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EMPOWERING PHYSICAL ACTIVITY THROUGH 'ACTIVE FUN PLAY'

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ABSTRACT

Active Fun Play (AFP) is an interactive multi-approach combining Roblox platform with exercise games designed to support children with Autism Spectrum Disorder through an engaging, interactive and inclusive digital learning experience in physical activity. The AFP also incorporates real-world physical activity embedded with exercise games through immersive storyboards creating a seamless blend of virtual and physical world. This purpose of this innovation is to adopt an interactive multi-approach to empower a fun gamified system to help children with ASD to improve their motor skills by connecting their mind and body, encouraging them to plan and execute movements while responding to their environment. The AFP has been implemented within inclusive educational settings in schools which demonstrated a positive impact on the development of physical activity skills among ASD students. The AFP proves its value in inclusive education being more engaging, fun and interactive. Through its interactive capabilities, it provides a safe and stimulating environment where learners can learn and acquire vital physical activity skills at their pace by guaranteeing an enjoyable and accessible education experience for all.

Keywords: Active, Physical Activity, Autism Spectrum Disorder, Children

INTRODUCTION

Physical activity is crucial for the holistic development of all children, including those with autism spectrum disorder (ASD). Children with autism spectrum disorder (ASD) frequently exhibit significantly lower levels of engagement in physical activity compared to their neurotypical peers. However, autistic children often exhibit sensory sensitivities, social communication difficulties, and motor coordination challenges, which can hinder their participation in traditional physical activities. This disparity is attributed to a confluence of factors which includes sensory sensitivities, social communication challenges, motor coordination difficulties, behavioral patterns and lack of suitable adapted physical activity programs that can meet the individual needs of autistic children (Chiva-Bartoll et al., 2021). These challenges contribute to sedentary lifestyles, increasing the risk of obesity, cardiovascular disease, and other health complications. This is a cause of concern as obesity is growing public concern with children with ASD are disproportionately affected with a higher prevalence of obesity in this population (Curtin et al., 2010). This would lead to a significant increase in the risk of physical and mental health exacerbating existing challenges and contributing to long-term health complications.

Research has shown progressive amounts of physical activity can aid in minimizing these negative consequences in the physical and cognitive development of children. Chiva-Bartoll (2021) study showed significant improvement in moderate physical activity performance on children with ASD. Increased levels of exercise can help decrease off-task and problem behavior, increased on-task behaviour and improved academic achievement (Maulida et. al., 2023; Chiva-Bartoll et al., 2021).

The usage of Roblox as a platform for physical activity in its ability to blend social interaction with game-based play and exercises has made it an attractive option for developers aiming to create games that encourage physical movement. Studies suggest that video games, when appropriately designed, can stimulate physical activity among children (Sinclair et al,m 2007; Zhang et al., 2023) Although Roblox does not inherently include motion sensors, its game design can still encourage players to simulate or mimic real-world actions which can promote exercise. For example, games that involve running, jumping, or dancing may stimulate children to move in ways that are beneficial to their physical health while also encouraging teamwork or competition with peers. This dual engagement in both cognitive and physical tasks has been identified as a valuable aspect of active gaming platforms like Roblox (Anderson & Dill, 2000).

The potential mental health benefits of Roblox exercise games should not be overlooked. Regular physical activity has long been associated with positive mental health outcomes, including reduced levels of anxiety and depression (Reed & Buck, 2009). Similarly, the social engagement facilitated by Roblox exercise games can contribute to emotional well-being, especially when it creates a supportive online community. Positive interactions with peers in game spaces can promote feelings of connection and reduce feelings of loneliness (Shin, 2017).

Traditional physical activity programs may lack the necessary adaptations to accommodate the unique needs of autistic children. Therefore, innovative and engaging interventions are needed to promote sustained participation in physical activities among autistic children. This case study explored a combined approach utilizing Roblox exercise games which aimed to examine how Roblox can be utilised as educational learning tool for autistic children. The study will provide better inputs for educators on enhancing roblox as a platform to open better opportunities and approaches for autistic education.

