Using a Mobile App to Reduce Off Task Behaviors in Classrooms: A Pilot Study

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Abstract

A mobile app, modeled after social media apps, was developed to apply token based response cost procedure intervention in special needs classrooms. Our pilot case study showed that when afforded user friendly mobile apps special needs teachers will utilize such apps to apply and track interventions in their classrooms.

Keywords

Off Task Behaviors, Mobile App, Special Needs Classrooms, Fragile-X Syndrome

Introduction

A gap exists between scientific research on using technology for interventions in special needs classrooms and the actual application of such interventions in classrooms. While research shows effectiveness of using technology based interventions, such as video modeling, in teaching special needs students new skills and reducing off task behaviors, research (Abualsamid 123) and anecdotal evidence indicate that technology based interventions are seldom used in special needs classrooms. Human factors, such as difficulty of use, are indicated as the main reason for already overwhelmed teachers to not use technology based interventions in the classrooms. Lack of awareness is cited as another main reason for teachers not using such interventions (Abualsamid 123).

Our expectation is that a discoverable, easy to use system, would increase the level of utilization of technology based interventions in special needs classrooms. To test that theory we developed an easy to use, open source, mobile application that implements a response cost intervention procedure for reducing off task behaviors. We sought four goals in building the system: i) ease of use, procurement and training was the main goal when designing the system. ii) implementation of an intervention that is familiar to teachers, specifically a token based response cost procedure that is already used by many special needs teachers, though in manual fashion. iii) off-loading some of the tasks that the teachers conduct in their classrooms to the app such as the app reduces the workload on the teacher and not increases it. iv) discoverable through app stores and sites dedicated to curating special needs apps, allowing teachers to discover the app even if they are not familiar with the scientific research that lead to its development.

In order to achieve our first goal we developed an html5 cloud based app that requires no installation and works the same on smartphones, tablets and desktop computers. We modeled the

app after familiar social media applications, such as Facebook, leading to minimal training requirements for using the app. For our second goal, the app implements a token based response cost intervention procedure. Specifically, when a student exhibits an off task behavior, the teacher adds an entry in the student's timeline indicating the off task behavior and any optional notes and context. The app keeps track of the time of the event and the number of off task behaviors for each student. The app displays a visual model representing the number of off task behaviors for the day, the model is comprised of a bold red thumbs down icon for each occurrence of an off task behavior for the day. Thus, the first off task behavior would be represented with one thumb down icon. Five off task behaviors in a day would be represented by five thumbs down icons. The app would also read out the count of off task behaviors out loud to reinforce the visual model. Our third goal is focused on the teacher's already busy daily routine. Special needs teachers are often overworked and under-supported; adding to their daily workload would lead to teachers to not implement any new system. Thus, the app allows the teachers to automate some of the tasks they already conduct in their daily routine. The app allows the system to track off task behaviors with few clicks, keeping track of the time and frequency of occurrences, and providing daily, weekly and monthly rollup reports. The tracking and reporting, automate tasks that teachers already had to conduct, reducing their workload. The app also allows teachers to communicate with parents via the same timeline. The parents can post events to the timeline, for example, the student had a healthy breakfast today, and can view entries made by the teacher. The familiar timeline interface, that many parents, students, and teachers are familiar with, through using social media apps, makes it easy for all parties to use the app to communicate on daily or weekly frequency, reducing the teacher's workload.

In order to establish a preliminary baseline to test our theory that an easy to use app would be utilized by special needs teachers we conducted a 16-week, A-B-A case design, pilot case study. The case study had a single participant, a male student with Fragile X syndrome that exhibits frequent off task behaviors that interfere with his ability to learn as well as henders his social interactions with his peers. The student attends a private special needs school that focuses on Applied Behavioral Analysis. All students in the school are students with special needs with cognitive challenges and autistic behaviors.

Fragile X Syndrome is a genetic disorder affecting nearly 1 in 4000 boys in the US and roughly half that rate for girls (Oakes et al. 54). Its effects are more pronounced in males where it causes severe intellectual disabilities, severe developmental delays, unintelligible speech patterns such as fast speech and/or mumbling, and stereotypical behaviors such as tantrums, hyperkinesis, hyper anxiety, repetitive behaviors, as well as limited theory of mind (Crawford et al. 359; Hagerman et al.). Fragile X is the leading genetic cause of autism, with autism occurring in approximately 30% of the population while another 30% suffering pervasive developmental disorders not otherwise specified (Wang et al. 264). While the cognitive disabilities of students with Fragile X syndrome are challenging on their own we hypothesize that some of the off task behaviors they exhibit act to reduce their learning opportunity both by removing them from the learner role as well as reducing the effectiveness of their teachers. Reducing the aforementioned behaviors is a primary concern for parents who often resort to administering stimulant drugs to try to control those behaviors (Garber et al. 666).

Children with Fragile X syndrome, as well as the more general population of children with autism, show better performance using visual learning than other forms of learning (Schwarte 290). The population also struggles with abstract concepts, such as math and time, but

performs better with concrete visual and auditory signals (Schwarte 290). In other words, utilizing visual models interventions in this population caters to their relative strengths and avoids their weaknesses.

We conducted a sixteen-week A-B-A design pilot case study in a small private special needs school. The student's classroom has eight total students, a primary teacher, a full-time teacher assistant and an assistant who splits his time between several classrooms. The student is pulled out for basic math once a day, but otherwise spends the day with the same group of students, while supervised by the same group of teachers. The students learn basic skills, eat snacks and lunch, participate in PE, watch videos, as well as receive basic reading, writing and math tutoring. The study tracked off task behaviors exhibited in four specific behaviors based on the student's Individual Education Plan (IEP) and input from his parents. The behaviors were hyperkinesis, uncontrollable outbursts, unintelligible speech and disorderly eating. In the first phase of the study, the baseline (A) phase, the teachers collected data via the app for three weeks. The teachers used the interval recording procedure to record the student's behavior every 30 minutes during the school day. In total, the teachers observed 42 off task behaviors in the baseline phase of the study. The observations, once noted in the app, where available in real time to the study authors. The intervention phase (B) lasted for four weeks during which the teachers continued to record the off task behaviors every thirty minutes but also used the response cost procedure to apply an intervention, via showing the visual model of the number of thumb downs to the student and explaining to him that he earns an extra red thumb down with every off task behavior. In those four weeks, the off task behaviors totaled 19 occurrences, with the numbers dropping every week. The student started expressing to the teachers that he does not want any more thumbs down and became more self-aware. The next calendar week was a school holiday.

After which the withdrawal phase (A) was conducted. For eight calendar weeks, that included two weeks of winter holiday school break, the teachers recorded the off task behaviors without applying any interventions. The student exhibited 12 total off task occurrences during the six week that school was in session.

Discussion

The goal of this work was to explore whether modern mobile apps can increase the utilization of research-proven, technology-based interventions in their classrooms. Our pilot case study showed that teachers would use such apps if they were easy to use and reduced their workload instead of increased it. At the end of the study, the teachers requested access to the app to use it for all students in their classroom. As a secondary result, the study showed that the student with Fragile X learned to improve self-control of off task behaviors through visual intervention applied through the app. Results are preliminary and need to be validated using larger studies. We continue to develop the app and are currently recruiting participants from another school to conduct a larger multiple baseline study across multiple participants.

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