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# Will teaching PECS to vocal and non-vocal students increase social interactions?

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*Rowan University*

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**WILL TEACHING PECS TO VOCAL AND NON-VOCAL STUDENTS  
INCREASE SOCIAL INTERACTIONS**

by

Patricia Infantino

A Thesis

Submitted to the  
Department of Interdisciplinary and Inclusive Education  
College of Education

In partial fulfillment of the requirement

For the degree of

Master of Arts in Special Education

at

Rowan University

May 13, 2019

Thesis Chair: Margret Shuff, Ed. D

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## **Acknowledgments**

I would like to express my appreciation to my professors for all of their guidance and help throughout this entire program. I know the skills and knowledge that I have gained will help me throughout my career. I am confident knowing whichever challenges that may come my way I have the strategies, and knowledge to overcome them.

I would like to thank my husband for all of his love and support throughout this whole process. I would also like to thank my Aunt Pat, without you none of this would ever have been possible.

## **Abstract**

Patricia Infantino  
WILL TEACHING PECS TO VOCAL AND NON-VOCAL STUDENTS INCREASE  
SOCIAL INTERACTIONS  
2018-2019  
Margaret Shuff, Ed.D  
Master of Arts in Special Education

The purpose of this study was to determine if the use of PECS when taught to vocal and non- vocal students would increase communication and interactions during social situations. While using PECS both groups increased their social interactions during play time. Before this study the children in group one were not interacting at all. After being taught the use of PECS Group One interacted an average of five times per session. Before the study the children in Group two were not demonstrating any interactions, and after being taught the use of PECS they interacted an average of 10 times per session. Implications for teaching students who are non- vocal and vocal to interact with each other are discussed.

## Table of Contents

Abstract.....	iv
List of Figures.....	vi
List of Tables.....	vii
Chapter 1: Introduction.....	1
Chapter 2: Literature Review.....	6
Chapter 3: Methodology.....	11
Settings and Participants.....	11
Procedure.....	13
Variables.....	19
Experimental Design.....	19
Chapter 4: Results.....	20
Summary.....	20
Results.....	20
Chapter 5: Conclusions.....	28
Review.....	28
Limitations.....	35
Practical Implications.....	35
Future Studies.....	36
Conclusion.....	36
References.....	38

## List of Figures

Figure	Page
Figure 1. Group One Days of the Week.....	15
Figure 2. Group Two Days of the Week.....	16
Figure 3. Group One Pre-test Results.....	24
Figure 4. Group One Post- Test Results.....	25
Figure 5. Group Two Pre- Test Results.....	26
Figure 6. Group Two Post-Test Results.....	27

## List of Tables

Table	Page
Table 1. Group One Results.....	21
Table 2. Group Two Results.....	22
Table 3. Group One & Group Two Results.....	23



## **Chapter 1**

### **Introduction**

When you walk into a preschool classroom during “free choice time” or “make believe play block time,” you may see students playing with something. However, not all of the children are able to interact with one another. This is often true for students who are non-vocal or who have limited language. These students have not attained the skills to interact with other children; therefore, they are missing out on one of the most important lessons in preschool, which is communication, interaction, and socialization. In contrast, many preschoolers with communication disabilities are not able to communicate or properly interact with one another, whereas typical developing preschoolers are communicating, interacting, and socializing with one another daily. To address the issue of communication, interaction, and socialization, major strides have been made to close the gap between students who are communication impaired and students who are typically developing. The use of peer buddies for intervention has been shown to improve communication, reciprocity, and engagement in routine preschool social setups.

