

Implementing Diverse Instructional Strategies in Adapted physical Education Program: A case study of a child with autism

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Abstract: The number of individual with autism has been increased past decades. Along with the prevalence, diverse instruction strategies were introduced and implemented in the field of adapted physical education/activity. The purpose of this case study is investigating the effectiveness of the instructional strategies for children with disabilities. A student, nine years old boy with autism, participated in this study. Four different teaching strategies, reproductive teaching style, video modeling, system of least prompts, and chaining strategy, were implemented to teach a target skill, overhand throw. Task analysis were implemented to measure the skill performance weekly for three weeks. The result indicated that the participant showed improvement in on a skill component, T position. The participant did not showed notable improvement on overall skill performance.

Key Words: Autism, Instructional Strategies, Adapted Physical Education



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disabilities, community engagement program, and teacher education.

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by lack of abilities in communication, social interaction, and restricted repertoire of activities and interests [1-3]. According to data from the Center for Disease Control and Prevention (CDC) (CDC, 2018), approximately 1 in 59 children is diagnosed with an autism, 1 in 37 boys and 1 in 151 girls.

Along with the increased in prevalence in Autism, diverse instructional strategies have been introduced and implemented for teaching children with autism to meet their characteristics such as Applied Behavior Analysis (ABA), Treatment and Education for Autism and Related Communication Handicapped Children (TEACHH), video modeling, system of least prompts, and chaining strategy. These instructional strategies have been implemented in the field of Adapted Physical Education (APE)/Activities (APA) as well. However, the

effectiveness of the intervention program has been not investigated in APE/APA [4-6].

The purpose of this case study is to see the effectiveness of an instructional program to teach fundamental motor skills for child with autism implementing diverse teaching strategies. More specifically, this case will be able to provide an example how the instructional strategies could be implemented in the school-based APE program

2. Methods

2.1 Student Description

C is a nine-year old student in second grade who was diagnosed with autism. He is in a special education self-contained class most of the time with a paraprofessional. He receives pull 2 out services for the occupational therapy and speech therapy in separate therapy rooms. C is also receiving total 60 minutes of adapted physical education services in both an inclusion and pulledout setting twice a week. C spends most of time in the resource room with his paraprofessional. The paraprofessional usually shadows when C took direct services. C had been identified as being cognitively delayed with a qualitative impairment in social skills. Since C is non-verbal, his primary form of communication is smiling, crying, and rocking. The drastic mood swings have been observed this year. When he is happy, he is smiling and running around the room flapping his hands. When he is in a bad mood, he tends to hit himself, bang his head on the floor, scream, and run away from the paraprofessional. Recently, he attempted a few words verbally such as table, book, and sun. However, it was not clear enough to understand for his peers.

In the psychomotor aspects, C's movement can be described as clumsy, his gross and fine motor skills are delayed. The impaired motor planning is also observed showing running with running in an atypical manner; his arms are positioned by his side loosely. C can demonstrate limited ability in objective control skills such as the kick, overhand throw, catch, and underhand throw. He has most difficulty in demonstrating eye-hand coordination.

2.2 Target Skill

Target skill Overhand throw is one of the fundamental objective control skill in not only in the national curriculum of Elementary Physical Education [7] but also Test of Gross Motor Development -2 (TGMD-2) [8]. Overhand throw is not on C's Individualized Education Program (IEP) goal in this year, but it was one of the goals of C's IEP last school year, and the IEP goal of the overhand throw was demonstrating 50% accuracy in components (3 out of 6 components) 60% of trials (3 out of 5 trials). However, he ended up with demonstrating 16% 3 accuracy (1 out of 6 components) 60% of trials.

After discussing with his Physical Education (PE) teacher, and the APE supervisor, the APE teacher decided to continue to work on the overhand throw this school year. In the national standards [7], overhand throw in stationary position is mandated to master in 2nd year in elementary school. Overhand throw is fundamental skill to participate not only in community physical activities, but also in activities in General Physical Education (GPE) classes. Based on the TGMD - 2 standards, 10 years old boys can demonstrate overhand throw 80% accuracy out of 5 components consistently.

