

Video Games as a Treatment for ADHD

Presented at the Gerontech Innovation Expo
Cum Summit, 2022 summit, October 13 and 14
2022, Hong Kong SAR

Randy Kulman, Ph.D.

- <https://learningworksforkids.com/>
 - <http://lw4k.com>

Take-Aways

- Recognition of the extent that children with ADHD are engaged with video games
- Understanding of the research on the positive and negative impact of commercial off the shelf video games on kids with ADHD
- Why video games might be used to help kids with ADHD
- Awareness of the newest digital therapeutics, digital medicines, apps, and technologies designed for kids with ADHD
- How to choose and use video game-based technologies to help children with ADHD

How Much do Kids with ADHD Use Popular Video Games?

- Parent, clinician, anecdotal observations – TOO MUCH!!
- More game play in ADHD kids (2.05 hrs) vs Community control 1.44 hours (Masi et al., 2021)
- 10- to 12-year-olds in France are exactly like their peers (Bioulac 2008)
- Milwaukee study of teens, same amounts with more variability (Fischer and Barkley 2006)
- More video-game play than music, in contrast to peers (LearningWorks for Kids 2011)
- 90% of ADHD rather than 80% of TD kids spend more than one hour a day on computer (Lingini, 2012)

How do Children with ADHD Perform on Video Games?

- Cogmed data and observations on Wisconsin Card Sorting Test (Ozonoff)
- Persistence is dramatically increased with a computerized task, resulting in success, although
- Sometimes requiring longer processing and more effort.
- Improved performance on reading tasks (Clarfield and Stoner)
- Improved on mathematics (Ota and DuPaul)

Problematic Behavior in Video-Game Play in Children with ADHD

- More than one hour a day is associated with short term increased signs of inattention (Taharoglu)
- Increased difficulty in transitioning and stopping video-game play, resulting in more oppositionalism
- More video-game time is associated with increasing signs of inattention (Mazurek and Engelhardt 2013 study)
- Video-game play can be associated with video-game addiction related to Dopamine release in the brain (Han and colleagues 2009)
- Total time spent with screen media is positively associated with attention problems (Swing, Gentile, et al. 2010).

Screen Time, Video Games and ADHD

Increased screen time throughout childhood associated with more ADHD at age 22 (Soares et al., 2021)

Association of higher digital media use and subsequent symptoms of ADHD in 15/16 year olds (Ra, et al., 2018)

ADHD and non ADHD 10 year olds similar >2 h/day playing video games. ADHD kids higher rate of compulsive video game use vs. controls 37.5% vs 11.8%, (Kietglaiwansiri and Chonchaiya, 2018)

Video Games and Learning

- Academics- reading, math fluency, topical areas
- Cognitive skills- processing speed, attention abilities
- Job-related skills- e.g., laparoscopic surgery, military functions, leadership
- Social-emotional functioning- social skills
- Executive functions- working memory, cognitive flexibility, focusing



Research On Executive Function Skills And Positive Effects of Video Games

- Increasing Processing Speed
([Green and Bavelier 2009](#))
- Improving Working Memory
([Klinberg et al. 2007](#))
- Increasing Pro-Social Behavior in Children
([Gentile et al 2009](#))
- Improving Social Involvement
([Ferguson, 2010](#))
- Executive Functions, Flexibility
(Kulman, Slobuski, and Seitsinger, 2014)
- Improving Executive-Functioning With Video Games
(Kulman, 2014)



What Are The Characteristics of Interventions That Work Best With Children With ADHD

- Point of performance interventions
- Immediacy of feedback
- Powerful and engaging feedback and meaningful consequences
- Multimodal presentations and multiple intervention agents
- Individualized to child's capacities
- Strategic teaching principles including: previewing, setting explicit goals, partnering, metacognition, and generalization strategies

Why Use Video Games and Digital Media to Help Kids with ADHD?



Kids with ADHD or Attention Difficulties

Usually have problems with following directions.

May struggle to learn new information and experience frustration or low self-esteem as a result.

Video Games and Digital Media

Video games teach by trial and error or through guided discovery, requiring that the player understand the instructions in order to succeed.

Most negative feedback from video games and other digital media occurs privately. This causes less embarrassment and frustration, while teaching the player how to handle these emotions

Why Use Video Games and Digital Media to Help Kids with ADHD?



Kids with ADHD or Attention Difficulties

May become easily bored and unable to sustain attention

Often require immediate reinforcement or consequence to stay focused on a task.

Often require that their body or mind to be actively engaged.