Traditional peer buddy intervention emphasizes communication and engagement. One study examined the effects of a peer mediated intervention that provided training of speech-generating device for preschoolers with Autism who also had limited to no verbal skills. Three peers without disabilities were taught to stay, play, and talk using a GO Talk 4+ and, then, paired up with a classmate who had Autism. This particular intervention demonstrated improved communication, reciprocity, and engagement

between children with Autism and typically developing peers. (Thiemann- Bourque et al., 2016)

In this study, I examined the effectiveness of implementing peer buddy training using the picture exchange communication system in order to communicate and engage with limited language or non-vocal peers. A Picture Exchange Communication System (PECS) is a picture-based, procedural package to teach children lacking spoken language skills to initiate, request, and describe what they observe. (Bondy & Frost, 1994) The objective of using the PECS is to enable non-vocal or limited language students a way to communicate and engage with their typically developing peers. I believe that preschoolers, who are trained on the PECS program with their peers, will have a higher rate of using language and interacting with their peers. This will encourage those limited language students who have not been trained in PECS. As a Preschool Disabled Teacher for the past six years, I have seen many students struggle to successfully communicate and engage with their typically developing peers. I have observed that students who have used PECS have improved their communication skills significantly. This has also led my students to have more success in the classroom socially and academically.

Communication and engagement can be very difficult for students who are non-vocal or who have limited language. These students need to be taught to communicate and engage in a way their peers understand. Using peers to properly teach them how to communicate and engage can be successful and rewarding if you stick to it and make it fun for everyone.

The research question that will be examined in this study is:

- Will preschoolers who are non-vocal or have limited language successfully communicate and engage with their typically developing peers if they are both taught how to communicate and engage using the Picture Exchange Communication System? This study will be conducted in my classroom with two of my students who are non-vocal or who have limited language skills and two children from a preschool inclusion classroom across the hallway. The two students from the inclusion classroom will be trained how to use the PECS during typical social preschool activities in order for their peers, who are non-vocal or have limited language, to effectively, communicate and engage with them. Altogether, there will be four students learning the PECS system. Of those four students, one has Down syndrome, and is non-vocal and comes from a Spanish speaking family. One student has limited language and is classified with Autism Spectrum Disorder and comes from a Spanish speaking family. Two students are not classified and have great communication and language skills. There are three females and one male. All four students are of Hispanic descent. In order for this to run smoothly, I will be using PECS symbols and words in English and Spanish.

Down Syndrome is defined as a congenital condition characterized especially by developmental delays, usually mild to moderate impairment in cognitive functioning, short stature, upward slanting eyes, a flattened nasal bridge, broad hands with short fingers, decreased muscle tone, and by trisomy of the human chromosome numbered 21 also known as trisomy 21. Webster, M. (1961). Definition of Down syndrome. Retrieved from <https://www.merriam-webster.com/dictionary/Down%20syndrome>. Autism Spectrum Disorder is defined as a condition related to brain development that impacts

how a person perceives and socializes with others, causing problems with social interaction and communication. The disorder also includes limited and repetitive patterns of behavior. The term "spectrum" in Autism Spectrum Disorder refers to the wide range of symptoms and severity. Mayo Clinic Staff ( Jan. 6, 2018). Autism Spectrum Disorder. Retrieved from <https://www.mayoclinic.org/diseases-conditions/autism-spectrum-disorder/symptoms-causes/syc-20352928>. The four children with Autism Spectrum Disorder and Down syndrome all had an Individualized Education Plan (IEP) that was written by me and have specific goals and objectives needed to be met.

The independent variable for this study is the PECS, which is a picture-based procedural package to teach children lacking spoken language skills to initiate, request, and describe what they observe (Bondy & Frost, 1994). The PECS consists of six phases:

- Phase One: How to Communicate. Individuals learn to exchange single pictures for items or activities they really want.

- Phase Two: Distance and Persistence. Individuals learn to generalize this new skill by using it in different places, with different people and across distances. They are also taught to be more persistent communicators.

- Phase Three: Picture Discrimination. Individuals learn to select from two or more pictures to ask for their favorite things. These are placed in a PECS Communication Book—a ringed binder with self-adhesive hook fastener strips where pictures are stored and easily removed for communication.

- Phase Four: Sentence Structure. Students learn to construct simple sentences on a detachable Sentence Strip using an “I want” picture followed by a picture of the item being requested.
- Phase Five: Responsive Requesting. Individuals learn to use PECS to answer questions such as “What do you want?”
- Phase Six: Commenting. Students are taught to comment in response to questions such as, “What do you see?”, “What do you hear?” and “What is it?” They learn to make up sentences starting with “I see”, “I hear”, “I feel”, “It is a”, etc.