Task analysis applied to analyze components of the skill breaking down of the target skill into its components. These components can be used as the assessment criteria [9]. After the task analysis, overhand throw could be broken down into 6 components;

- a) Side orientation: standing with non-dominant side toward target, weight evenly distributed on both feet, feet shoulder width apart, eyes on target, ball held in dominant hand at waist level in front of body
- b) T positioning: with almost complete extension of the throwing arm
- c) Throwing hand passes above shoulder, with body rotation forward
- d) Weight shift to throwing arm side foot during extension of throwing arm, and weight shift on foot on the opposite side of the body as throwing arm passes

above the shoulder

- e) Ball release toward the target, palm facing downward, knee and hips slightly flexed
- f) Arm follow through, well beyond the ball release toward target

2.3 Present Level of Performance

C had inconsistent throwing patterns. He tended to throw the object from side to side. It was hard for him to throw the ball over his shoulder. C only can demonstrate one component correctly, side orientation, consistently. It is positive sign that C understood the concept of target. After the big target was set on the wall, C could demonstrate side orientations. When the APE teacher asked C to throw the ball to the target, he pushed the ball away using side arm. Currently, C could not demonstrate 16% accuracy independently 5 out of 5 trials (100%). The probable stage of learning for the target skill was that C could demonstrate at least 3 components, a) side orientation, b) T position, and c) throw the ball over his shoulder.

- a) Objective 1: C will catch the ball with 33% accuracy independently 60% of trials.
- b) Objective 2: C will catch the ball with 49% accuracy independently 60% of trials.
- c) Goal: C will catch the ball with 60% accuracy independently 60% of trials

2.4 Assessment Procedure

The target skill was assessed in his APE classes twice a week by the APE teacher and the APE supervisor. At this time, the APE teacher works with C on his IEP goals, in both an inclusive setting and pulled-out setting. Assessment occurred in the gymnasium, during his PE class; this setting is reflective of where C would actually perform the skill when acquisition would be achieved. The APE teacher set up the basket filled with bean bags and baseball size balls with the target (25 X 25 inches) on the wall. To determine baseline, C's baseline on this skill was measured and observed using task analytic assessment reporting the % of steps completed (see Table 1.).

The assessment probe was the same as the baseline probe; it was the instructional cues given by the APE teacher. In order to most accurately measure C's performance in this task, a multiple opportunity task analytic assessment had been used; while he could only demonstrate first step correctly, he could still 5 perform later in the task analysis. According to his ability to comprehend, C was given a 5- second latency period to perform each component. If at any point, it took longer than 5 seconds to initiate a component the APE teacher assisted C to continue the assessment by preparing him for the next component of the task. To let C know he is going to perform the catch, the APE teacher will say to him, "C! Overhand throw, Pick up the bean bag". The APE teacher stood right next to C to assist him. If C demonstrated a component, he would get +, independent response. If C incorrectly demonstrated the component, he would get -, incorrect or if C did not respond or run away from the setting, he would get a 0. At this time, the APE teacher worked with the APE supervisor. To verify the accuracy level of reflecting C's performance, both the APE teacher and supervisor assessed and then compared the results. The results that matched more than 95% between the APE teacher and the supervisor were only accepted as assessment data. Assessment probe followed the same procedure in baseline used during or after intervention, which allows baseline and intervention data to be compared. During the assessment, there will be no prompting, no response such as specific praise.

2.5 Instruction Plan

C worked on the target skill in his pulled-out setting. Teaching session occurred thirty minutes a week and it happened on the hallway behind the library. In the pulled-out session, he usually works in one-on-one, but in the middle of the session, two or three classes travel through the hallway. At that time, he tended to stop the activity, so that the teaching session for the target skill had been completed in first 5 – 10 minutes in the pulled-out session. In pulled-out APE class, one APE teacher, one paraprofessional, and one supervisor worked together. The APE teacher will set up the equipment, bean bags, balls and a target.

Table 1 Assessment Results

DATE	10/25 BL1	10/30 BL2	11/1 BL3	11/6 T	11/8 P	11/1 3T	11/15 P	11/20 T	11/27 P
Side	-	-	-	-	-	-	-	-	-
T	-	-	-	-	-	-	-	+	+
Over Shoulder	-	-	-	-	-	-	-	-	-
Weight Shift	-	-	-	-	-	-	-	-	-
Throw	-	-	-	-	-	-	-	-	-
Follow through	-	-	-	-	-	-	-	-	-
TOTAL % correct	0%	0%	0%	0%	0%	0%	0%	16%	16%

First of all, the reproductive teaching style was applied to teach C the target skill. In reproductive teaching styles, students duplicate or mimic the teacher's understandings [10]. One of the characteristics of children with autism is reproducing or replicating the movement pattern of the target skill. C is asked to follow step-by-step directions given by the teacher. The goal for C was copying the teachers' movement pattern as accurately as possible. The major advantage of the reproductive teaching style is that students know exactly what they are supposed to do [11].