METHODOLOGY

The Active Fun Play (AFP) was presented as an integral component of a proactive classroom management framework which directly supports effective teaching practices in the classroom. This approach aligns with the principle that proactively addressing potential behavioral issues through positive strategies, rather than reactively responding to disruptions are crucial in teaching autistic children. By fostering student engagement and a sense of connection, proactive management through the AFP can minimizes off-task behavior, thereby enhancing the efficacy of enabling the autistic

children to engage and learn progressively. Given that effective teaching is the most significant factor in student progress, the AFP, through its contribution to proactive management can influences student achievement, engagement, and motivation by highlighting the teacher's pivotal role in teaching the autistic children.

The AFP consisted of the Roblox exercise games was designed to incorporate achivements which served as a tool for modulating the autistic children's arousal levels and channeling excess energy that can reduce restlessness and increase in their ability to self-regulate. In addition, it can foster a sense of enjoyment and motivation through the engaging and interactive nature of Roblox. There were 2 exercise games which were created by Roblox incorporating physical movement to make learning more fun and engaging. These games enabled the children to practice their fundamental motor skills mirroring the real-world necessity of challenging their body to improve their motor skills for more challenging activities. The two games are Fun Exercise Treasure One and Fun Exercise Priate Two that are made up of fundamental motor skills. The Fun Exercise Treasure One consisted of 6 exercises which are (1) walk forward (2) turnaround and walk (3) jump on the spot (4) jump over obstacles (5) run (6) shoot a basket. Whereas the Fun Exercise Priate Two also consisted of 6 exercises which are (1) running on the spot (2) jumping on the spot (3) run forward (4) jump over 4 obstacles (5) kick a ball (6) shoot a ball. These exercises are short and manageable that have been taken into consideration not to overwhelm the children with sensory overload and complexities of attention in autism. The duration for each of the Roblox exercises is between 60 seconds to 120 seconds.

The teachers and participants were briefed and shown on how to perform the roblox exercises games by the reasearcher. The researcher leads the roblox exercise games where each of the participants were engaged in the Roblox exercise videos independently. Participants received structured support through direct instruction, observational modeling, visual resources, ongoing feedback, and personalized adjustments to meet individual needs.

The participants were 6 students with autism spectrum disorder (ASD) from a primary school who were aged 9 (3 students) and 10 years old (3 students). The inclusion criteria for the students with ASD were able to demonstrate some functional communication skills, comprehension, and ability to follow instructions as well as willingness to participate in physical activity based on verbal reports and exhibiting no medical conditions preventing participation in physical activities. Exclusion criteria were students with ASD who constantly showed some form of aggressive behavior that may put the researcher, participant, or teacher in harm's way and likeliness of problem behavior when required to engage in physical activity.

The Institutional ethics committee approved this study. In addition, the school authorities and teachers were informed of the study and informed consent, and assent were also obtained from the parents and children respectively. The participants' teachers were also present during the intervention. The anonymity and confidentiality of the participants were maintained during the study.

Instruments

The Social Validity Questionnaire (Stipes, 2021) was used to examine the participants' social aspects towards Roblox exercise games. The participants were asked based on the statements focusing on the participants' liking of the exercise games, perceived impact on behaviour and their desire to continued use after the study. The questions of the questionnaire were read and explained to the participants. The preference and personal benefit of the participants were examined through 3 questions based on a 3-point Likert scale where 1 represents a sad face, 2 represents a neutral face and 3 represents a happy face.

Target Behaviour

The researcher observed the on-task behaviour during the participants' engagement during the Roblox exercises games. The on-task behaviour refers to the participant engaging in the assigned task from the researcher such as the participant is performing the exercises based on the games.

RESULTS AND FINDING

Table 1: Demographic Characteristics of the Participants (N = 6)

Characteristics	Frequency (F)	Percentage (%)
Gender		
Male	3	50.0
Female	3	50.0
Age (years old)		
9	3	50.0
10	3	50.0
Ethnicity		
Malay	2	33.3
Bumiputera Sarawak	2	33.3
Chinese	2	33.3

Table 1 presents the demographic characteristics of the participants. A total of six participants were included in the study. The sample consisted of an equal distribution of males and females, with three participants in each category, representing 50% of the total sample. Regarding age, half of the participants (50%) were 9 years old, while the other half (50%) were 10 years old, with three individuals in each age group. The ethnic composition of the participants was diverse, encompassing three different groups: Malay, Bumiputera Sarawak, and Chinese. Each group was represented by two participants, accounting for 33.3% of the total sample respectively.

