Using a reinforcement system as an intervention plan to reduce unwanted behavior of student with ADHD: deep learning study in a single subject research design

Sultan Alzahrani

Special Education Department, University of Jeddah, Jeddah City, Saudi Arabia.

Correspondence: Sultan Alzahrani, Special Education Department, University of Jeddah, Jeddah city, Saudi Arabia. E_mail: ssaalhariri@uj.edu.sa

ABSTRACT

The purpose of this deep learning study is to use the reinforcement system, which gives an economy token as a behavior intervention to reduce moving without permission behavior of a student with ADHD during the reading class. A reversal A-B-A single subject research design was used in this study. The data collected through observation. The intervention that was used to the student is a token giving to him such as a sticker or candy every 10 minutes if he did not move without permission during the reading class. As a result, the average of the frequency of moving without permission during the reading class was reduced from 7.25 to 0.7 over the course of the intervention.

Keywords: Moving without permission, adhd, behavior intervention, linguistic intelligence, deep learning.

Introduction

Students with Attention deficit–hyperactivity disorder (ADHD) have to be controlled in the classroom. The main character of the students with ADHD is continuous moving without stopping which may cause the limited time of attention, and as a result, a low level of the student's performance in the school [1]. Thus, researchers have to conduct deeper learning studies via designing an intervention plan to help those students with ADHD to learn and succeed.

The classroom should be under the control of the teacher to let the students learn well. Hitting a classmate, talking with each other, and moving without permission, could distract the teacher and the other students in the class. This paper emphasizes using an economy system token as an intervention plan to reduce a negative behavior, specifically moving without permission during reading class. During the observation, a six-year-old student moved without permission and interrupted the teacher, and other students in the class several times. This behavior had a negative effect on the teacher; the continuance of the lesson, and his classmates in the classroom [2]. Because of that, this project focuses on developing a single subject design research to reduce moving without permission behavior using an intervention plan.

Having student with ADHD in the classroom could be challenging for the teacher to be able to control the classroom, the teacher should consider some of the intervention plans with those students with ADHD to help them to learn first and help other students in the classroom no to be distracted. Anyone who is applying the intervention plan has to get the advice from a doctor for the students with ADHD severe cases to give them a medicine helping them to relax in the class and be able to pay attention.

This paper discusses a problem of having a student with ADHD in the regular classroom. An intervention has been designed to help the student to reduce his moving without permission behavior, and increase his time of attention. Section two discusses the purpose of the study, section three explains the literature review, the fourth section explains the methodology and the last section is discussing the results.

Purpose of Study

The purpose of this study is to reduce the moving without permission behaviors of the subject in his reading class using a token reinforcement system.

Literature Review

Case observation offers a good opportunity to learn, and notes the impact of the intervention. Most likely, direct daily observation of the student in the classroom will provide helpful information about the student's behavior to help the researcher to design a deep learning research [3]. The single-subject design research allows the researchers to assess the effectiveness reinforcement, as well as the timeliness of the intervention. A concrete reinforcement is one of the best strategies when paired with verbal reinforcement [4]. The teachers should consider which reinforcement can best be used in specific classroom situations. Educators should use reinforcement systems to manage the classroom and social skill development. This sets the stage for students' success in school [5]. Teachers should have plans and goals to manage the classroom. Further, they must establish standards for the behavior that they want to modify by establishing specific objectives that can be easily and clearly explained and applied [6].

[7] developed a program to reduce unwanted behavior among the students. The program is called "Hands are not for Hitting." [7] mentioned that one of the main goals of "Hands are not for Hitting" is to promote wanted behaviors such as asking for a permission to move in the classroom, and instilling those behaviors in young children as a means of early intervention plans. These kinds of programs can help the education community to increase the awareness of the effect of the unwanted behaviors among the students in academic, social, and cultural situations.

