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# THE EFFECTS OF A MODEL, LEAD, AND TEST PROCEDURE TO TEACH CORRECT REQUESTING USING TWO APPS ON AN IPAD WITH A 5YEAR OLD STUDENT WITH AUTISM SPECTRUM DISORDER

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## ABSTRACT

*The purpose of the present case study was the evaluate the effectiveness of employing the model, lead, and test error correction procedure across two iPad applications in a special preschool classroom. These augmentative and alternative systems interventions were used to teach a preschool student with autism to correctly communicate. The two applications employed were My Choice Board and Go Talk Now for Free. The behavior measured was our participant's correct requests with each application. The use of model, lead, and test was also evaluated in a multiple baseline across applications. In addition, data were gathered without the use of model, lead, and test error correction to assess the maintenance of treatment effects over time. The outcomes indicated increased correct requesting when model, lead, and test were employed. In addition, after model, lead, and test error correction was no longer in effect, our participant continued to accurately use both applications on his Ipad touch. The benefits of employing model, lead, and test error correct as part of an overall system to teach young students with autism to communicate were discussed.*

**Keywords:** iPad, AAC, autism, preschool student, special education classroom setting, applications, single case research, case study

## INTRODUCTION

Communication is often the catalyst to learning. Without a means to communicate, learners are at a loss as to a way to share their thoughts, expressions, desires, and needs, with others (Fitzer & Sturmey, 2009; Heward, 2012). One third to one half of children with Autism Spetrum Disorder (ASD) have trouble using speech functionally (Hall, 2009; Mirenda, 2003; Thompson, 2008). By providing a means to communicate through augmentative and alternative communication systems to supplement or replace a lack of speech, children with ASD gain the ability to functionally use communication (Miller, Light, & Schlosser, 2006). Augmentative and alternative communication systems included but not limited to GoTalks, DynaVox, Picture Exchange Communication Systems (PECS), etc (Hall, 2009; Welch, 2010). All of these procedures provide students with limited communication skills, the means to learn how to communicate in an alternative way in accordance with their skill levels (Cook, Klein, & Tessier, 2008) While these communication systems have proven effectiveness in the acquisition and application of communication skills for students with autism, new technology has been released in the last few years that offers new opportunities for learners). The iPad technology has been suggested as an excellent device to improve school outcomes (Murray & Olcese (2011). The Apple iPad device offers children with autism almost endless opportunities to use applications developed by outside resources for communication purposes. Advantages of using the iPad for augmentative and alternative

communication includes the ability to have access to continued updates from application developers, more customizable features for children with varying levels of mental and physically disabilities, and a more cost effective delivery system for students (Murray & Olsese, 2011).

Model, lead, and test (MLT) error correction consists of the teacher or trainer, modeling the correct response, next the student and teacher correctly respond together, and finally the teacher requires the student to independently complete the task correctly. If the student performs correctly, the teacher then moves to another task or academic behavior. If the student responds incorrectly, the model, lead, and test error correction procedure is reinstated. These procedures continue until the student correctly can complete the task. Often, the student has to complete the problem so many times correctly in succession before a new problem or task is presented (McLaughlin, et. al 2011).

Model, lead, and test error correction is a very important component of Direct Instruction (DI) curricula (Marchand-Martella, Slocum, & Martella, 2004), and his employed when teaching discrete skills to students using either DI flashcards with or without reading racetracks (Crowley, McLaughlin, & Kahn, in press; Erbey, McLaughlin, Derby, & Everson, 2011; Hopewell, McLaughlin, & Derby, 2011; Kaufman, McLaughlin, Derby, & Waco, 2011; Mangundayao, McLaughlin, R. Williams, & Toone, in press; Pierce, McLaughlin, Neyman, & King, in press). The use of model, lead, and test error correction with students with autism has received some attention in the peer- reviewed literature. Peterson, McLaughlin, Weber, and Anderson, (2009) implemented a model, lead, and test procedure along with to teach a single adolescent with autism "where" he was in his school. Model lead and test error correction has also been employed to teach sight words to students with autism. Crowley et al. employed DI flashcards with its subsequent error correction procedures to teach basic sight word vocabulary to two elementary school students diagnosed with autism. Recently, Mangundayao and colleagues were able to teach three preschool students their shapes, numerals and colors employing flashcards and error correction.

