



Wisconsin Science & Technology Advisory

an initiative of the Catalysts for Science Policy

WiSTA, a legislative outreach initiative to support evidence-based policy, gives UW-Madison scientists an opportunity to engage in policy and write policy memoranda, while increasing policy makers access to scientific expertise.

To: Representative Tip McGuire

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Catalysts for Science Policy (CaSP)

Re: Impacts of eSports on children with autism or other developmental disabilities

Date: March 19, 2021

EXECUTIVE SUMMARY

Public policy lags behind private industry in advancing emerging treatments of developmental disorders. This memo focuses on the emergence of video games as a potential therapy for developmental disorders. We summarize the current literature on this topic with a particular focus on research of collaborative games and social engagement. In addition, we lay out the policies and policy proposals for government intervention around eSports outlining potential government policies that could facilitate eSports exposure to individuals with developmental disorders.

INTRODUCTION

Developmental disorders, such as attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD), are characterized by difficulties in social functioning, learning, and behavior abnormalities. One emerging treatment strategy is the use of video games which can be used to improve social skills. For many adolescents, gaming is a social experience with 65% of teens playing with people in the same room and 27% playing games with people over the internet¹. Compared to non-ASD siblings, children with ASD spend more hours per day playing video games². Due to the high engagement of children with ASD and video games, a number of studies investigate the use of video games as a potential therapeutic tool. One specific subcategory of video games which can serve as a potential therapeutic is eSports, defined here as an organized, multiplayer video game competition. The eSports industry is expected to surpass 1 billion dollars in revenue in 2021 which would translate into more than a 14% growth rate in the last year³. Viewership is also on track to have nearly doubled in a 6 year period by 2023⁴. Despite the rapid growth of the eSports industry and growing body research around video games as treatment, state and federal legislatures are currently lagging behind the private sector in advancing the use of video games and eSports as therapeutics. Openings currently exist for government intervention in the form of regulation, public funding, and/or private collaboration.

DEVELOPMENTAL DISORDERS AND AUTISM SPECTRUM DISORDER

Developmental disabilities are a group of disorders that involve impairments in physical, learning, language or behavior areas. Attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) are among the most common developmental disabilities, diagnosed in approximately 9% and 2% of children, respectively⁵. ADHD is characterized by inattention, disorganization and excessive activity/impulsivity⁶. Individuals with ADHD commonly have issues staying focused on tasks, organizing and following through on tasks,

talking excessively, and interrupting others⁶. ASD is characterized by 1) persistent deficits in social communication and social interaction, and 2) restricted, repetitive patterns of behavior, interests, or activities⁶. Social functioning is a critical component to ASD. Individuals commonly show deficits in social-emotional reciprocity, like holding back-and-forth conversations or sharing emotions, non-verbal communication, like interpreting body language, and forming relationships.

Accordingly, there are a variety of treatment options and interventions available. Most treatment options focus on reducing behavior problems and teaching social skills to improve communication⁷. However, new research has emerged citing the efficacy of video games as a treatment for individuals with ASD, some of which have seen improvements in social skills⁸.

VIDEO GAMES AND ASD

Virtual environments allow for social interactions without the challenges associated with in-person situations, such as being misunderstood⁹. In an interview-based study, three individuals with ASD reported little interactions in face-to-face situations at school but socializing with people around the world in massively multiplayer online role-playing games (MMORPGs)¹⁰. They cited not understanding social rules as a significant challenge in face-to-face social situations. An additional study interviewing young adults with ASD described MMORPGs as a tool for emotional regulation and anxiety reduction¹¹. A similar study investigated how friendships developed among boys with ASD in the context of the popular multiplayer video game Minecraft¹². It was found that the children were able to work collaboratively to create representations in the game, share resources and interact with each other. Despite this, some friendship difficulties can arise during online gaming such as difficulties with reciprocal trust and verbal disagreements. Another study explored a moderated Minecraft community for children on the autism spectrum with a number of modifications on the server to support social engagement and self-regulation¹³.

One significant challenge for the usage of video games as a therapeutic tool for children with ASD is the lack of input from mental health experts and children. By considering feedback from children and clinicians, one group developed a Kinect-based game that promotes social initiation in children with ASD¹⁴. Others measured brain activity in two groups of children with ASD, one group undergoing cognitive behavioral therapy (CBT) with a pro-social game and the other using offline CBT¹⁵. They found that the game helped in recognizing emotion and encouraging social engagement, but the online CBT was less effective at evoking a response to emotional words. Another group studied children with ASD playing a collaborative puzzle game and found more positive social interaction in the enforced collaboration mode compared to the free play mode¹⁶.

Aside from the social engagement aspect, video games have been explored as a therapeutic tool in a variety of other ways such as improving attention/gaze¹⁷, multiple cue response¹⁸, and balance¹⁹. Games such as Project EVO have been specifically developed as a treatment to improve attention in ASD and ADHD and underwent clinical trials²⁰.