Table 2: Social Validity Rating among the Participants

	Variables	Participant A	Participant B	Participant C	Participant D	Participant E	Participant F
1.	I liked the Roblox games.	3	3	3	3	3	3
2.	What did you like about the Roblox games?	"jump on the spot"	"kick a ball"	"turn around and walk"	"running on the spot"	"jumping over obstacles"	"shoot a ball"
3.	I could focus better in class after participating in the Roblox games.	3	3	3	3	3	3
4.	What did you like about the class time after the games?	"very nice"	"fun to do the different movements"	"like….had our own space to move"	"fun to see new exercise!"	"good!....can do the exercises easily"	"cool…interesting.
5.	I want to keep doing the Roblox games.	3	3	3	3	3	3
6.	What did you think the Roblox games are helpful with?	"very helpful in understanding the steps	"very helpful with useful steps"	"the games showed fun exercises"	"helped to exercise easily"	"helped me do the exercises right"	"helpful with the demonstrations"

Note. 1 = sad face, 2 = neutral face, 3 = happy face.

Table 2 presents the social validity ratings of six participants (A through F) regarding their experience with the Roblox exercise games. The table includes six variables, each representing a different aspect of the participants' perception and experience with the videos. Ratings were based on a three-point scale: 1 = sad face, 2 = neutral face, and 3 = happy face. All participants consistently rated the Roblox exercise games positively (rating of 3 – happy face) for questions 1, 3, and 5. This indicated a high level of overall satisfaction with the games, perceived improvement in focus after participation, and a desire to continue using them. Besides, for question 2, which asked what participants liked about the games, elicited a variety of specific activity preferences such as jump on the spot, kick a ball, turn around and walk, running on the spot, jumping over obstacles and shoot a ball. This suggested that the games offered diverse activities that appealed to different participants. Moreover, for question 4, focusing on the class time after the games, it also received positive feedback, with participants using terms like "very nice," "fun," "awesome," and "cool" to describe their experience. This suggests the videos have a positive impact on the overall classroom atmosphere or engagement. Lastly, question 6, which asked what the videos were helpful with, revealed that participants found them helpful in breaking down processes, retaining information, learning new workouts, solidifying understanding, performing exercises correctly and understanding demonstrations.

Target Behaviour

The on-task behaviour of the participants showed a notable positive shift as the participants demonstrated engagement, attentiveness and sustained focus during the Roblox exercise games. The participants also showed sustained attention during the exercise games and were able to follow approximately 90 percent of the exercises. They did not show any form of fidgeting and verbal disruptions during the duration of the exercise games. The study showed that the physical activity provided through the Roblox exercise games may have had a positive impact on their overall behavioral regulation and cognitive readiness

DISCUSSIONS, RECOMMENDATIOS AND CONCLUSIONS

This study examined the implementation of the Active Fun Play in the form of Roblox exercise games that investigated the effect of on-task behaviour and social aspects of six children with ASD. The results were consistent with past studies which showed that Roblox can stimulate children in performing exercises and physical activity in a fun way. The results also showed that Roblox interactive game-based activity can increase on-task behaviour. The incorporation of physical activity within this engaging framework transforms exercise from a normal chore into an enjoyable and intrinsically motivating experience which encourages active participation.

The virtual environment is cognitively stimulating which can mitigate some of the anxieties associated with traditional exercise settings, potentially increasing participation among children who may be hesitant to engage in physical activity in real-world contexts. The results which showed favourable social aspects of Roblox indicated that an enhancement in exercise engagment that can foster children to participate in activities together with friends and peers can encourage a sense of belonging and encouraging collaborative activities. This social interaction can increase motivation and provide a supportive environment for children to engage in physical activity.

The results are consistent with the growing body of research exploring the use of Roblox, exergames and virtual reality for promoting physical activity. The immersive and interactive nature of these technologies have been shown to effectively increase engagement and adherence to exercise programs. Roblox, with its vast user base and customizable features, provides a unique and accessible platform for delivering these types of interventions.

The limitation of the study lies with the small sample size which significantly restricts the generalizability of the findings to the broader population. As it is not a quasi-experimental study would further limit the generalizability of these findings. Thus, it is recommended that we increase the sample size of children with ASD to enhance the generalizability of the findings.

In conclusion, the AFP Roblox exercise games demonstrate considerable promise as a tool for stimulating children's engagement in physical exercise. The platform's gamified structure, customizable

environments, and social features offer a unique and effective means of promoting active lifestyles among children with ASD.

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