The purpose of the present case report was to employ a model, lead, and test error correction procedure across two different applications for a single preschool student with autism. A second purpose was to assess the effects of removing the model, lead, and test procedures and have the student request independently. The final purpose with to extend the use of model, lead, and test error correction using readily available AAC applications with an iPad.

## METHOD

### Participant and Setting

The participant was a five-year-old male. The student's eligibility category was Developmentally Delayed (DD). He had also been diagnosed with Autism Spectrum Disorder (ASD) by a local pediatrician. The student was chosen for this study because he is limited in communication skills. He has minimal verbalizations and used the PEC system (Welch, 2010) established in the classroom mostly for scheduling purposes.

The study took place in a special education A.S.S.I.S.T (Autism: School Support for Inclusion and Systematic Teaching) preschool classroom in the Pacific Northwest. The classroom focused on using Direct Instruction (Marchand-Martella, Slocum & Martella, 2004) and discrete trial training (Smith, 2001) to teach a wide range of skills to the students. The classroom has been described elsewhere (Armstrong, McLaughlin, Clark, & Neyman, 2012). The study took place between 11:30 a.m. to 12:45 p.m. Monday through Thursdays and from 9:00 a.m. to 12:30 p.m. on Fridays in both the A.S.S.I.S.T classroom and a

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playroom classroom located next door. The classroom consisted of various stations including floor toys, table toys, sensory table, schedule stations, workstations, snack table, and a teacher table. Each station includes tables, chairs, toys, carpet squares, exercise ball chairs, Rifton chairs, and shelving units. The playroom was a large room consisting of soft mats covering the floors, various large toys for gross motor play, a sensory table, tables and chairs, Rifton chairs, a swing, and a trampoline. Students were able to be at various stations throughout their time in the A.S.S.I.S.T classroom and playroom along with between 1-3 educational assistants. The classroom and playroom was generally quiet will minimal distractions. During the time of the study there were anywhere from 1-7 other students in the immediate area surrounding the participant. There were anywhere from 1-4 adults in the immediate area surrounding the participant when data were taken. The classroom has been described elsewhere (Armstrong, McLaughlin, Clark, & Neyman, 2012; Wasson, McLaughlin, Derby, & Clark, 2013). The study was conducted by the first author who was completing her special education student teaching for an endorsement in special education from the Office of the Superintendent of Public Instruction for the State of Washington and Gonzaga University.

## MATERIALS

A variety of materials were used to conduct this study. The PEC system (ref) was used to facilitate communication and work time with the author. The iPad was the most important material used in the study. On the iPad, the apps My Choice Board (Good Karma Applications, 2012) and Go Talk Now Free (The Attainment Company, 2012) were used to facilitate requesting with our participant. Rewards were also used with the participant and included, but were not limited to, time on a swing, access to soft tubes, listening to music, and playing with Slinkys, etc. for working hard and compliance.

### Dependent Variable and Measurement

The dependent variable for this study was the number of correct requests the participant made using the iPad. Requests included choices for reinforcers and centers or work time in the special education classroom setting. A correct response in this study was defined as the participant appropriately using the iPad by pointing to a specific icon to request. The type of data used in this study was event recording. These data were collected by the first author in two settings. These included the participant's special education preschool classroom and his A.S.S.I.S.T classroom. The iPad was presented to the participant with the correct application open. The first author then recorded whether the participant appropriately used the iPad by pointing to a specific icon to request. Correct answers were noted by an "√" while incorrect answers were noted by an "X". The first author also recorded which application was presented and what prompting was needed for a response.

## EXPERIMENTAL DESIGN AND CONDITIONS

A multiple baseline design (Kazdin, 2011; McLaughlin, 1983) was used to evaluate the effectiveness of the iPad for communication. First baseline data were taken for each set; each set being defined as the My Choice Board and Go Talk Now Free applications, respectively. The study began with a baseline designed to determine the participant's present level of performance when using an iPad My Choice Board application to request.

