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Effectiveness of Using Video Game Therapy (V-GT) Design to Improve Learning Concentration of Autistic Students

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ABSTRACT

Background: Problems in the brain system result in autistic students exhibiting attention deficits when studying content outside of their special interest areas, which causes significant problems with their learning concentration. As a result of this concentration problem, it is difficult for autistic students to grasp the learning material provided by the teacher in class. The aim is to develop Video Game Therapy (V-GT) to address the issue of concentration in teaching autistic students.

Method: This research is a Research and Development (R&D) type of study aimed at developing a product and testing the results of its development. The study population was autistic children aged 6-10 years who had low concentrations, and only had 5 children with autism. Samples were taken by proportional random sampling for autistic children in Surakarta with the Slovin formula, a significance of 0.10

Result: The results showed that, based on the due diligence, Video Games Therapy (V-GT) was categorized as very good. This means that it can be used for concentration therapy for autistic students. Testing the effectiveness of V-GT with the pre-post test shows that it can increase the learning concentration of autistic students.

Conclusion: Development of Kinect-based Video Game Therapy (V-GT) to accommodate the convenience of autistic games, and the duration of the game is set so that autistic students can maximize their learning concentration.

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INTRODUCTION

Autistic disorder is characterized classically by disturbances of social interaction, social communication, and social imagination. Autistic disorder is the fastest-growing developmental disorder in countries around the world (Li et al, 2018). By 2022, the study found that the global prevalence of autism had increased to 1 in 100 children (Zeidan et al., 2022). The results of the study show that the prevalence of autism is 1:100 on average globally. The number of people with autism increases every year; at least 500 children are diagnosed every year. According to the latest data, the number of people with autism in Indonesia in 2022 is around 2.4 million (BPS, 2022). A total of 6,691 school-age children are experiencing various learning difficulties in the classroom. Autistic children have abnormalities that distinguish them from children in general, but autistic children can also learn at school (Barutu et al., 2022). The number of sensory abilities in

autistic children is still low and different for each autistic child, depending on their communication and concentration abilities (Wing et al., 2011). Disturbances in concentration are considered early markers of autistic children's disorders, which result in cognitive decline at school (Sano et al., 2021).

Children with autism spectrum disorders (ASD) show difficulty paying attention when learning (Banire et al., 2020). Problems in the brain system result in autistic students exhibiting attention deficits when studying content outside their area of special interest, which causes significant problems with their ability to concentrate on learning (Strickroth et al., 2020). Teachers often find it challenging to support autistic children in concentrating on learning and class assignments (Aliee et al., 2013). The study's results showed that 78% of autistic children had poor concentration abilities, making it difficult for them to complete tasks assigned by the teacher (Gao et al., 2025). As a result of this concentration problem, it is difficult for autistic students to grasp the learning material provided by the teacher in class. This can result in low learning outcomes and leave students behind their peers in class. With poor autistic children's concentration, therapy needs to be given to increase their concentration level. When providing concentration therapy for autistic children, it is essential to consider the use of colors that children enjoy in the therapeutic media used by the teacher. The use of attractive colors can alter the concentration of autistic children, as they will focus on what they like (Nair et al., 2022).

By combining video games and therapy designed by video games for Autistic Children with motion-based touchless devices, such as Microsoft Kinect devices, and touch screens with gadget devices. The use of these media to enhance the concentration abilities of autistic children through therapeutic approaches such as ABA, occupational therapy, visual, and audio play (Almeida et al., 2019; Bimantara et al., 2015; Prasetya & Mutiara, 2014). By packaging video games inclusively, including elements of Autism therapy to improve the concentration abilities of autistic children, as a form of therapy (Malinverni et al., 2017). However, it is necessary to design games that do not cause children to have tantrums, such as those with a high or complicated level of difficulty (Mazurek et al., 2015). In this study, making games prioritizes concentration and eye contact in autistic children, so they use simpler games and emphasize colors that attract children's attention (Engelhardt et al., 2017). Games that will be developed to help autistic children overcome concentration problems include: guessing colors, shapes, shooters, bubbles, puzzles, and others (Engelhardt et al., 2017). The use of games as therapy is expected to help parents carry out therapy independently at home, so they can save costs and overcome concentration problems that arise in children with autism. Based on the description above, the researcher aims to develop Video Game Therapy (V-GT) to address the issue of concentration difficulties in autistic students.