To enhance the reproductive, video modeling applied in APE this semester for the first time. Video modeling is a model of teaching that uses video recording and display equipment to provide a visual model of the targeted skill [12]. Diverse video modeling were introduced including basic video modeling, video self-modeling, point-of view video modeling, and video prompting. The effectiveness of the video modeling as an instructional strategy has been observed by several researchers. Christy et al., found that video modeling led to a fast acquisition of tasks and fundamental generalization for students with autism [13]. Franzone and Collet-Kilingerberg indicated that the most effective implemented age for video modeling is from early childhood through middle school [12]. C's occupational therapist started to use I-pad to teach C to wash his hands in the last semester, and C showed drastic improvement in

washing hands. Therefore, video-modeling, specifically video self-modeling, was applied to C's instruction strategy. The paraprofessional video recorded his performance when C demonstrated overhand throw. To make an accurate demonstration, the APE teacher stood behind C to give physical prompts. After C's throwing video recorded, C was asked to watch the video before and after he practices overhand throw. A short memo was sent to parents to watch C's overhand throw video at home as well.

A system of least prompts was used to teach C the skill. Prompts are usually considered to be an extra stimuli added to a learning environment to ensure correct responding. It has been shown that individuals with ASD will sometimes fail to transfer from prompt to training stimuli, especially for more difficult skills [14]. Such a characteristic makes using a system of least prompts appropriate as it minimizes the effect of eventual prompt removal. It was also thought that a system of least prompts would help generalization of the skill as a system of least prompts would hopefully result in the child doing the skill when unprompted or with minimal prompts. This would be more easily generalizable to another setting than if the child were to become dependent on a more intrusive prompt. Least prompt system was applied with three levels, verbal cue, verbal cue with gesture, and verbal cue with physical prompt [15]. First, the APE teacher gave a verbal

prompt. If C did not respond on that, a verbal prompt with gesture/modeling would be given to C. If C did not respond on last step, physical prompt with verbal prompt was given to C. For example, the APE teacher gave an instructional probe only, "pick up the ball". If C did not respond with the verbal prompt, the APE teacher point out the basket giving C a cue. If C did not respond with those two cues, finally the APE teacher physically assist him to pick up the ball. The APE teacher worked on all the steps with same procedure, such as physical assistance with 5-second latency. One of the advantages in least prompt system is the natural, built-in plan for fading prompt [15].

Chaining strategy was used to reinforce approximation of a target skill. Chaining is one of the teaching methods for a complex skill acquisition developing series of discrete portions or links that, when tied together, lead to enhance performance of the skill [16]. Chaining involves the step by step instruction of a sequence of subskills leading to accurate completion of the entire task [17]. Forward chaining teaches the responses beginning with the first step in the sequence and adds successive steps: teach step A, then AB, ABC and so on. Backward chaining is a similar but opposite method of training, teaching the behavior in reverse order. That is, teach C first, then teach BC, teach ABC. Both forward and backward chaining system was implemented for C. Since he had not understand the concept of the target skill, under these circumstance, it might necessary to teach the last step in a sequence first, followed by the next-to-last step, and so on until the entire sequence is learned. After C understood the concept of the target skill, the APE teacher could apply forward chaining process to promote % of accuracy of demonstrating each step.

The token system was used to keep C on the task. This was ensured that (a) incentives were linked directly to appropriate behaviors and (b) we had a way of tracking whether she was successful. Usually, C choose one reward, such as a computer, first and then he worked to earn 10 tokens maximum in one 30 minute class, so that the APE teacher gave C one token in every 3 minutes approximately. To promote focusing on the target skill, the APE teacher

gave 1 token, after C finished 3 trials of the target skill. After C reached first objective of the target skill, C will catch the ball with 33% accuracy independently 60% of trials, C would get one token only after 6 trials. The APE teacher can diminish the frequency by C's progress, and ideally, C could demonstrate the skill consistently without token.

3. Results

During the baseline probe, C performed none of these steps correctly (see Table 1.). In terms of internal reliability, all the baseline probes were matched perfectly between the teacher and the supervisor. C's performance during probes indicated that C had difficulty to find rationale of overhand throw.