### Baseline

The participant and first author stayed within the A.S.S.I.S.T classroom setting within a secluded corner of the room. The first author transitioned the participant to the 'workstation' and the first author sat down across from the participant at a rectangular table. The participant

was given the iPad with the My Choice Board application open and asked, "What do you want?" The My Choice Board application consisted of four pictures of reinforcers, established from a pre-existing preference assessment, with corresponding pre-recorded verbal label of the picture. The first author recorded whether the participant correctly or incorrectly requested using the iPad for communication. If the participant correctly requested using the iPad for communication, he gained access to the reinforcer requested for a 30 second interval. Baseline was in effect for 4 sessions for my choice board + model, lead, and test. Baseline for the application used on the iPad was the GoTalk Now Free. The participant was accessed within the special education classroom to request centers to choose (i.e. house, blocks, floor toys, art, etc.). Baseline was in effect for 12 sessions for go talk now free + model, lead and test.

***My choice board+ MLT***

A model, lead, test procedure was used to teach the participant to use the iPad to request reinforcers with the My Choice Board application. The first author presented the iPad to the participant, correctly and appropriately modeled selecting a picture icon and verbalizing the request (i.e. pointed to picture of music and said, "music") and then presented the requested item to the participant for a 30 second interval. Then the first author presented the iPad to the participant and using hand-over-hand prompting, helped the participant select a picture icon and verbally request the item, following this with the presentation of the requested item to the participant for a 30 second interval. Finally, the first author presented the iPad to the participant and asked, "What do you want?" If the participant correctly requested an item, he was given access to that item for a 30 second interval. This condition was in effect for 18 sessions.

***My choice board: independent***

The model, lead, test procedure (Marchand-Martella et al., 2004) was removed for this section of the study. The iPad was presented to the participant with no prompting, verbal or physical, and it was recorded whether the participant independently made a correct request or not. This condition was in effect for 5 sessions.

***Go talk now free + MLT***

A model, lead, test procedure was also used to teach the participant to use the iPad to request choice activities with the GoTalk Now Free application. The first author presented the iPad to the participant, correctly and appropriately modeled selecting a picture icon and verbalizing the request (i.e. pointed to picture of house center and said, "house") and then led the participant to the house center for a 30 second interval. Then the first author presented the iPad to the participant and using hand-over-hand prompting, helped the participant select a picture icon and verbally request the choice activity, following this with the presentation of the requested choice activity to the participant for a 30 second interval. Finally, the first author presented the iPad to the participant and asked, "What do you want?" If the participant correctly requested an item, he was given access to that choice activity for a 30 second interval. This condition was in effect for 12 sessions.

***Go talk now free: independent***

The model, lead, test procedure was removed for this section of the study. The iPad was presented to the participant with no prompting, verbal or physical, and it was recorded whether the participant independently made a correct request or not. This condition was in effect for 3 sessions.

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### Reliability of Measurement and Fidelity of the Interventions

Reliability of measurement was gathered for one half of all sessions. When data were taken in the A.S.S.I.S.T classroom setting, interactions with the participant were video recorded and inter-observer agreement was taken at a later date while viewing the video recordings of the sessions. When data were taken in the special education preschool, classroom inter-observer agreement was taken by one of these instructional aides. The marks made by each observer were then compared and what constituted an agreement and disagreement was discussed. An agreement was considered when both recorders marked the same response from the participant. For example, if both recorders marked that the participant correctly responded when an iPad application was presented, the first authors would be in agreement. Inter-observer agreement was calculated by taking the number of agreements, divided by the number of agreements and disagreements and then multiplying by 100. Reliability of measurement was 100% across all conditions and applications.

Reliability as to the implementation of the various experimental conditions was taken thee times by having the second author observe the sessions and list which condition and application was being employed. Reliability of the correct implementation of the various conditions was 100%.

## RESULTS

### Baseline (My Choice Board)

Baseline data are displayed in the top panel Figure 1. The number of correct requests made independently varied from 0-1 with an overall mean of .25 correct requests

### AAC Using My Choice Board + MLT

An increase in student requesting was found when MLT and My Choice Board were employed. The mean number of correct requests was 4.39 with a range of 2 to 5 out of a possible of 5.

### My Choice Board Independent

The model, lead, test procedure was removed. When the iPad was presented to the participant with no prompting, the number of independent requests decreased for the first two sessions but was perfect (five out of five) for the last two sessions. The overall mean for this condition was 4.0 (range 3 to 5 requests).