METHOD

Research procedure

This research is a type of Research and Development (R&D) study aimed at developing a product and testing the results of its development. The development research method is a research approach used to produce specific products and evaluate their effectiveness (Sugiyono, 2014). Research activities are carried out to identify the problems associated with concentration and current concentration therapy for children with autism. The product development in this research involves the creation of Video Game Therapy (V-GT) to address the concentration issues of autistic children. The research was conducted in three stages. Preliminary studies. Literature and field studies on concentration problems, the importance of concentration therapy, and current models of concentration therapy for autistic children. Model Development. Formulation of Video Games Therapy (V-GT) prototypes to solve concentration problems for autistic children, Game graphics, Storyline, Gameplay, Reports, and Video Games Therapy (V-GT) manual books. Furthermore, product feasibility tests will be carried out by experts (expert judgment) and users to determine the feasibility of the product being developed. The final stage involves testing the effectiveness of Video Game Therapy (V-GT) in addressing concentration problems for autistic children who are ready for dissemination.

Population and Sample

The study population was autistic children aged 6-10 years who had low concentrations, and only had 5 children with autism. Samples were collected using proportional random sampling for autistic children in Surakarta, based on the Slovin formula, with a significance level of 0.10 (Sugiyono, 2014).

Therapeutic Administration Technique

In play therapy interventions that utilize educational game media, the therapist will employ modeling techniques as needed, specifically life modeling. Life modeling, based on Bandura's theory, requires a model to demonstrate the target behavior directly, or it involves a real-life characterization where the subject observer admires and imitates the behavior observed in real life (Rahmawati, 2014). The intervention process will consist of seven sessions, each lasting approximately 30 minutes, and will be conducted over a period of seven days. It is used to reduce and overcome the addictive effects of using V-GT.

RESULTS

The feasibility of Video Game Therapy (V-GT) to address concentration problems in autistic children involves experts from six fields: Information Technology, Media, Psychology, Occupational Therapy, Graphic Design, and Special Education, with a total of 25 validators. With the results of the due diligence as follows:

Table 1. Feasibility of Video Game Therapy (V-GT) to address the concentration problems of autistic children

No	Rating Items	Average Value	Category
1	Practicality Aspect	22,4	Very good
2	Display Aspect	30,2	Very good
3	Programming Aspect	20,6	Very good
4	Convenience Aspect	25,8	Very good

Based on Table 1, the average value of the Video Games Therapy (V-GT) feasibility test in terms of the practical aspect is 22.4, which falls within the very good category (15.66 < X). In terms of appearance, the average value is 30.2, which falls within the very good category (21.66 < X). The Programming Aspect has an average value of 20.6, which falls within the very good category (15.66 < X), and the Ease of Use aspect has an average value of 25.8, also within the very good category (18.66 < X). The conclusion obtained from the results of the Video Games Therapy (V-GT) feasibility test shows a very good category.

Figure 1. Video Games Therapy (V-GT)

Testing the effectiveness of using Video Game Therapy (V-GT) for autistic students applied to five autistic children in a special school for autism in Surakarta. Analysis of the results of the pre-post test conducted on students can be seen in Table 2 as follows:

Table 2. Test results for the effectiveness of using Video Games Therapy (V-GT)

No	Subject	Pretest	Posttest	Deviation	%	Rank
1	MY	17	36	19	24,35	I
2	GN	18	30	12	15,38	V
3	AN	18	34	16	20,51	III
4	TN	21	39	18	23,07	II
5	NN	17	30	13	16,66	IV
Total		91	169	78	100	

		N	Mean Rank	Sum of Rank
Posttest-Pretest	Negative rank	0[a]	.00	.00
	Positif rank	5[b]	3.00	15.00
	Ties	0[c]		
	Total	5		

Test statistics

	Posttest-Prettest
Z	-2.023
Asymp. Sig (2 tailed)	0.43

Based on Table 2, significant increases in concentration were experienced by MY (24.35%), TN (23.07%), AN (20.51%), NN (16.66%), and GN (15.38%). Wilcoxon statistical calculations resulted in a calculated Z value of -2.023 and a significance level of 0.043. Since the significance level of 0.043 was smaller than 0.05 (0.043 < 0.05), a statistically significant difference was observed between the before- and after-treatment groups. This means that there is an effect of V-GT on increasing concentration in autistic children.