( Bondy, PhD & Frost, MS, CCC-SLLP. 1994. P. 1-19)

For the purpose of this study, Phases Four, Five, and Six will be eliminated. During this study, I will focus on using several pictures in order for the students to communicate and engage with one another and by, hopefully, combining these with a few words. I am not concentrating on using sentences or “WH” questions.

In this study, students who were non-vocal or have limited language will be trained with their typically developing peers to use PECS. It is hypothesized that students who are taught to use this system would be able to effectively communicate and engage with their peers better than students who are not trained to use it. This instruction could provide children who are non-vocal or have limited language skill more success in communicating and engaging with their typically developing peers.

## **Chapter 2**

### **Literature Review**

Sulzer- Azaroff, Bondy, Frost Hoffman, and Horton (2009) found that the picture exchange communication system (PECS) was originally designed to enable young children with autism lacking functional communication to initiate requests and to describe what they observed,(PECS) has been the subject of an ever-expanding body of research and development. Findings from multiple studies suggest PECS is providing people who have limited to no speech with a functional means of communication.

In 1994, Bondy and Frost reported their development of PECS, a picture-based procedural package that taught children with limited to no spoken language how to request and describe what they observed. PECS is an applied behavior analytic approach that is designed for early communication training. This approach is to be used in the natural setting of the classroom and home in order to help those who would normally struggle with communication a true means of communicating with others.

During this study, a child using PECS switched his communication method over to speech in less than a year and seven other children learned to communicate, mostly in the form of language, in less than 22 months. Over the next five years, the developers of PECS followed 85 children with autism who were taught the PECS program. During this study 59% of the participants acquired speech independent of visual supports, and 30% of the participants spoke while using the PECS visuals. Since the original demonstration back in 1994, the use of PECS has been spreading across the autism and other developmental disability communities. The researchers reported improvements in

communication among the vast majority of their participants. An analysis of this study by Azaroff, Bondy, Frost, Hoffman, and Horton supports that, by using PECS, professionals and parents can successfully teach individuals to initiate exchanges of pictures for tangible and nontangible items.

Ganz, and Simpson (2004) found that picture symbols, which provide two-dimensional representations that resemble basic requests, are shown to be easier for some young children with autism to pick up rather than manual sign symbols. PECS are preferred over sign language because they are easily understood by anyone, and you do not have to be trained in sign language to understand the request because you are able to look at the picture of the child's request.

PECS is based on how individuals with ASD learn language and social skills. Many traditional language programs require the individual to learn attending skills before they can move on. However, PECS does not require this and, instead, one of the first steps is to teach a social approach towards another individual such as asking for a specific toy or food.

Results of the Ganz and Simpson study indicated that individuals who were taught to use PECS, increased their communication skills. Individuals also demonstrated an increase in the average amount of tangible words that were spoken while using the PECS program.

Thiemann-Bourque, McGuff, and Goldstein (2017) examined effects of a peer-mediated intervention on the use of a speech-generating device between students with severe ASD and typically developing peers. During this study, three students with ASD,

with little to no verbal skills, and three typically developing peers were taught to stay, play and talk using a Go Talk Go Plus, and were paired up together during classroom social activities. After the training, rates of communication for preferred items such as specific toys increased. Students with ASD also had increased rates of peer engagement after this training as well. The results of the study also provided evidence of the benefits of peer-mediated and speech-generated interventions.

Thiemann-Bourge, Brady, McGuff, Stump, and Naylor (2016) addressed this need by developing and examining a combined PECS and speech-generating device. This research involved four minimally verbal preschoolers with ASD and four typically developing peers. These students were also taught to stay, play and talk during social activities. After this training, improved communication and peer interaction was noted in the study by Bourque, Brady, McGuff, Stump, and Naylor.

Bellini, Peters, Benner, and Hopf (2007) found positive effects of peer intervention on the social interactions of children with ASD. In this study, a speech language pathologist and three early childhood educators trained typically developing peers to engage children with ASD in play. Three students with ASD and six typically developing peers participated. These intervention sessions took place in the classroom during free play time using blocks and play dough. Results indicated that all three students with Autism Spectrum Disorder made significant gains in their number and length of interactions with peers.