### Baseline (Go Talk Free)

Baseline data with the My Talk Now Free are displayed in the bottom panel of Figure 1. The number of correct requests made independently in baseline was low ($M$ = 0.25; range 0-1).

### Go Talk Now Free + MLT

When model, lead and test with go talk now free application, the participant's correct requesting increased ($M$ = 3.67; range 1 to 5 correct requests). During the last five sessions, the participant requested correctly at each opportunity.

### Go Talk Free: Independent

When model, lead, test procedure was no longer employed and just the iPad was presented to the participant, there was a decrease in his correct requesting. However, on the last session he correctly requested. The mean number of correct requests was 3.67 (range 3 to 5).

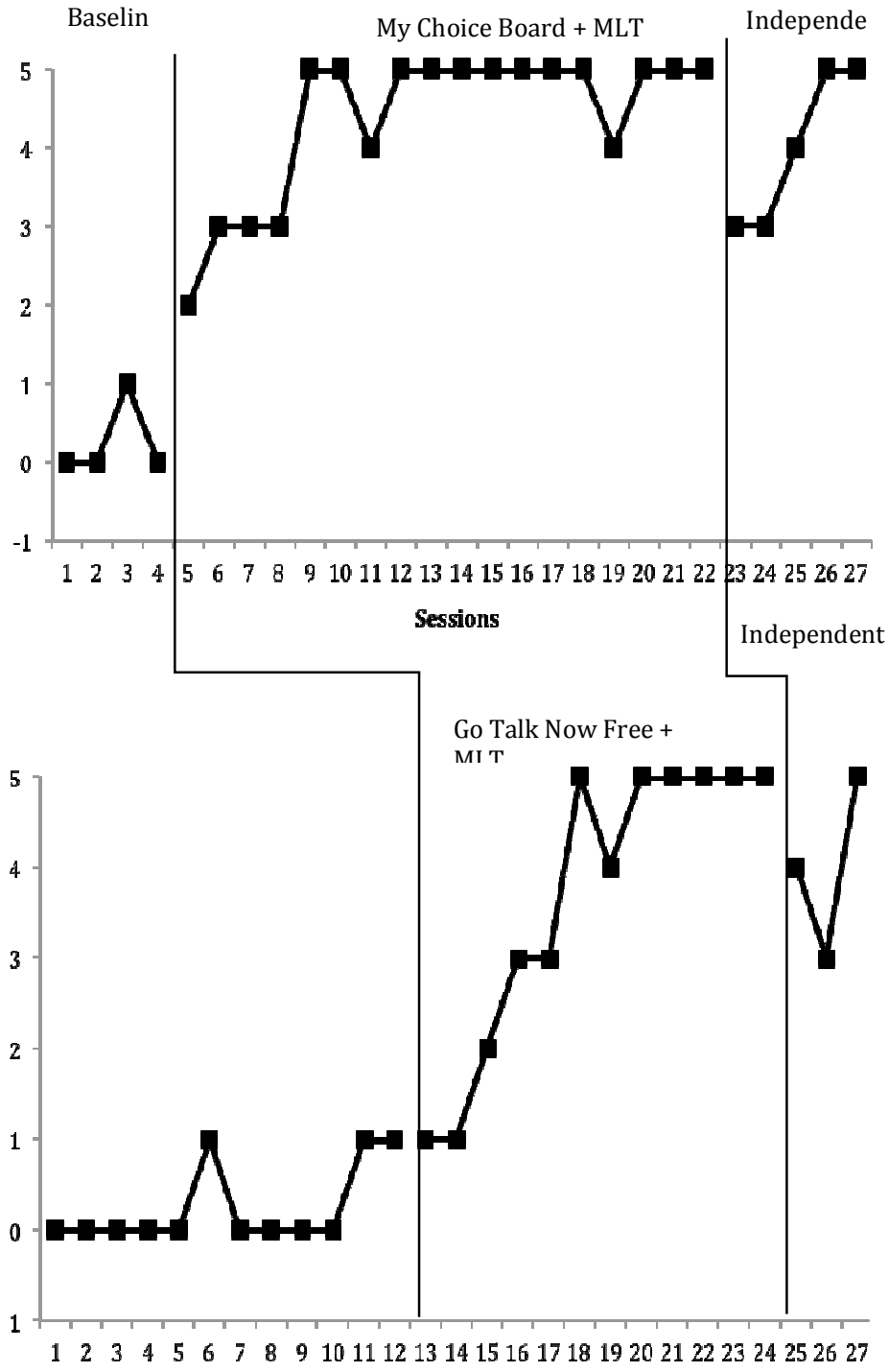


*Figure 1*. The number of correct requests on the iPad for baseline, My Choice Board + MLT, My Choice Board Independent, Go Talk Now Free + MLT and Go Talk Now Free Independent.

## DISCUSSION

The results of this study expand on the existing research surrounding the use of augmentative and alternative communication for students with ASD. In the present case report, a single preschool student was autism was able to independently use an iPad. The entirety of this

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study showed the practicality and efficiency of our procedures. If we follow Mirenda (2003) which states, "the ultimate measure of a successful intervention is the extent to which it results in functional, unprompted communication across environments and people, and interventions with such outcomes deserve and should be awarded both respect and support, regardless of the modality involved," then the present case report clearly meets his criteria.

The procedures were easy to implement and evaluate in the classroom. Just as with our other research in this classroom setting (Armstrong et al., 2012; Talkington, McLaughlin, Derby, & Clark, 2012; Wasson et al., in press), these procedures were continued and adopted by the para-educators and parents of students in the classroom. In addition, the cost of the materials was reduced because one of the student's parents in the classroom purchased the iPad and gave it to the classroom. The two aps that were employed were free and did not cost the teacher or the classroom any additional monies. This should make the use of these applications attractive to classroom personnel.

The immediacy of our participant's requesting found with My Choice Board was not replicated with the use of Go Talk Now Free + MLT. However, after two sessions, improvements in our participant's responding were found. An additional study where the order of these two aps was manipulated may be able to separate out these differences. One could also employ an alternating treatments design where each application was different for each session. This will have to be examined in the future and could be an interesting finding.