[8] designed a deep learning research and an intervention plan for such wanted behavior among students in classrooms. The intervention sought to change the children's behavior by increasing their knowledge of the effects of their unwanted behavior such as moving without permission by giving them opportunities to practice new behavior patterns [8]. Moving without permission behavior in the classroom could disturb other students and impede the progress of the educational process [9]. Especially students with ADHD need to be under the control in the classroom for the benefit of the student himself and other students in the classroom.

Methodology

A. Participants

John is a six-year-old white boy. He was diagnosed as an ADHD child. His linguistic intelligence is in normal level, and his IQ score shows that his mental capabilities are within the range of the typical children in his age. John has a healthy body, and he can read the English alphabets and some words of two letters such as (He) or (Pa). He can read the numbers from 1 to 10, and write most of the letters correctly. During the reading class, when John participates in a small group, he moves without permission, causing the others to leave him alone, so fulfilling his intent to avoid working with them. When assigned independent work, John takes others' things without

permission. Consequently, John is sent to the office. According to his teacher, whenever John has a difficult assignment, he refuses to work, disturbs others, and is again sent to the office. The teacher feels that John's behavior is designed to escape from the difficult tasks.

The classroom does have specific rules for conducting the students. One of these rules is "inform the teacher when you are feeling disturbed by others, and be positive when responding to others." When John is seated in the reading class, and peers smile with no ill intent, John calls them bad names and hits them, interrupting the teacher's instruction to handle the disturbance. This behavioral problem occurs about 5 to 11 times with average 8 times a day. This behavior usually occurs when he is assigned to a group work on a specific activity. Also, this behavioral problem appears when others try to give answers to a question while looking at John. As a result, he gets upset and strikes his classmates.

Also, John demonstrates the target behavior when he asks others and they do not give him any attention. This behavior transpires 1 to 11 times a day for various reasons that seem to anger him, elicited by his classmates refusing to help him with his difficult questions when combined with his high energy level. Yet, when he arrives fresh from home and in a favorable mood, this behavior occurs less often. It seems that his disruptions emerge when he does not take a break during the class.

Design

A reversal A-B-A single subject research design was used in this study. This deep learning method seeks to determine whether a relationship exists between the behavior and the intervention plan. Direct Observation Form (DOF) was used as an instrument of this research. The form is a 10-minute observation of the target behavior (moving without permission) in reading class in the regular classroom. There are several studies indicating the validity and reliability of the direct observation form [10]. The score of reliability was calculated at .81.

After the observation was conducted, the intervention plan was applied, a return to baseline phase allows comparison of pre-intervention and post-intervention effects on the target behavior. The return to baseline phase acts as an internal control, and illuminates the improvement in the subject's behavior obtained by the effectiveness of the intervention plan. The A-B-A design is a simple design which helps the readers to get a deep understanding of the baselines and the treatment phases in the research.

Procedures

A. Target Behavior (Dependent Variable)

In the reading class when the student participates in a small group, he moves without permission, causing them to leave him alone. John is ADHD child, and moving without permission that occurs when he senses others are trying to tease him, or because he lacked sufficient sleep the preceding night as the teacher said. This behavioral problem occurs

between 5 to 11 times a day. Often, this behavior occurs when he is assigned to a group work on a specific activity. Also, this behavioral problem appears when others try to give answers to a question while looking at John. As a result, he gets upset and moves from his seat without permission.

Baseline Data

The research design includes the data collection through observation of a participant that will create a baseline. During each reading class, the data were collected on four days for 60 minutes each day. The average number of prompts was computed by adding all numbers and dividing by the number of days recorded. Table 1 displays the number of times John moves without permission during the baseline observation sessions. This period of observation occurred during the reading class starting on February 20.

Table 1: The Frequency of John's Behavior (FB)				
Date	Day 1 - 2 /20	Day 2 – 2/23	Day 3 – 2/25	Day 4 – 2/27
FB	6	5	7	11

The recording of this particular behavioral problem while observing John four times for one hour in each class period displays occurrences of this conduct ranging from 5 to 11 per hour in each reading class.