POLICY OPTIONS

Exposure to video games for individuals with ASD, ADHD, or other developmental disorders can be driven through the professional world of video games, namely eSports. State and federal

agencies have lagged behind NGOs and private firms in efforts to properly guide these individuals toward video games and eSports. There has been little interest in other states to introduce legislation regarding the growing eSport industry. Nevada State Senator Ben Kieckhefer (R-16) introduced SB165 on March 2, 2021 which would establish the Nevada Esports Commission within the Department of Business and Industry. The Commission would largely regulate the eSports industry in the state²¹. Hawaii State Senator Jarrett Keohokalole (D-24) introduced SR208 on March 16, 2021 which requests the state Board of Education to authorize eSports programs for public high schools in the state²². Much of the current state level policy around ASD has focused mandating that insurers provide coverage for ASD. Currently, 47 states have some mandate ensuring coverage (ASHA). Specifically, Wisconsin has one of the more expansive mandates which requires coverage of treatment if it is prescribed by a physician and performed by a qualified professional up to \$50,000 for intensive-level services and \$25,000 for non-intensive-level services²³. The way in which intensive-level services are defined means that any evidence based therapy is covered, potentially opening the door to video game based therapy.

Apart from government mediation, NGOs and private firms have introduced a number of initiatives geared towards advancing eSports specifically for individuals with ASD, ADHD, or other developmental disorders. In the United Kingdom, Enemy of Boredom Academy and Autistica Play have collaborated to provide gaming experiences and even video game development skills for individuals with ASD and other developmental disorders to facilitate social skill and coordination development while promoting autism awareness within the video game industry^{24,25}. The eSport facility company Nerd Street Gamers and Jefferson Heath's Center for Autism and Neurodiversity in Philadelphia has reportedly collaborated to build the first eSports campus that is partially focused on developing the social skills and professional development of gamers with autism²⁶. Likewise, Dell Technologies actively pushes for eSports integration into K12 school by producing streamlined guides for strategies for implementation at both public and private schools²⁷.

The integration of eSports into public schools in Wisconsin can be facilitated by legislative intervention through a number of means. As in Nevada, a statewide eSports commission could be established to regulate the industry as a whole. This regulation could include the mandate of ASD, ADHD, and other developmental disorder inclusivity, thus fostering the already budding collaboration between video games and these disorders. Similarly, recommendation for authorization of eSports programs in public schools by the Wisconsin Department of Public Instruction similar to what's been introduced in the Hawaii state legislature. Lastly, partnerships with NGOs and other private firms interested in expanding the impact of eSports on individuals with ASD, ADHD, or other developmental disorders can be explored to direct grant funding toward establishment of academic programs and facilities to house these programs.

SUMMARY

As video games emerge as a potential therapeutic for developmental disorders including ASD and ADHD, new policy solutions will be required to increase the exposure of individuals with developmental disorders to video games and eSports. Possible policy proposals include partnering with private companies or NGOs, establishing a statewide eSports commission, and authorizing eSports programs in public schools.