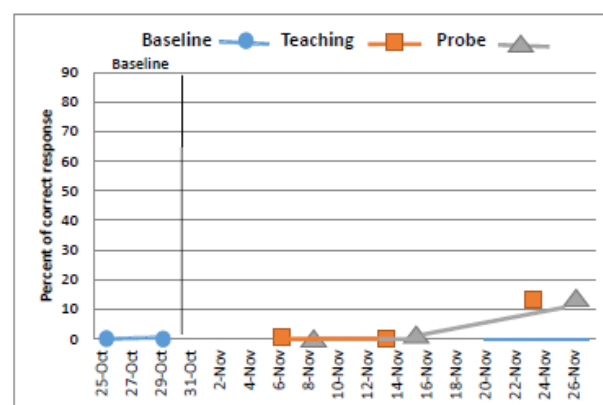


Figure 1 Graph of baseline and intervention

C did not show improvement in the first week of the instruction. In the second week, it was not shown in tables but C showed improvement. His level of demonstration was not enough to get + on assessment sheet. However, it was obvious that he tried to lift his arms to make T position. Finally, in the third week, C perfectly demonstrated T position without any prompt in teaching. In probe, C could not demonstrate the first step, a side orientation, but, he perfectly demonstrated T position and then threw the ball using side arms.

During intervention, C's progress was recorded twice a week on a task analysis chart for one teaching session and probe (see Figure 1.). C had not demonstrated any of steps during the first two weeks of intervention. C seemed frustrated to understand the concept of overhand throw so that he could demonstrate the skill with verbal prompts and

physical prompts. C demonstrated the same pattern in probe session. He could not display any demonstration without help. After 3 weeks of the intervention, C could finally demonstrate skill components, step and T positioning, independently in both a teaching and a probe session

Discussion

Since C had difficulty to focus on a given task, he could not demonstrate any of components during the baseline. We could say that C could not understand the concept of overhand throw, so that it was hard for him to demonstrate any of steps. However, C showed a drastic improvement 10 on his skill demonstrating one component in overhand throw after he started to learn 2 weeks. Based on C's IEP last year, it took a whole school year to demonstrated 2 steps of underhand roll out of 5 steps, so that we could concluded that the skill level of C demonstrating overhand throw got a lot faster than last year. To analyze this drastic improvement, the APE teacher conducted a meeting with formal APE teacher. They concluded 2 reasonable differences between last year and this year in teaching.

First, the video modeling is applied in APE this year. Watching tablet pic like I Since one of C's hobbies was watching videos through the i-pad, he chooses I-pad as his reward most of the time. His occupational therapist strongly recommends using I-pad for instructional purpose at the last IEP meeting so that formal APE teacher commented on C's IEP to recommend using the I-pad. C also enjoyed watching the video of himself performing the skills at school, and also his parents reported that C watches his own video frequently at home.

Second, cooperation within C's IEP team made a major improvement on his skill. C's IEP team communicated periodically to share information and instructional strategies they are currently implementing on C's instruction. Regular communication of the IEP team provided a chance to figure out the most effective instructional strategies for C. For example, C was watching the video frequently, his physical therapist and occupational therapist watched the video as well. Therapists gave

positive feedback to C, also they asked C to demonstrate the skill with them. At home, C watched the video with parents and his parents motivated C to work on the skill on his backyard. I believe that cooperative learning environment helped C to understand the concept of the skill better and finally to generalize it.

Currently, the occupational therapist and the APE teacher use the I-pad to work on C's IEP goal. It is strongly recommended to use I-pad as an overall educational purpose. Also, even though each therapist and the APE teacher has their own IEP goals, this result has proven how important to cooperate each other to achieve goals. their own IEP goals, this result has proven how important to cooperate each other to achieve goals.

5. Conclusion

It showed that the student with autism could get holistic understanding on the skill acquisition by implementation of the diverse instructional strategies. Diverse instructional strategies can provide different levels of motivation, stimulation, and learning to the student with autism, and this would fundamentally promote student's skill acquisition. For the last decade, different types of instructional strategies have been introduced in the field of APE along with advances in educational technology. To provide the most effective instructional strategy, it is strongly recommended to implement diverse instructional strategies to figure out the effective strategy for the student with autism to provide holistic understanding about the skill.