Behavior Intervention Plan (Independent Variable)

John's frequency of moving without permission during the intervention data collection for four days, one hour of the day, markedly decreased. A behavior intervention plan (BIP) was tailored for John to address his moving without permission issue. During the intervening period, the researcher gave John a token that he can replace it with something else, every 10 minutes as reinforcement if he didn't move without permission during the reading class. After deep learning intervention plan and as a final remedy, what the researcher had him do was to consult me when he needed help with an activity and to think about how successful he could be. This strategy helped John to ignore the moving without permission behavior and disturbing his classmates in the class.

To supplement the spending about 12 hours on John's behavior, John's para-educators collaborated with his mother to reduce the negative conduct outside of school. Para-educators were requested to guide and train his mother along with informing her of her personal interaction with her son. After implementing the intervention plan, John's frequency of moving without permission during intervention data collected for four days, one hour per day, markedly decreased (Table 2).

Table 2: The Frequency of John's Behavior FB after IBP				
Date	Day1– 3/3	Day2– 3/10	Day3- 3/12	Day4– 3/16
FB	3	2	1	2

Withdrawal Phase

After implementing the intervention plan, the behavior of moving without permission in reading class has obviously decreased. On April 6, the behavior repeated only one time, and on the April 8, the behavior didn't happen during the reading class. It is evident that the intervention plan succeeded to reduce John's behavior of moving without permission during the reading class (Table 3).

Table 3: The Frequency of John's Behavior FB During WP				
Date	Day1– 3/3	Day2– 3/10	Day3- 3/12	Day4– 3/16
FB	3	2	1	2

Results

[11] mentioned that the use of the visual analysis is the best statistical way to analyze single subject research design data. So, the visual analysis was used in this research. When using the visual analysis, the reader can compare the data in each phase easily.

Based on the data collected, John's behavior improved from the second day of monitoring, and by the last period of the final day's program, John's displayed little unacceptable moving without permission behavior. Quite clearly, John's post-intervention behavior demonstrates a lower ratio of disturbance compared to the first day of the baseline observations, with ensuing behavioral issues becoming nearly invisible! Likewise, using a specific behavior form plan will forge the student's development aligned with a helpful and regular teacher who gives reports in regard to his conduct. Moreover, an evaluation team will be needed to arrange frequent meetings with the mother of the student every month (Figure1).

Figure 1: John's behavior before, during, and after

The graph contains three phases which are:
(A) The observation period of the student's behavior,
(B) The observation of the behavior during the implementing of the intervention plan, and (A) the observation of the behavior during withdrawal phase.

Summary

The data indicated a decrease in the frequency of the moving without permission behavior after the intervention plan. The behavior of John has been observed during the baseline for four days, each day 60 minutes. The mean of the frequency of moving without permission during the reading class was 7.25. After that, the intervention baseline was four days of observing John's behavior, 60 minutes for each day. During the implementing, the intervention plan, which was giving him a sticker or candy every 10 minutes if he didn't move without permission during the reading class, John's behavior was observed. The mean of the repeated behavior was found to be 2. The difference between the mean numbers before and after the intervention plan is 5.25. During the return to baseline phase, John was observed for four days, 60 minutes for each day. The mean number of the frequencies of John's behavior was 0.75. The findings show the effectiveness of using a token reinforcement as an intervention plan to reduce a negative behavior such as moving without permission in the classroom during the reading class.

Discussion and Conclusion

The overall results of this deep learning study show that using a token reinforcement as an intervention plan could reduce the negative behavior such as moving without permission. That demonstrates the power of using the reinforcement to change the human behaviors. In this research, a token reinforcement was given to the student for each 10 minutes when he **didn't** move without permission. In the next study, it may work if a token reinforcement will give to the student for each 15 minutes of not moving without permission. Moreover, conducting a new research to reduce such a negative behavior using different kinds of reinforcement, might show a better or faster result.

In future research, it is recommended to apply the intervention plan on more participants. Moreover, it could get benefit from the cognitive science that studies the human developments in language, attention, and memory which may open the windows for the researchers to recruit the artificial intelligence to develop the senses of the children with disabilities and help them to skip their difficulties.

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