Video Games and Digital Media

Good video games and digital media are often multi-modal, requiring ever-changing skills and employing video, sounds, words, and actions that help keep kids interested and engaged.

Video games provide clear and immediate feedback, constantly letting the player know what he is doing wrong and right.

Video games and digital media are extremely engaging and many require physical and cognitive involvement.

Why Use Video Games as a Tool For Helping Kids With ADHD?

- Excitement, fun, and cognitive engagement - At LW4K we call it “Engagement”
- Attentive, Immersed, Sustained focus, persistent, willing to overcome frustration
- Multimodal, immediate feedback, cognitively and physically interactive
- Negative feedback is private and teaches skills
- Kids feel like they are learning, creating, and improving
- They need a break from school

The Emotions And Biology of Why Kids With ADHD Love Technology?

- They feel good about it
- They like the feeling of being attentive and engaged
- They can share their experiences with others
- Games create a “dopamine rush”
- It focuses their brains, they like to feel attentive (For example ADHD entrepreneurs)





How to Use Technology to Treat ADHD?

- “Low” tech- websites, videos, podcasts, social media to educate and train individuals about ADHD
- Many screen-based technologies -more than video games.
- Rapid changes in the “software” and hardware
- Wearables, mobile and tablet-based, requires a new type of monitoring and understanding.
- New techs: Augmented Reality, Virtual Reality, Metaverse
- No choice for parents, teachers or clinicians.



What Are Digital Therapeutics, Digital Medicine, Neurotechnologies, and Apps for ADHD?

Digital Therapeutics- medical interventions using evidence-based, prescriptive, clinically evaluated software-often seek government approval (FDA in US)

Digital Medicine- the use of technologies as tools for measurement, and intervention that support the practice of medicine broadly.

Digital health refers to the use of information and communications technologies (Apps, brain training) to manage illnesses and to promote wellness.

Apps and Games- Consumer directed, popular games and apps used as tools to help with learning, skill development, problem solving, and personal growth



Characteristics of Video-Game-Based Digital Therapeutics, Neurotechnologies

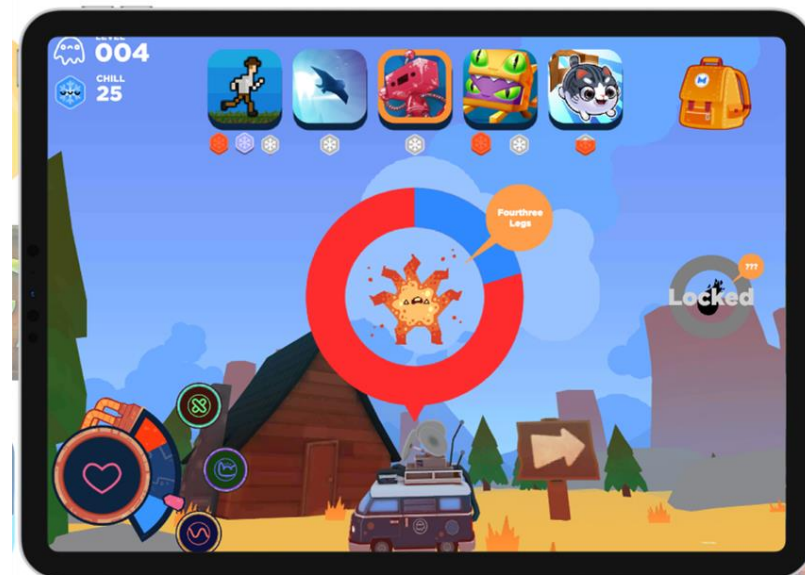
- Evidenced-based approaches and research
- Directly targets specific brain functions, skills, self regulatory capacities, behaviors
- Built in algorithms, adaptable,
- A tool in the toolbox, adjunctive, used in combination with other interventions

Mightier



Mightier

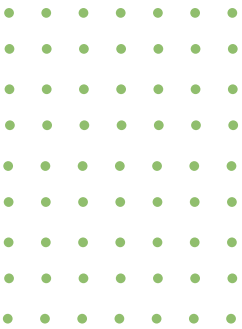
- **Age Range:** 8-12
- **Target diagnoses or symptoms:** Frustration, anger, oppositional behavior, anxiety, emotional regulation, inattentiveness, and hyperactivity.
- **What is Mightier?** A video game-based program, with more than 30 engaging games designed to help kids build emotional regulation skills.
- **Cost:** Monthly Subscription \$40, Annual \$336
- **Length of use:** Ongoing, suggested use 3 times per week, 15 minutes per day