A study by Thieman- Bourque, Brady, McGuff, Stump, and Naylor (2016) was conducted in order to investigate the effectiveness of a social intervention that combined peer-mediated approaches along with PECS. The participants included four students who had severe autism and seven typically developing peers. These seven typically developing peers were trained to use PECS in order to facilitate social skills with their peers who had autism. Results indicated that all children improved in peer- directed communication, and all the typically developing peers increased their communication with those who had autism.

A study by Lerna A., Esposito D, Conson M., and Massagli A. (2014) investigated the long-term effects of PECS training for children with ASD. Fourteen families were involved and the children were assessed in structured and unstructured environments a year after the original training finished. The final results indicated that the children made significant improvements in joint attention and initiation; cooperative play increased as well. PECS training was demonstrated to promote long-term improvements of communicative skills in children with autism.

A study by Mathews, Vatland, Lugo, Koenig, and Gilroy (2017) examined a treatment package to teach typical school-aged children the correct skills in order to become peer models. The participants were taught the following skills: initiating verbal interactions, prompting for targeted skills and delivering of praise. Results indicated that peer models quickly acquired the skill of initiating verbal interaction; however, they needed more guidance and practice in prompting targeted skills and praise.

This study by Travis, and Geiger (2010) focused on the effectiveness of introducing the PECS for requesting and commenting along with the length of verbal utterances. There were two participants with ASD who had limited use of communicative exchanges. Results indicated that both participants had an increase in requesting along with the development of forms of communication.

All of these studies researched have shown a lot of positive effects during the implementation of PECS. Studies have shown an increase in communication, socialization, and language. PECs have helped those with ASD and other communication disorders increase their quality of life. When PECS is implemented correctly, positive results have been indicated.

## **Chapter 3**

### **Methodology**

#### **Setting and Participants**

This study included four preschool students who attend an urban central New Jersey school district. The school district contains 13 schools, one Pre- Kindergarten Center, nine elementary schools, one middle school, and two high schools. There are a total of approximately 10,000 students in the district. The pre- kindergarten center holds 13 preschool classrooms, the elementary schools consist of grades preschool through eight, the middle school consists of grades six through eight, and the two high schools consist of grades nine through twelve. The typical school day at the elementary school runs for six hours and thirty-five minutes. The amount of actual instructional time is five hours and fifty-five minutes.

According to the New Jersey School Performance Report (New Jersey Department of Education, 2017), 0.3% of the students in the school are white, 25.5% of the students are African American, 73.4 % of the students in the school are Hispanic, 0.3% of the students are Asian, 0.1% of the students are American Indian, and 0.5% of the students are two or more races. Spanish is the primary language spoken in the community and a percentage speaks English. When examining this particular elementary school's population, 28% of the students were students with disabilities, 81% of the students were economically disadvantaged, and 14% of the students were English Language Learners.

Two students chosen for this study have an Individualized Education Plan, are non-vocal, and they are in a self-contained classroom. The other two students chosen for this study are in inclusion classrooms and are typically developing children. Teachers recommended these students receive the intervention in order to increase the interaction and communication between vocal and non-vocal students.

Participant 1, C.P., is a preschool, Hispanic, female who receives special education, and has an IEP. She qualifies for special education services under the category of preschool disabled. C.P. has Down Syndrome and is cognitively and language impaired. She remains in a self-contained classroom throughout the day and receives speech, occupational therapy and physical therapy in school. C.P. has a hard time following routines, sitting in her seat for small group, and interacting appropriately with the other children. Her area of greatest difficulty is socialization.

Participant 2, M.M., is a preschool, Hispanic, male who receives special education and has an IEP. M.M. qualifies for special education services under the category of preschool disabled and he has Autism Spectrum Disorder, language impairments and is cognitively impaired. M.M. remains in a self-contained classroom throughout the day and receives speech and occupational therapy in school. He has a hard time communicating his wants and needs, participating in groups, and interacting with his peers. His area of greatest difficulty is socialization.

