

A Project entitled

A teaching kit with game cards and dices, for students with Autism spectrum disorder to enhance their coordination and communication skill in fitness class

Submitted by

Bau Hiu Lam Helen

submitted to The Education University of Hong Kong

for the degree of *Bachelor of Education (Honours) (Physical Education)*

in *April 2023*

Declaration

I, *Bau Hiu Lam Helen* declare that this research report represents my own work under the supervision of *Mr. CHAN Ching Yat, Roy*, and that it has not been submitted previously for examination to any tertiary institution.

Signed

Bau Hiu Lam Helen

Date

Abstract:

Purposes: The objective of this project is to improve the physical fitness level of students while enhancing communication skills of students with Autism Spectrum Disorder (ASD) through a specially designed tabletop game. Since game-based intervention is found to be an effective tool for ASD students and it provides a tactile experience that can engage them more effectively, a board game is hence designated for ASD students.

Methodology: A board game is designed for students with light to moderate levels of Autism Spectrum Disorder (ASD). It includes various tools such as game board, tokens, dice, game cards, “Level Board”, “Chance Board”, “Communication Board”, card holders, and roulette. The game consists of five levels of gameplay that allows students to choose different gameplay and completes different exercise based on their ability. Among all the gameplay, students have to complete the required exercise shown on the board to get the game card. The winner would be the players who collect game cards the fastest according to the corresponding gameplay. Players can work together or invite others to complete tasks. QR codes are provided on the game cards and “Level Board” shows different levels of exercise so that students can complete the exercises according to their ability; “Communication Board” is also included to help students communicate effectively. When players land on “CHANCE”, they can roll the roulette and get the “treasure” by completing corresponding exercise, which further motivates players to complete challenges. Overall, the board game is designed to promote fitness level and muscle strength and communication skill of ASD students through an engaging and interactive learning experience.

Objectives:

The tabletop game aims to enhance fitness level and muscle strength of students with Autism spectrum disorder (ASD) through different levels and combinations of exercise. Also, it aims to improve their communication skills through collaborative workouts with both their peers and

friends to accomplish task. It provides an alternative for students to involve in physical activity while it creates an engaging way for students to perform exercise so as to build up a habit of doing exercise.

Background:

The prevalence of ASD is on the rise among children in Hong Kong, as statistics has shown a steady increase over time. Specifically, the number of diagnosed cases of ASD increased from 3,800 in 2007 to 10,200 in 2013 (Hong Kong Census and Statistics Department, 2015). Children with ASD usually exhibit autistic symptoms before the age of 3 and tend to have significantly lower levels of motor proficiency and fitness compared to their peers. Moreover, adolescents with ASD are less physically active than peers without disabilities and the level of physical activity tends to decrease with age. Additionally, they exhibit lower levels of muscle strength and endurance when compared to typically-developing children.

Children with ASD may experience difficulties with motor skills, and that may be associated with social communication skills (McPhillips, Finlay, Bejerot & Hanley, 2014). Communication can be a challenge for children with ASD as they may have limited or no speaking skills and difficulty in interpreting body language and different vocal tones. Meanwhile, physical activity programs have been found to be beneficial for children with ASD in several aspects like improving social skills, motor skills and fitness levels. Exercise can reduce stereotypical behaviour patterns and show improvements in verbal and non-verbal communication skill. It results in a reduction in repetitive behaviours for children with ASD, as well as improvements in cardiovascular, muscle strength, coordination. Moreover, participation in physical activity can positively impact overall attitude and engagement of children with ASD towards exercise.

Tailor-made exercise and physical activity program have been designated for children with ASD. Game-based interventions have been found to be particularly beneficial. They focus on teaching ASD students' ability to learn a game and generalized the learnt skills to other areas. Tabletop games and board games have been proved to be effective learning tools for ASD students as they provide opportunities in hands-on and tactile experience that is engaging and interactive. This eventually increases motivation and provide opportunities for students to develop a range of skills, including communication, social interaction and shared attention. ASD students can hence build up positive communication behaviours and increase their social responsiveness through the board game, leading to increased engagement with others. Based on these benefits, a specialized teaching kit in the form of a board game will be designed, with the aim of improving the fitness levels of communication skills of ASD students.

Methodology:

This board game named “體能鬥一反” . It is a combination of tabletop game and card games. There is a total of 5 levels of gameplay, which caters different students' needs. The students first select one gameplay level and start the game. It generally follows to the subsequent procedure. Initially, player roll the dice and move the “chess” according to the result on the dice. Next, they perform the corresponding exercise shown on the board. Upon finishing the task, students can get a game card and place it in the cardholder. The winner is the player who collects game cards the fastest based on the relevant gameplay.