Mightier

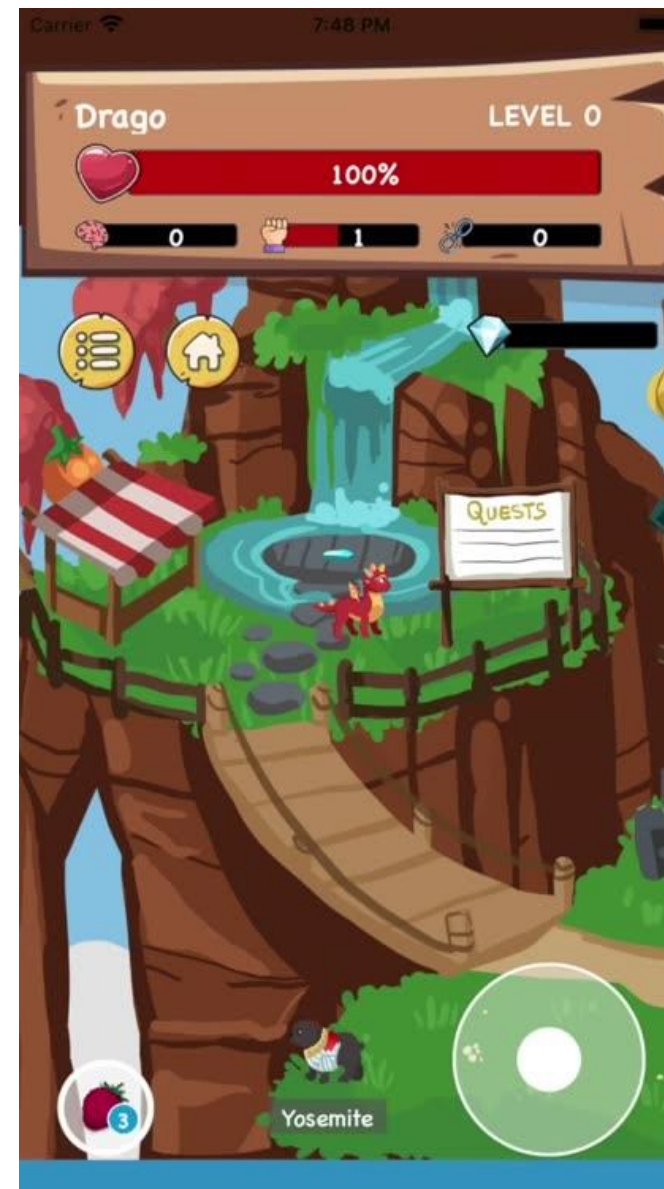
- **How does Mightier work?** Direct instruction in breathing and relaxation techniques and sustained practice of these skills via their heart rate monitor that controls game play.
- Kids wear a wireless heart rate monitor on their arm while playing Mightier games
- A graphic within the game shows them their heart rate
- Players observe that if their heart rate rises due to excitement or anxiety, the games become harder.
- Using various calming skills taught within the gameplay they learn how to bring their heart rate down. These same skills can then be applied in real-world situations of frustration, anger, or loss of control.

Joon



Joon

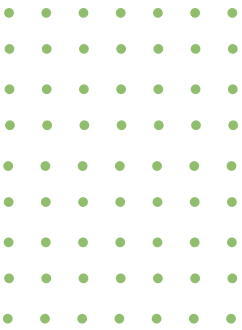
- **What is it?** A mobile game that turns daily tasks into a fun adventure game for neurodivergent children.
- **Ages:** 6-12
- **Target symptoms:** Task Initiation, Motivation, Focusing, Task Persistence
- **Cost:** Monthly 18.99, Yearly 89.99
- **Length of use:** Ongoing



Joon

- **How does Joon work?** Parents create an account and input their child's daily routine and select from a list of age appropriate habits that they want their child to practice.
- Children earn coins and experience points by completing parent assigned tasks
- They use these points to take care of their online pet , explore Joon, and unlock new items
- Kids can play Joon either on their parent's phone or on iPads, Chromebooks, Android tablets
- 30,000+ parents using Joon report better chore completion, less nagging around homework