Figure 2. Trial of Video Game Therapy (V-GT)

DISCUSSION

Playing is a fun physical or mental activity that improves children's skills, particularly those involving their visual abilities, enabling them to focus on games (Elbeltagi et al., 2023). Children with autistic disorder have a strong preference for screen-based media, especially video games (Mazurek et al., 2015). Video games can be used as a therapeutic tool to help autistic students overcome issues with poor concentration (Jiménez-Muñoz et al., 2022). Other studies have shown that video games can be effective in increasing the concentration of autistic children (Mahmood et al., 2021; Samson et al., 2020). The use of video games can capture the attention and focus of autistic children, enabling them to improve their concentration during learning (Eder et al., 2016). The game design presented for autistic students in this study uses the kinetc system. Kinect-based video games, according to other research results, are highly effective for autistic children in terms of the reactions of children who are more interested in playing these games (Golden et al., 2022). Another important aspect of successful game development for individuals with autism is the incorporation of elements and mechanisms that appeal to children, such as attractive colors and animations in video games (Malinverni et al., 2016). Video game development must prioritize accessibility for children with autism when playing games (Valencia et al., 2019).

Traditional therapy is often considered boring by children; in contrast, game-based therapy has proven to be effective and more engaging (Ruiz-Rodriguez et al., 2019). The study's results demonstrate the positive effects of therapeutic video games and digital assistive technology, particularly for children with autism (Concepcion, 2017). The effectiveness of therapy-based games offers the benefit of reducing concentration problems in autistic students (Bhatt, 2022; Navan, 2020). Video games are a type of game that is very popular among autistic students, considered very interesting and motivating (Baldassarri et al., 2021). The use of therapeutic video games needs to pay attention to addiction problems that can be triggered by continuous use in autistic students (Gómez et al., 2021). Therapy using video games requires a facilitator to supervise its use (Coma-Roselló et al., 2020). It is necessary to set the duration of each therapy session using this video game. The effectiveness of therapy for autistic students is associated with the intensity and duration of therapy, which is typically carried out over several weeks, rather than in one or two hours (Malinverni et al., 2016). In this study, Kinect-based Video Game Therapy (V-GT) was developed to accommodate the convenience of autistic students, and the duration of the game is set to maximize their learning concentration.

CONCLUSION

Based on the feasibility test, Video Game Therapy (V-GT) is categorized as very good. This means that it can be used for concentration therapy for autistic students. Testing the effectiveness of V-GT shows that it can increase the learning concentration of autistic students. Video games can be used as a therapeutic tool to help autistic students overcome issues with poor concentration. Video games are a type of game that is very popular among autistic students, considered very interesting and motivating. The study's results demonstrate the positive effects of therapeutic video games and digital assistive technology, particularly for children with autism. The effectiveness of therapy-based games has the benefit of reducing concentration problems for autistic students. In this study, Kinect-based Video Game Therapy (V-GT) was developed to accommodate the convenience of autistic students, and the duration of the game is set to maximize their learning concentration.

REFERENCES

Aliee, Z. Shams, Jomhari, N., Rezaei, R., & Alias, N. (2013). The effectiveness of managing split attention among autistic children using computer-based intervention. T*urkish Online Journal of Educational Technology*. 12 (2), 281–302.

Almeida, L. M., Silva, D. P. D., Theodório, D. P., Silva, W. W., Rodrigues, S. C. M., Scardovelli, T. A., Silva, A. P. D., & Bissaco, M. A. S. (2019). ALTRIRAS: A Computer Game for Training Children with Autism Spectrum Disorder in the Recognition of Basic Emotions. *International Journal of Computer Games Technology*. 1 – 16.