REFERENCES

1. “Teens, Video Games and Civics.” (2008) *Pew Research Center: Internet, Science & Tech.* <https://www.pewresearch.org/internet/2008/09/16/teens-video-games-and-civics/>
2. Mazurek, M. O., & Wenstrup, C. (2013). Television, Video Game and Social Media Use Among Children with ASD and Typically Developing Siblings. *Journal of Autism and Developmental Disorders*, 43(6), 1258–1271. <https://doi.org/10.1007/s10803-012-1659-9>
3. Newzoo: Esports industry revenue expected to surpass \$1B in 2021. (2021, March 10). Retrieved March 18, 2021, from <https://www.reuters.com/article/esports-business-esports-growth/newzoo-esports-industry-revenue-expected-to-surpass-1b-in-2021-idUSFLM4K2cJ7>
4. Reyes, M. (2021, January 05). Esports ecosystem REPORT 2021: The key industry companies and TRENDS growing the esports market which is on track to surpass \$1.5B by 2023. Retrieved March 18, 2021, from <https://www.businessinsider.com/esports-ecosystem-market-report>
5. Zablotzky, B., Black, L. I., & Blumberg, S. J. (2017). Estimated Prevalence of Children With Diagnosed Developmental Disabilities in the United States, 2014–2016. *NCHS Data Brief*, 291, 1–8.
6. American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition). American Psychiatric Association. <https://doi.org/10.1176/appi.books.9780890425596>
7. DeFilippis, M., & Wagner, K. D. (2016). Treatment of Autism Spectrum Disorder in Children and Adolescents. *Psychopharmacology Bulletin*, 46(2), 18–41.
8. Jiménez-Muñoz, L., Peñuelas-Calvo, I., Calvo-Rivera, P., Díaz-Oliván, I., Moreno, M., Baca-García, E., & Porras-Segovia, A. (2021). Video Games for the Treatment of Autism Spectrum Disorder: A Systematic Review. *Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s10803-021-04934-9>
9. Parsons, S., & Cobb, S. (2011). State-of-the-art of virtual reality technologies for children on the autism spectrum. *European Journal of Special Needs Education*, 26(3), 355–366. <https://doi.org/10.1080/08856257.2011.593831>
10. Gallup, Jenn, Duff, C., Serianni, B., & Gallup, A. (2016). An Exploration of Friendships and Socialization for Adolescents with Autism Engaged in Massively Multiplayer Online Role-Playing Games (MMORPG). *Education and Training in Autism and Developmental Disabilities*, 51, 223–237.
11. Gallup, Jennifer, & Serianni, B. (2017). Developing Friendships and an Awareness of Emotions Using Video Games: Perceptions of Four Young Adults with Autism. *Education and Training in Autism and Developmental Disabilities*, 52(2), 120–131.
12. Stone, B. G., Mills, K. A., & Sagers, B. (2019). Multiplayer Games: Multimodal Features That Support Friendships of Students With Autism Spectrum Disorder. *Australasian Journal of Special and Inclusive Education*, 43(2), 69–82. <https://doi.org/10.1017/jsi.2019.6>
13. Ringland, K. E., Wolf, C. T., Boyd, L. E., Baldwin, M. S., & Hayes, G. R. (2016). Would You Be Mine: Appropriating Minecraft as an Assistive Technology for Youth with Autism. *Proceedings of the 18th International ACM SIGACCESS Conference on Computers and Accessibility*, 33–41. <https://doi.org/10.1145/2982142.2982172>
14. Malinverni, L., Mora-Guiard, J., Padillo, V., Valero, L., Hervás, A., & Pares, N. (2017). An inclusive design approach for developing video games for children with Autism Spectrum Disorder. *Computers in Human Behavior*, 71, 535–549. <https://doi.org/10.1016/j.chb.2016.01.018>
15. Chung, U., Han, D. H., Shin, Y. J., & Renshaw, P. F. (2016). A prosocial online game for social cognition training in adolescents with high-functioning autism: An fMRI study. *Neuropsychiatric Disease and Treatment*, 12, 651–660. <https://doi.org/10.2147/NDT.S94669>
16. Ben-Sasson, A., Lamash, L., & Gal, E. (2013). To enforce or not to enforce? The use of collaborative interfaces to promote social skills in children with high functioning autism spectrum disorder. *Autism*, 17(5), 608–622. <https://doi.org/10.1177/1362361312451526>
17. Chukoskie, L., Westerfield, M., & Townsend, J. (2018). A novel approach to training attention and gaze in ASD: A feasibility and efficacy pilot study. *Developmental Neurobiology*, 78(5), 546–554. <https://doi.org/10.1002/dneu.22563>
18. Hiniker, A., Daniels, J. W., & Williamson, H. (2013). Go go games: Therapeutic video games for children with autism spectrum disorders. *Proceedings of the 12th International Conference on Interaction Design and Children*, 463–466. <https://doi.org/10.1145/2485760.2485808>
19. DeWeerd, Sarah, et al. (2018). “Can Science-Based Video Games Help Kids with Autism?” *Science Mag | AAAS*. <https://www.sciencemag.org/news/2018/06/can-science-based-video-games-help-kids-autism>.
20. “Project EVO.” *Sensory Neurodevelopment & Autism Program*, <https://neurodevelopment.ucsf.edu/project-evo>. Accessed 18 Mar. 2021.

21. NV SB165 | 2021 | 81st Legislature. (2021, March 03). LegiScan. Retrieved March 17, 2021, from <https://legiscan.com/NV/bill/SB165/2021>.
22. HI SR208 | 2021 | Regular Session. (2021, March 16). LegiScan. Retrieved March 17, 2021, from <https://legiscan.com/HI/bill/SR208/2021>.
23. State Insurance Mandates for Autism Spectrum Disorder. (n.d.). Retrieved March 19, 2021, from <https://www.asha.org/advocacy/state/states-specific-autism-mandates/>
24. (2019). 'Video Games Helping Non-Neurotypical & ASD', *Enemy of Boredom*, 24 July. Retrieved March 16, 2021, from <https://eobacademy.com/blog/video-games-helping-non-neurotypical-and-asd/>.
25. (2021). *Autistica Play*. Retrieved March 16, 2021, from <https://www.autistica.org.uk/get-involved/support-us/autisticaplay>.
26. Frank, M. (2020). 'World's First Esports Campus To Open In Pennsylvania; Group Will Help Autistic Gamers Go Pro', *Lehigh Valley Public Media*, 1 October. Retrieved March 16, 2021, from <https://www.wlvt.org/blogs/philadelphia/worlds-first-esports-campus-to-open-in-pennsylvania-group-will-help-autistic-gamers-go-pro/>.
27. Dell Technologies. (2019). 'eSports in K12: A "Getting Started" Checklist', *Dell Technologies*, July. Retrieved March 16, 2021, from https://www.delltechnologies.com/en-in/collaterals/unauth/infographic/solutions/delltechnologies_k12_esports_infographic.pdf.