Participant 3, J.S., is a preschool, Hispanic, female who is in a general education classroom and does not receive any special education services. She does not have an IEP or a 504 plan and she is outgoing, friendly, and a well-behaved little girl with a strong

vocabulary. J.S. comes from a bilingual background at home; therefore, she can communicate in both Spanish and English.

Participant 4, K.T., is a preschool, Hispanic, female who is in a general education classroom for the entire day and she does not receive any special education services. K.T. does not have an IEP or a 504 plan. She comes from a primarily English-speaking home; however, she can communicate and understand both English and Spanish. K.T is a well-behaved girl with a strong vocabulary who loves to help her teachers and classmates.

### **Procedure**

The intervention was implemented over a six-week period from February 2019 through April of 2019. I met with the two groups of students three times a week, for twenty-five minutes each, from 10:45 to 11:40. The students were pulled from make-believe play in order to work on the intervention. Group 1 consisted of two preschool females, one general education student, and one special education student who was non-vocal. Group two consisted of a male preschool special education student who was non-vocal and a female general education student. Group 1 met on Mondays, Wednesdays and Fridays from 10:45 to 11:10, and Group 2 met on Mondays, Wednesdays, and Fridays from 11:15 to 11:40. The intervention took place in a classroom in the elementary school the children attended.

The intervention was delivered using PECS and twelve sessions took place over the course of the six-week period. The intervention was broken into three sections based on the PECS steps. The PECS procedure, and how the PECS would be implemented, was

discussed between the two teachers, a general education teacher and a special education teacher, along with the five paraprofessionals in the two classrooms. Questions and concerns were discussed so that any needed clarifications could be made.

In Session 1, PECS training took place on Phase One, which consisted of the students exchanging one picture in return for the tangible object with their partner. The children were then given a pre-assessment, using five pictures, to see if they could automatically exchange pictures for the objects with their partner. A checklist was used to indicate whether the exchanges were made correctly, with a negative sign indicating no and a plus sign indicating yes for each picture. Every time a child would use a picture in exchange for an object, s/he would receive verbal praise. The PECS pictures were based on the children's interests.

At the beginning of Session 2, the use of PECS was reviewed, and then the children were sent to the center for observation. A checklist was used to record the pictures they would exchange together. The checklist consisted of a total of five objects that could be exchanged amongst each other in return for the tangible object. The participants were evaluated on how many pictures were exchanged during the 15-minute free play session. A tally mark would be made under the pictures that were exchanged.

Days of the week	Doll	Carriage	Doll House	Play Food	Doll Crib
Monday					
Wednesday					
Friday					
Monday					
Wednesday					
Friday					
Monday					
Wednesday					
Friday					
Monday					
Wednesday					
Friday					

*Figure 1.* Group 1 Days of the Week

Days of the week	Doll	Carriage	Doll House	Play Food	Doll Crib
Monday					
Wednesday					
Friday					
Monday					
Wednesday					
Friday					
Monday					
Wednesday					
Friday					
Monday					
Wednesday					
Friday					

Figure 2. Group 2 Days of the Week

During Session 3, the children were automatically sent into the center together to play. Using the checklist, tally marks were made for the amount of times they exchanged the pictures with the objects. The PECS were laid out in front of the students so they could easily pick out the pictures along with the object. A quick modeling session was done to remind the children how to use the PECS.

During Session 4, the children were trained in Phase Two of the PECS program. During this phase, the students were taught to generalize the skill by using it in different



places, with different people and across distances. They were also taught to be more persistent communicators. This training was done by first presenting the non-vocal student with the PECS strip and by pointing out the objects in the different areas to the vocal student. A hand-over-hand approach was used to help the non-vocal students pick out the picture they wanted and handed it to their partner. The partner was then instructed on how to find the object to bring it to them. Data was recorded by using tally marks on any pictures that were exchanged.

In the beginning of Session 5, a refresher on Phase Two of the PECS program was given, using all the centers the children would play in. The children were then guided into the different centers to remind them of the PECS pictures and objects located there. The children were then allowed to play while the observer used tally marks to indicate which pictures were exchanged.

Session 6 was based on observing the children and taking data during the 25-minute period. This time, one of the paraprofessionals took data as well, in order to ensure that every exchange was captured. One observer was back and forth in the table toys section and block center while the other was in between the science and kitchen areas. In the end, the results were combined into one record.