Badan Pusat Statistik. (2022). *Jumlah Anak Berkebutuhan Khusus (ABK) di Indonesia*. Jakarta: BPS.

Baldassarri, S., Passerino, L.M., Ramis, S., Riquelme, I., & Perales, F.J. (2020). Toward emotional interactive videogames for children with autism spectrum disorder. *Universal Access in the Information Society, 20*, 239 - 254.

Barutu, N., Husna, A., Winarni, S., & Marlina, M. (2022). Analysis of number sense ability in children with Autism Spectrum Disorder (ASD) in solving mathematical problems. *Jurnal Penelitian dan Pengembangan Pendidikan Luar Biasa*, 9(2), 43-50.

Bhatt,S., Leon, N., & Al-Jumaily, A.(2022). Augmented reality game therapy for children with autism spectrum disorder. *International Journal on Smart Sensing and Intelligent Systems*,7(2), 519–536. https://doi.org/10.21307/ijssis-2017-668

Bimantara, A., Suyanto, M., & Boedijanto, E. (2015). Implementasi aplikasi game autisme "Ahada" Di SLB Bina Anggita Yogyakarta. *Data Manajemen Dan Teknologi Informasi (DASI)*. *16*(2), 1 – 11.

Coma-Roselló, T., Blasco-Serrano, A.C., Garrido Laparte, M.Á. et al. (2020). Mediation criteria for interactive serious games aimed at improving learning in children with attention deficit hyperactivity disorder (ADHD). *Research and Practice in Technology Enhanced Learning*, 15 (25), 1-20.

Concepción, H. (2017). Video game therapy as an intervention for children with disabilities: Literature review and program protocol. 51 (3), 221–228

Eder, M. S., Diaz, J. M. L., Madela, J. R.S., Mag-usara, U., M., & Sabellano, D. D.M. (2016). Fill Me App: An interactive mobile game application for children with autism. *International Journal of Interactive Mobile Technologies (iJIM)*, 10(3), 59–63. https://doi.org/10.3991/ijim.v10i3.5553

Elbeltagi, R., Al-Beltagi, M., Saeed, N. K., & Alhawamdeh, R. (2023). Play therapy in children with autism: Its role, implications, and limitations. *World journal of clinical pediatrics*, *12*(1), 1–22. https://doi.org/10.5409/wjcp.v12.i1.1

Engelhardt, C. R., Mazurek, M. O., & Hilgard, J. (2017). Pathological game use in adults with and without autism spectrum disorder. *PeerJ*. 2(6), 1 – 17. https://doi.org/10.7717/peerj.3393.

Gao, J., Song, W., Huang, D., Zhang, A., & Ke, X. (2025). The effect of game-based interventions on children and adolescents with autism spectrum disorder: A systematic review and meta-analysis. *Frontiers in pediatrics*, *13*, 1498563. https://doi.org/10.3389/fped.2025.1498563

Golden, D., Liang, L. & Getchell, N. (2022). The effects of Xbox Kinect active video gaming on executive function, inhibition, in children with and without autism spectrum disorder: A pilot study. *Journal of Behavioral and Brain Science*, 12 (6), 287–301.

Gómez, C., Sanchez, J., Vázquez, S., Sancho, S., Gómez, P., & Martha. (2021). The use of videogames as digital leisure among people with autism spectrum disorder. *Siglo Cero: Revista Española sobre Discapacidad Intelectual*. 52 (3). 101-117. 10.14201/scero2021523101117

Jiménez-Muñoz, L., Peñuelas-Calvo, I., Calvo-Rivera, P., Díaz-Oliván, I., Moreno, M., Baca-García, E., & Porras-Segovia, A. (2022). Video Games for the Treatment of Autism Spectrum Disorder: A Systematic Review. *Journal of autism and developmental disorders*, *52*(1), 169–188. https://doi.org/10.1007/s10803-021-04934-9

Li, D., Larsen, L., Yang, Y., Wang, L., Zhai, Y., & Sullivan, W. C. (2018). Exposure to nature for children with autism spectrum disorder: Benefits, caveats, and barriers. *Health & Place*. 55 (1), 71–79.