EndeavorRX



EndeavorRX



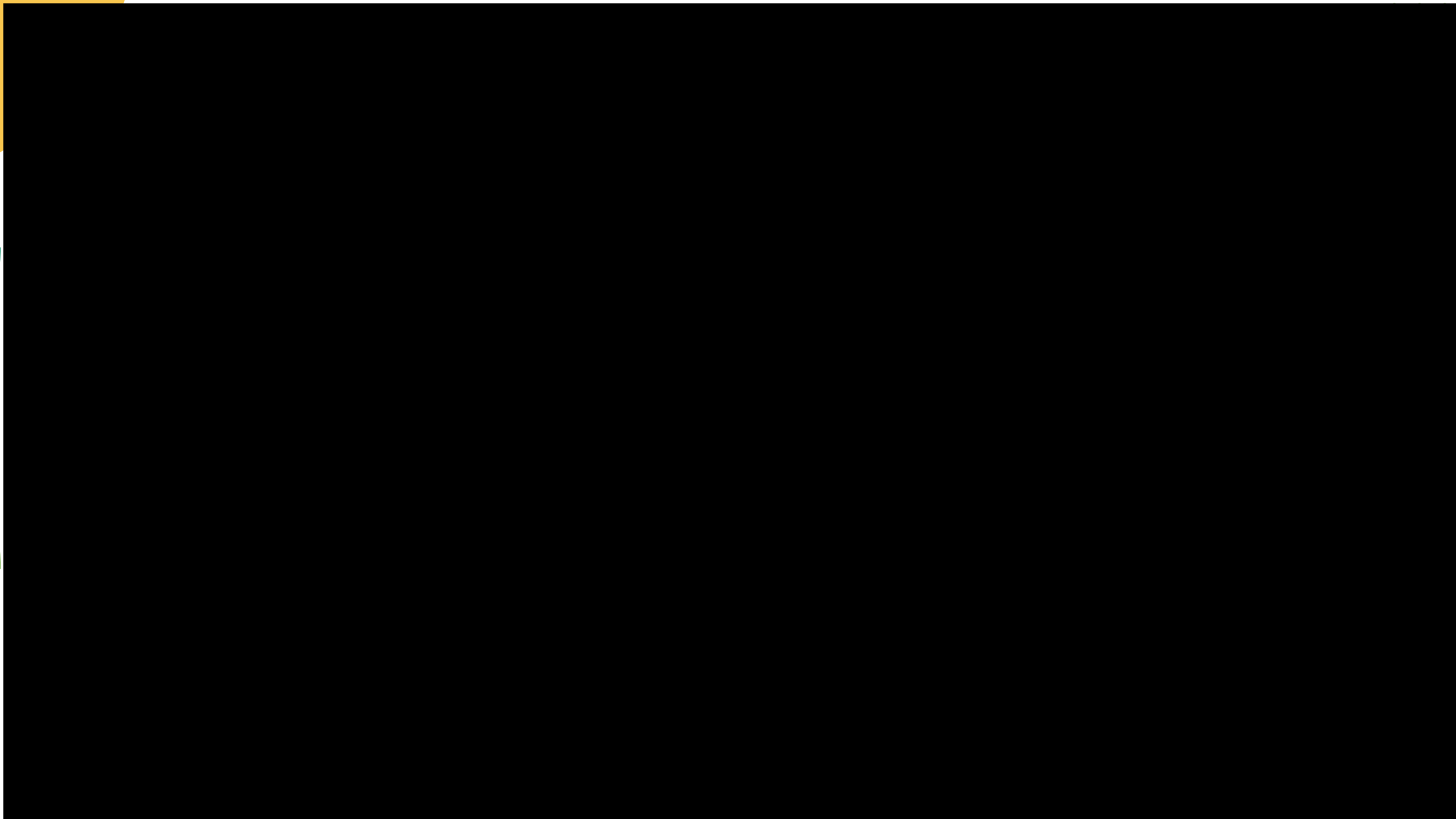
- **What is it?** Endeavor Rx is an engaging video game in which players chase mystic creatures, race through different worlds, and problem-solve. Akili Interactive describes it as “the only doctor prescribed videogame treatment for kids with ADHD” that has received FDA authorization
- **Age Range:** 8-12
- **Target diagnoses or symptoms:** ADHD Inattentive and ADHD Combined-Type. Selective and sustained attention.
- **Cost:** Insurance may pay for some patients. There is a \$99.00 maximum per month for a 3 month subscription
- **Length of use:** 25 minutes per day, 5 days per week for 4 or 8 weeks.

EndeavorRX



- **How does EndeavorRx work?** A proprietary platform, called the Selective Stimulus Management System, engages specific cognitive networks with interactive game experiences to strengthen attentional control.
- EndeavorRx is prescribed by a physician and then downloaded onto a mobile device.
- It is fast-moving, graphically complex, presents increasingly difficult challenges, adapting to the players skill, and is not easy to beat.
- Players need to avoid distractions, multitask, and avoid obstacles in order to succeed in game play.