The design of board game focuses on the support of ASD students. To begin with, Picture Exchange Communication System (PECS) is applied. Different colors are used for different parts of exercise. Pictures, simple wordings and demonstration code are also used to illustrate the exercise and assist interaction. As signs and pictures are easy to understand, they are highly interpretable. With the assistance of PECS, students initiate to perform exercise and talk as they

could imitate the demonstration to perform some exercise or point to the sentence they want in order to deliver message. It is a good communicative partner which encourage social interaction with others.

Besides, choices are provided in the board game. Students can select the levels they would like to play. Throughout the game, they can decide the level of exercise that they would like to do and move their “chess” in alternative ways, such as backward and forward. Providing choices for ASD students enhance their positive behaviors and motivation. Moreover, it also helps developing sense of self and problem-solving skills as they know what they want and would consider the possible choices that they prefer.

Last but not least, this is a diversified board game. As it consists of 5 levels of gameplay, it caters for individual differences. Students with different levels of ASD and ability can also participate in the game. Engaging in diverse gameplay, students can cultivate problem-solving skill as well as their ability to communicate effectively with others since they have to make decision by themselves and interact with others to achieve some goals. Furthermore, the design of board game encourages students to engage in physical exercise, which ultimately leads to enhanced fitness levels.

Evaluation:

The tabletop game has been introduced to a group of ASD students and questionnaires are sent to their parents. Feedback is well received. Most of the parents thought that the board game helped improve students’ fitness levels and foster social communication and interaction. Moreover, the majority found the game to be interesting and engaging as many reported that their kids enjoyed playing it. After considering the feedback received, there is a room for improvement. First, each level may have a suggested age group so that students can have

reference on what levels they may prefer. Another improvement is about the “Communication Board”. It can be designed with PECS. Pictures are associated with simple explanation on every card. Students can select the corresponding cards and put it in the sentence provided so as to deliver thoughts and feelings to their peers. Hence, they can make use of the “Communication Board” and deliver different types of messages.

Conclusion:

Overall, the board game has been shown a positive impact on fitness level and communication skill of students with ASD. It is hoped that the game can be introduced to families and school settings in Hong Kong so as to improve fitness and communication abilities of ASD students. In addition, it can also serve as a useful reference for physical educators, who can use them to arrange appropriate activities and training programs for students with ASD.

References:

Atherton, G., & Cross, L. (2021). *The use of analog and digital games for autism interventions*. *Frontiers in Psychology*, 12. Retrieved from <https://doi.org/10.3389/fpsyg.2021.669734>

Autism and exercise: Special benefits. Autism Speaks. (n.d.) Retrieved from <https://www.autismspeaks.org/expert-opinion/autism-exercise-benefits>

Communication Disorders. (n.d.) Retrieved from <https://www.nidcd.nih.gov/health/autism-spectrum-disorder-communication-problems-children>

Exercise right for kids: Autism spectrum disorder. Exercise Right. (2020). Retrieved from <https://exerciseright.com.au/kids-autism-spectrum-disorder/>

Hart, A., & Carr, S. (n.d.). *Autism Q & A: Providing Choices*. Retrieved from <https://vcuautismcenter.org/resources/factsheets/printView.cfm/1194>

Jones, G. (2021). *The Ultimate Guide to Autism Friendly Colours*. Experia. Retrieved from <https://www.experia.co.uk/blog/ultimate-guide-to-autism-friendly-colours/>

McPhillips, M., Finlay, J., Bejerot, S., & Hanley, M. (2014). *Motor Deficits in Children With Autism Spectrum Disorder: A Cross-Syndrome Study*. *Autism Research*, 7(6), 664–676. <https://doi.org/10.1002/aur.1408>

Pan, C.Y. (2012). *Motor proficiency and physical fitness in adolescent males with and without autism spectrum disorders*. *Autism*, 18(2), 156–165.

<https://doi.org/10.1177/1362361312458597>

Oppenheim-Leaf, M. L., Leaf, J. B., & Call, N. A. (2012). *Teaching Board Games to Two Children with an Autism Spectrum Disorder*. *Journal of Developmental and Physical Disabilities*, 24(4), 347–358. <https://doi.org/10.1007/s10882-012-9274-4>

U.S. Department of Health and Human Services. (n.d.). *Autism spectrum disorder: Communication problems in children*. National Institute of Deafness and Other

10 reasons Why I Like the Picture Exchange Communication System (n.d.) Retrieved from <https://autismclassroomresources.com/10-reasons-why-i-like-picture-exchange/>