasize mindfulness and relaxation methods may help people with ADHD manage their stress, enhance their emotional control, and improve their general well-being. These apps include guided breathing exercises, relaxation methods, and meditation activities that encourage calmness and lessen anxiety (Choi et al., 2018).

Mobile apps may include instructional materials, articles, or interactive modules with details about ADHD, its symptoms, and treatment options. These tools may provide users with information, aid in understanding their conditions, and offer techniques for self-advocacy (Glynn et al., 2018).

Mobile apps should be used as part of an ADHD intervention, but it's important to take into account each user's demands, preferences, and app's characteristics. Apps should be selected based on their evidence-base, usability, and alignment with specific goals (Richardson et al., 2017). The incorporation of apps within a thorough treatment strategy is also advised. This treatment strategy may also include additional treatments like counseling, medicine, or behavioral techniques. Working with healthcare experts or ADHD specialists may provide advice on choosing and incorporating mobile apps into a person's ADHD treatment plan (Glynn et al., 2018).

9. Methodology

Both quantitative and qualitative methodologies are widely used in the area of study that looks at mobile apps for ADHD, while the frequency of each methodology may differ.

In order to understand patterns, trends, and statistical correlations, quantitative research involves gathering and analyzing numerical data. The majority of quantitative research on mobile apps for ADHD focuses on evaluating the effectiveness of particular applications by surveys, controlled tests, or impartial assessments. These research might examine the impact of app use on cognitive function, functional results, or symptoms of ADHD. (Richardson et al., 2017) Quantitative research increases the generalizability of results to wider groups and offers crucial statistical proof.

Comparatively, qualitative research places a stronger emphasis on examining and comprehending subjective experiences, viewpoints, and meanings. In-depth interviews, focus groups, and/or observations are often used in qualitative research on mobile apps for ADHD to elucidate users' app-using experiences. This approach helps researchers understand the viewpoints, preferences, and challenges related to app use. According to (Richardson et al., 2017), qualitative research may give detailed, contextualized information that complements quantitative data and offers a greater understanding of how mobile apps affect people with ADHD.

Each quantitative and qualitative research methodology has benefits and drawbacks.

While qualitative studies provide a plethora of information about unique individual experiences and subjective views, quantitative studies offer statistical proof and allow generalization. The study's unique aims, research questions, and budget constraints often have an impact on the choice between quantitative and qualitative methods. To fully understand the effect of mobile apps for ADHD, several research use a mixed-methods approach that combines quantitative and qualitative methodologies. In order to fully comprehend the subject, researchers may use this integrated strategy to gather both quantitative data for statistical analysis and qualitative data for in-depth examination (Richardson et al., 2017).

Quantitative strategies seem to be more common than qualitative ones in the area of research evaluating mobile apps for ADHD. Numerous research in this area evaluate the effectiveness of certain apps and how they affect objective outcomes like cognitive functioning and symptoms of ADHD. These studies usually use quantitative techniques to gather quantitative data that can be statistically examined, including surveys, controlled experiments, and standardized exams. Quantitative approaches enable researchers to examine patterns, trends, and statistical linkages, enabling generalizable conclusions and more extensive study (Richardson et al., 2017).

Although quantitative research predominates in the sector, qualitative research is becoming recognized for its value in understanding the subjective experiences and views of people with ADHD who use mobile apps. Qualitative research sheds light on the intricacies of users' experiences and the contextual aspects that affect app adoption by offering insights into their motivations, challenges, and preferences. Along with quantitative data, qualitative approaches like focus groups, interviews, and observations provide for a better understanding of how mobile apps affect people's lives (Tse & Shah, 2017).

Although quantitative techniques are more common in the area of study looking at mobile apps for ADHD, there is an increasing appreciation of the significance of adding qualitative methods to get a more in-depth knowledge of the subject. By combining quantitative and qualitative methodologies, researchers may acquire a thorough knowledge of the effectiveness, user experiences, and wider implications of mobile apps for ADHD (Richardson et al., 2017).

10. Conclusions

Finally, we stress the significance of all digital technologies in the field of education and in ADHD training, which is highly effective and productive and facilitates and improves assessment, intervention, and educational procedures via

mobile devices that bring educational activities everywhere [27-30], various ICT applications that are the main supporters of education [31-37], and AI, STEM, and ROBOTICS that elevate educational procedures to new performance levers [38-48] and friendly games [49-51]. Additionally, the development and blending of ICTs with theories and models of metacognition, mindfulness, meditation, and emotional intelligence cultivation [52-76] accelerates and improves even more the educational practices and results, particularly in children with ADHD, treating.

More specifically, mobile apps may be beneficial support tools for people with ADHD. They provide a wide range of features and capabilities that help people manage their symptoms, stay organized, and be more productive. By using task and time management tools, people may more effectively plan their tasks, set priorities, and stay on track (Santesteban-Echarri et al., 2017). By utilizing applications that emphasize attention and concentration, people with ADHD may participate in exercises that enhance their capacity for sustained attention and decrease distractions. Applications for cognitive training may target certain cognitive processes affected by ADHD, such as working memory or attention. By allowing users to track their development, actions, and symptoms, self-monitoring software help users develop self-awareness and self-control. Apps for mindfulness and relaxation provide approaches for emotional and stress management. According to Bateman et al. (2017), the applications include information about ADHD and symptom treatment techniques.

The usefulness of mobile applications for ADHD, however, may differ depending on the user, and further study is necessary to determine the long-term efficacy of certain apps. When choosing and incorporating apps into an intervention strategy, it is important to take into consideration users' preferences, requirements, and the unique characteristics of each app. Mobile apps need to be used as a component of an all-encompassing treatment strategy that can also contain counseling, medicine, or behavioral techniques (Santesteban-Echarri et al., 2017).

The choice and use of mobile apps for ADHD treatment might be guided by collaboration with healthcare experts or ADHD specialists. Mobile apps generally have the ability to provide beneficial support, empowerment, and aid in managing the challenges connected with ADHD. They may improve the organization, focus, productivity, and general well-being of ADHD patients when administered effectively and in combination with other therapies (Bateman et al., 2017).

Compliance with ethical standards

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The Authors proclaim no conflict of interest.

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