Mahmood, A. A., Kashani-Vahid, L., & Moradi, H. (2021). Effectiveness of "maghzineh" attention cognitive video games on executive functions of children with autism spectrum disorder. *International Serious Games Symposium (ISGS), Tehran, Iran, Islamic Republic of, 2021*, pp. 59-64, doi: 10.1109/ISGS54702.2021.9684768.

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.

Malinverni, L., Mora-Guiard, J, Padillo, V.,Valero, L., Hervás, A., & Pares, N. (2016). An inclusive design approach for developing video games for children with Autism Spectrum Disorder. *Computers in Human Behavior*, 1–5, S0747563216300188–. doi:10.1016/j.chb.2016.01.018

Mazurek, M. O., Engelhardt, C. R., & Clark, K. E. (2015). Video Games from the Perspective of Adults with Autism Spectrum Disorder. *Computers in Human Behavior*, *51*(2), 122–130. https://doi.org/10.1016/j.chb.2015.04.062.

Nair, A.S., Priya, R.S., Rajagopal, P., Pradeepa, C., Senthil, R., Dhanalakshmi, S., Lai, K.W., Wu, X., & Zuo, X. (2022). A case study on the effect of light and colors in the built environment on autistic children's behavior. *Front. Psychiatry*,13:1042641.

Navan, A., Khaleghi, A. (2020). Using gamification to improve the education quality of children with autism. *Revista Científica*, 37(1), 90-106. Doi: https://doi.org/10.14483/23448350.154

Rahmawati, H . (2009). *Buku Ajar – Modifikasi Perilaku*. Cetakan Pertama. Penerbit Al-Izzah

Prasetya, R. P., & Mutiara, G. A. (2014). Augmented reality untuk pengembangan game interaktif bagi anak berkebutuhan khusus. *Jurnal Fakultas Hukum UII*. 29–34.

Ruiz-Rodriguez, A., Martinez-Garcia, A.I., & Caro, K. (2019). Gesture-based video games to support fine-motor coordination skills of children with autism. *Proceedings of the 18th ACM International Conference on Interaction Design and Children (IDC '19). Association for Computing Machinery, New York, NY, USA*, 610–615. https://doi.org/10.1145/3311927.3325310

Samson, A. C., Sokhn, N., Van Herwegen, J., & Dukes, D. (2022). An exploratory study on emotion regulation strategy use in individuals with Williams syndrome, autism spectrum disorder and intellectual disability. *Frontiers in psychiatry*, *13*, 940872. https://doi.org/10.3389/fpsyt.2022.940872

Sano, M., Yoshimura, Y., Hirosawa, T., Hasegawa, C., An, K. M., Tanaka, S., Naitou, N., & Kikuchi, M. (2021). Joint attention and intelligence in children with autism spectrum disorder without severe intellectual disability. *Autism Research*, 14(12), 2603– 2612.

Strickroth, S., Zoerner, D., Moebert, T., Morgiel, A. & Lucke, U. (2020). Game-Based Promotion of Motivation and Attention for Socio-Emotional Training in Autism: Exploring the Secrets of Facial Expressions by Combining Minecraft and a Mobile App. *I-com*, 19(1), 17-30.

Sugiyono. (2014). *Metode Penelitian Kuantitatif Kualitatif dan R & D*. Bandung : Alfabeta.

Valencia, K., Rusu, C., Quiñones, D., & Jamet, E. (2019). The Impact of Technology on People with Autism Spectrum Disorder: A Systematic Literature Review. *Sensors (Basel, Switzerland)*, *19*(20), 4485. https://doi.org/10.3390/s19204485

Wing, L., Gould, J., & Gillberg, C. (2011). Autism spectrum disorders in the DSM-5: Better or worse than the DSM-IV?. *Research in Developmental Disabilities*, 32(2), 768– 773.

Zeidan, J., Fombonne, E., Scorah, J., Ibrahim, A., Durkin, M.S., Saxena, S., Yusuf, A., Shih, A., & Elsabbagh, M. (2022). Global prevalence of autism: A systematic review update. *Autism Research*, 15, 778–790.