The beginning of Session 7 was based on the training of Phase Three of the PECS program. Phase three involved Picture Discrimination. Individuals learned to select from two or more pictures to ask for their favorite things. These are placed in a PECS Communication Book, a ringed binder with self-adhesive hook fastener strips, where pictures are stored and easily removed for communication. This time, the observer started

with two pictures, a preferred and non-preferred item. The students were shown how to choose the picture they wanted from a field of two and hand it to their partner in exchange for the object. The entire 25-minute session was spent working on this phase at a table with the toys in reach.

Session 8 was dedicated to working on Phase Three in the different centers in order for the students to generalize the skill. After 15 minutes of direct instruction in the centers, data was taken on how many pictures they were able to exchange amongst each other. Once again, a paraprofessional served as a second observer to ensure that every exchange was recorded.

Session 9 was all observation on Phase Three in the different centers. The two observers took data on the amount of exchanges observed within the 25-minute period. The children were not given any modeling or guidance. They were encouraged to play in the centers and data was recorded by the observers on exchanges made.

Session 10 was used to add two more pictures to the field, now totaling four pictures to choose from and all were preferred items. The observers modeled for the children how to choose a picture from the communication board and hand it to their partner in exchange for the object. All of the objects were at the table so the children could practice with all four pictures and guidance was provided as needed. After 15 minutes of training, the toys were brought back to the different centers and the children were observed to see if they could exchange using four pictures. The children went into the four different centers during the remaining ten minutes of the intervention.

In Session 11, one more picture was added. Now, the children had five preferred pictures to exchange for five preferred items during the make-believe play block. Before being sent into the centers, the children were reminded that one more picture had been added. All data observed in the 25-minute intervention session was recorded.

During Session 12, a post assessment was given. The children were asked to sit at the table and they were presented with the PECS board and were shown the different objects on the table. Next, each time they were observed interacting with a picture and an object, this was recorded on the tally sheet.

### **Variables**

The independent variable in the study is the PECS, which is a picture-based procedural package to teach children lacking spoken language skills to initiate, request, and describe what they observe. This intervention aimed to increase the interactions between vocal and non-vocal students. The dependent variables in this study were the students and use of interactions.

### **Experimental Design**

The PECS intervention consists of a total of six phases. For the purpose of this study, only three phases were used. Twelve sessions took place, two were used for a pre- and post- assessment. Four sessions were used to teach the different phases of the PECS Program. The remainder of the sessions was observation. At the beginning of each session, the children were reminded how to use the PECS in exchange for the tangible object. The children were observed during the exchanges and the data was recorded.

## **Chapter Four**

### **Results**

#### **Summary**

In this single subject design, the use of a Picture Exchange Communication System was examined to determine if it could increase the communication and interaction between vocal and non-vocal students. Both vocal and non-vocal students were trained in the use of PECS and a one word: checklist was used to keep track of how often an interaction occurred between the children. The research question to be answered was: Will preschoolers who are non-vocal or have limited language successfully communicate and engage with their typically developing peers if they are both taught how to communicate and engage using the Picture Exchange Communication System?

#### **Results**

Table 1 below shows the results of the interactions of Group One. The two students in this group worked together over six weeks during 12 sessions. They were taught the first three stages of PECS and, during each session, the teacher would record the amount of times an interaction occurred was recorded. The PECS pictures used during the study were: doll, Legos, trolley, truck, bubbles, and dinosaur. The results of Group One indicated that throughout this study a vocal and non-vocal student, when taught, will interact with one another. A surprising result was towards the end of the study when a few sounds and forms of words were noticed by the teacher to be coming from the non-vocal students. Table one below shows the results from Group One. All

together there were a total amount of 69 interactions that occurred between the two students during the study.