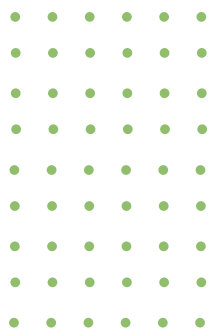


LearningWork for Kids (LW4K.com)

- **What is it?** LW4K.com is an educational platform using live and self-guided online classes that leverages popular video games as a teaching tool. LW4K.com uses games such as Minecraft, Roblox, and Pokemon to identify, practice, and apply executive functioning and social-emotional learning (SEL) skills.
- **Age Range:** 6-13
- **Target diagnoses or symptoms:** Executive function and social-emotional learning (SEL) skills
- **Cost:** \$5.00 per class or Monthly subscriptions \$19.00
- **Length of treatment:** Ongoing



LW4K.com



- **How does LW4K.com work?** LW4K identifies popular games that require players to use executive functioning skills such as time management, organization, planning, task initiation, and flexibility in their gameplay.
- They offer both live, instructor-led and self-guided classes.
- Classes help children identify, think about, and apply executive functions by teaching them the soft skills that improve their game play and real world abilities to solve problems.
- Currently, there are 50 self-guided classes.
- Videos and game-based projects instruct students in the LW4K model of “Detect, Reflect, and Connect” that serve to transfer game-based executive functions to real-world activities.



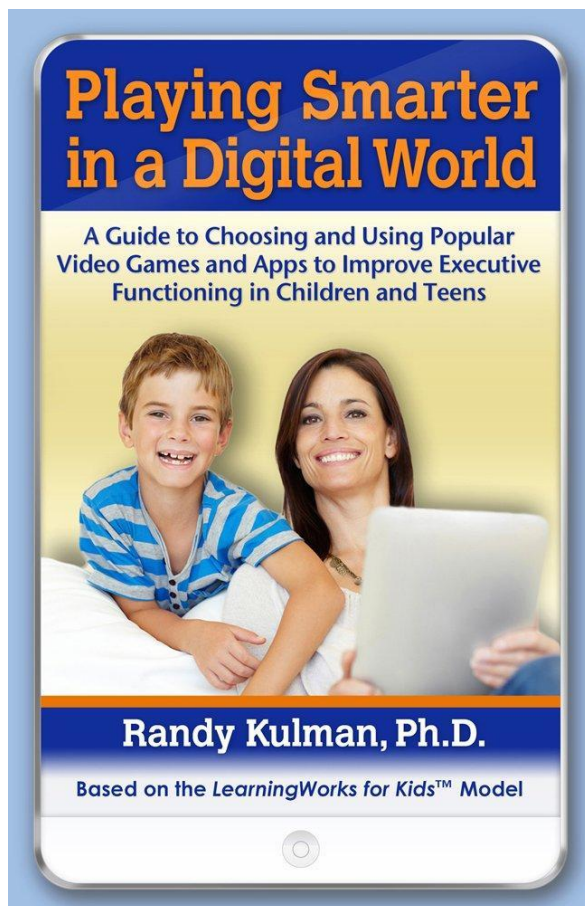
Additional Tools For Finding Games For Kids With ADHD

- This [ebook about ADHD](#) is a great resource to learn about ADHD, executive functions, and to check out some games to help.
- Another way to find games is through the LearningWorks for Kids [website](#).
- Using Minecraft, Roblox, and Pokemon lessons to practice and apply executive functioning skills at [lw4k.com](#)



Playing Smarter In A Digital World:

A Guide To Choosing And Using Video Games And Apps To Improve Executive Functioning In Children And Teens



“The book’s clearly articulated strategies help parents use digital media in a more effective manner and, at the same time, set effective limits and implement a healthy “play diet” for their children. A section devoted to exploring specific strategies for using digital media with children in specific populations—such as children affected by ADHD, autism spectrum and learning disorders, and other mental health and educational issues—is also featured, as is a list of specific games, apps, and tools to make game-based learning most effective.”

Thank you!

Randy Kulman, Ph.D.

- Email: randy@learningworksforkids.com
 - www.learningworksforkids.com
 - <http://lw4k.com>
 - <http://southcountychildandfamily.com/>
 - <http://pinterest.com/lw4k>
- <https://www.facebook.com/LearningWorksForKids>
 - [linkedin.com/in/randy-kulman-291643a/](https://www.linkedin.com/in/randy-kulman-291643a/)
 - [instagram.com/learningworksforkids/](https://www.instagram.com/learningworksforkids/)
 - [Screen Play Psychology Today Blog](https://www.screenplaypsychologytoday.com/)
 - <https://www.youtube.com/c/LW4KLetsPlay>