The present results also extend the use of model, lead, and test error correction procedures and provide an additional replication of prior research (Cole, McLaughlin, & Johnson, 2012; Crowley et al., in press; Hopewell et al., 2011; Kaufman et al., 2011; Mangundayao et al., in press; Ruwe, McLaughlin, Derby, & Johnson, 2011). However, in the present case an iPad, rather than DI flashcards with or without a reading racetrack was used.

There were limitations in the present research. First, we were only able to employ a single preschool student. Second, data collection was again short in duration due to the time line required of the first author's student teaching experience. Third, it would have been important to carry out follow up assessments as to whether our participant had maintained his performance over a long period of time. Finally, it would be of interest if one could fade out the iPad and employ a simple set of PECS. PECS have been shown to be easy to implement and evaluate in a preschool setting (Rauch, McLaughlin, Derby, & Rinaldi, 2012). This last issue will have to be assessed in future research. Also, it would appear appropriate to begin to systematically assess the social validity (Wolf, 1978) of employing the new digital technology in the classroom to that of simply employing PECS. It has been our experience, that both preschool students with autism and their teacher staffs enjoy using this technology. It appears that the forecast of Murray and Olcese (2011) regarding the widespread use and the enjoyment of having iPads was seen in this research.

The participant enjoyed the experience of working with the first author as well as the other adults in the classroom. He looked forward to working with the iPad each session. Since the classroom had two iPads, other students were also taught basic requesting skills using free aps on these devices. Having an iPad in the classroom was viewed my many of the students a real fun activity in which to engage. With all of the various centers and materials in the classroom, certain students really liked having the iPad in the classroom.

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his family for their assistance. Portions of these data were presented as the First Community Involvement Symposium, April 2013 and at the Spokane Intercollegiate Research Conference (SIRC), Spokane, WA April 2013. Requests for reprints should be addressed to Molly Dundon, Department of Special Education, Gonzaga University, and Spokane, WA 99258-0025 or via email at mdundon@zagmail.gonzaga.edu. Ms. Dundon is now teaching early childhood special education in Renton Public Schools, Renton, WA

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