Parents engagement can play important role in child's learning. Specifically, active communication between IEP team and parents would positively affect students' skill acquisition sharing learning goals, progressions, and concerns. Communication would initiate parents' understanding on their child's education goals. Based on the communication, at the same time, the IEP team members would earn better understanding about the student's own characteristics, background, and learning style which would fundamentally help students' learning. To promote regular communication between the IEP team and parents, it is critically important to figure

out what would be the best way to communicate regularly considering different types of communication strategies, such as text message, email, and/or phone call.

References

- [1] R.A. Muhle , H.E. Reed , K.A. Stratigos , J. Veenstra-Vander Weele, The Emerging Clinical Neuroscience of Autism Spectrum Disorder: A Review, *JAMA Psychiatry*, 75 (2018) 514-523.
- [2] Hye Ran Park, Jae Meen Lee, Hyo Eun Moon, Dong Soo Lee, Bung-Nyun Kim, Jinhyun Kim, Dong Gyu Kim, and Sun Ha Paek, A Short Review on the Current Understanding of Autism Spectrum Disorders, *Experimental Neurobiology*, 25 (2016) 1-13.
- [3] Kristen Lyall, Lisa Croen, Julie Daniels, M. Daniele Fallin, Christine Ladd-Acosta, Brian K. Lee, Bo Y. Park, Nathaniel W. Snyder, Diana Schendel, Heather Volk, Gayle C. Windham and Craig Newschaffer, The Changing Epidemiology of Autism Spectrum Disorders, *Annual Review of Public Health*, 38 (2017) 81-102.
- [4] P. Hernandez, Z. Ikkanda, Applied behavior analysis: behavior management of children with autism spectrum disorders in dental environments, *Journal of the American Dental Association*, 142 (2011) 281-287.
- [5] V. Shea, (2013) Treatment and Education of Autistic and Related Communication-Handicapped Children. In: Volkmar F.R. (eds) *Encyclopedia of Autism Spectrum Disorders*. Springer, New York, NY
- [6] Joseph Winnick, (2016) David L. Porretta, *Adapted Physical Education and Sport Sixth Edition*, Human Kinetics, Inc.; Sixth edition.
- [7] SHAPE America (2013), *Grade-level outcomes for K-12 physical education*. Reston, VA: Author.
- [8] D.L. Ulrich (2007), *Test of Gross Motor Development – 2*, University of Michigan press, MI.
- [9] L. Kelly, & V. Melograno, (2004), *Developing the Physical Education Curriculum: An Achievement-Based Approach*, CHAMPAIGN: Human Kinetics.
- [10] M.D. Curtner-Smith, J.R. Todorovich, N.A. McCaughtry, S.A. Lacon, Urban teachers' use of productive and reproductive teaching styles within the confines of the National Curriculum for Physical Education, *European Physical Education Review*, 7 (2001) 177-190.
- [11] E. M. Block, (2009). *A Teacher's Guide to Including Students with Disabilities in General Physical Education*, Brookes, Baltimore, MA.
- [12] E. Franzone, & L. Collet-Klingenberg, (2008), *Overview of video modeling*. Madison, WI: The National Professional Development Center on Autism Spectrum Disorders, Waisman Center, University of Wisconsin.
- [13] Marjorie H. Charlop-Christy, Loc Le, and Kurt A. Freeman, A Comparison of Video Modeling with In Vivo Modeling for Teaching Children with Autism, *Journal of Autism and Developmental Disorders*, 30 (2000) 537-552.
- [14] O.I. Lovaas, R.L. Koegel, & L. Schreibman, Stimulus overselectivity in autism: A review of research, *Psychological Bulletin*, 86 (1979) 1236-1254.
- [15] M.E. Snell, & L.K. Vogtle, (1997). Facilitating relationships of children with mental retardation in schools. In R. L. Schalock & G. N. Siperstein (Eds.), *Quality of life. Vol II: Application to persons with disabilities* (pp. 43-61). Washington, D.C: American Association on Mental Retardation.
- [16] J.P. Winnick (2011), *Adapted Physical Education and Sport*, Human Kinetics, Champaign, IL.
- [17] J. Hu, & S. Osborne, A comparison of forward and backward chaining methods used in teaching corsage making skills to mentally retarded adults, *The British Journal of Developmental Disabilities*, 77 (1993) 108-117.

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Conflict of interest

None of the authors have any conflicts of interest to declare.

Informed consent

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