Table 1

*Group 1 Results*

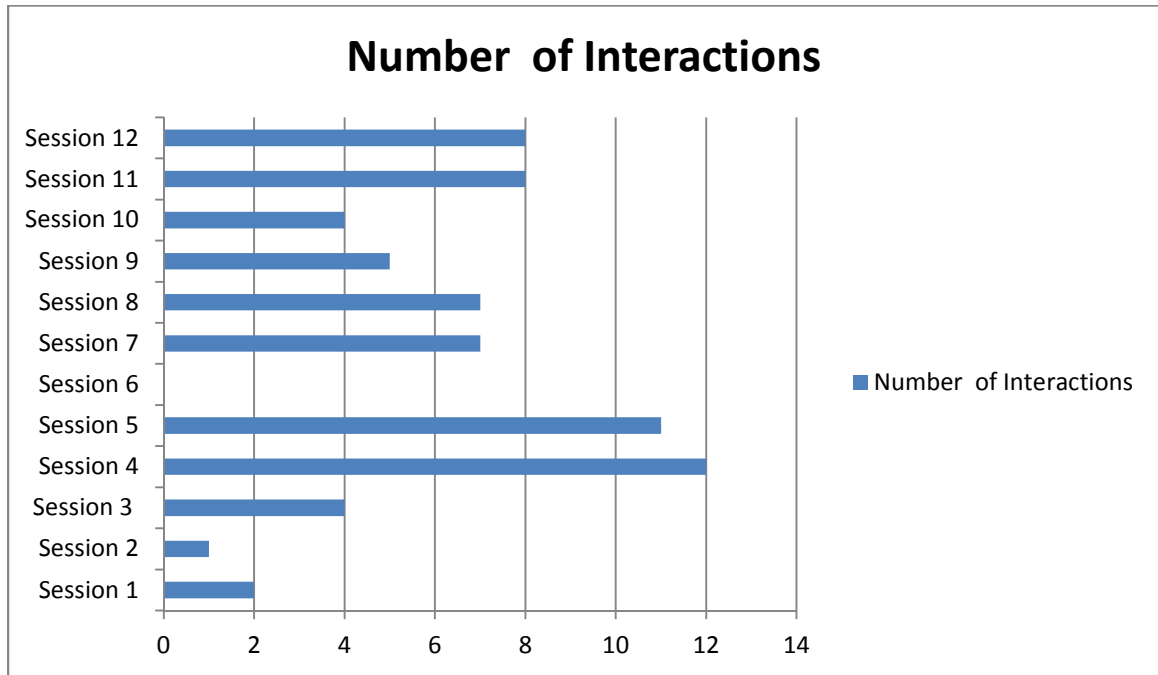


Table 2 shows the results of the interactions of Group Two. The two students in this group worked together over the six-week course during 12 sessions. As with Group One, they were taught the first three stages of PECS. During each session, the teacher would record the amount of times an interaction occurred. The PECS pictures used during the study were: Legos, dinosaurs, bristle blocks, trolley, trucks, and bubbles. The results of this study reflected growth of interactions during vocal and non-vocal students when being taught the PECS program. Growth in the use of language was also evident.

Table two indicates the results of Group Two. All together there was a total of 102 interactions that occurred between the two students during the study.

Table 2

*Group 2 Results*

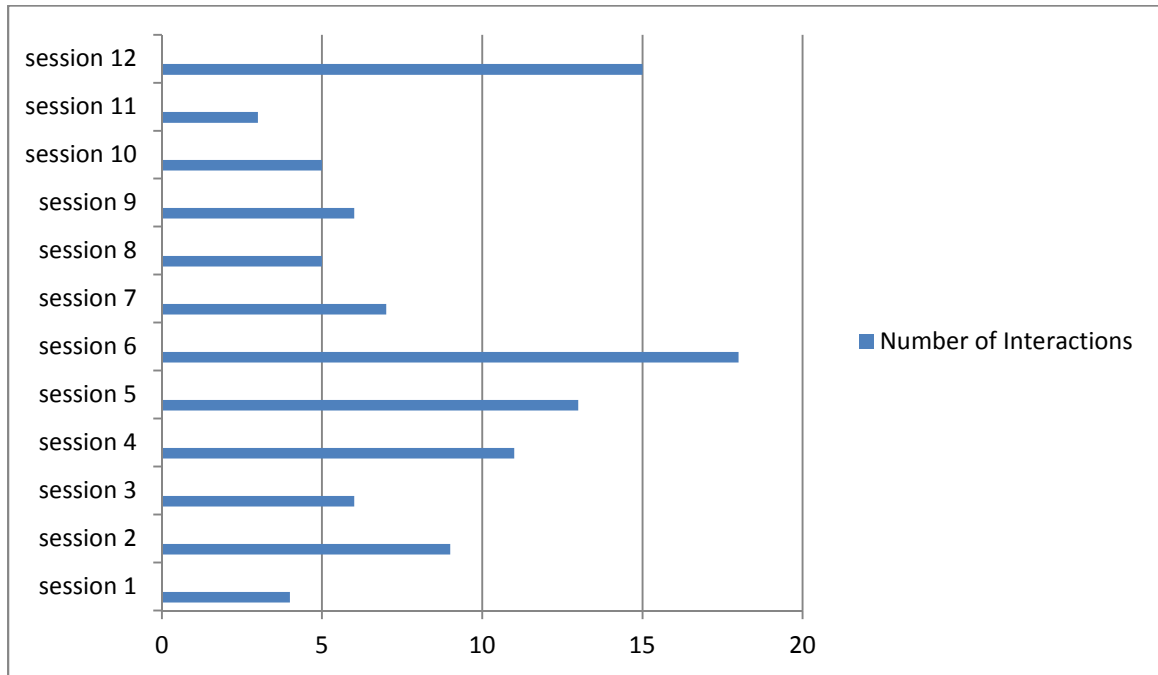
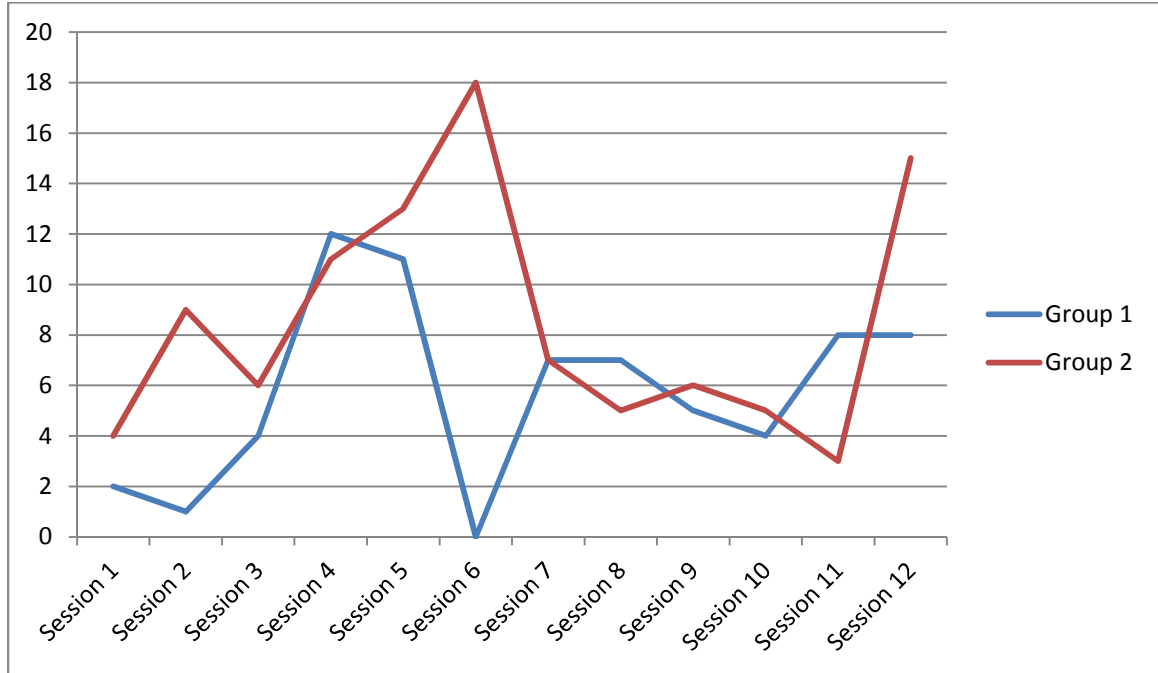


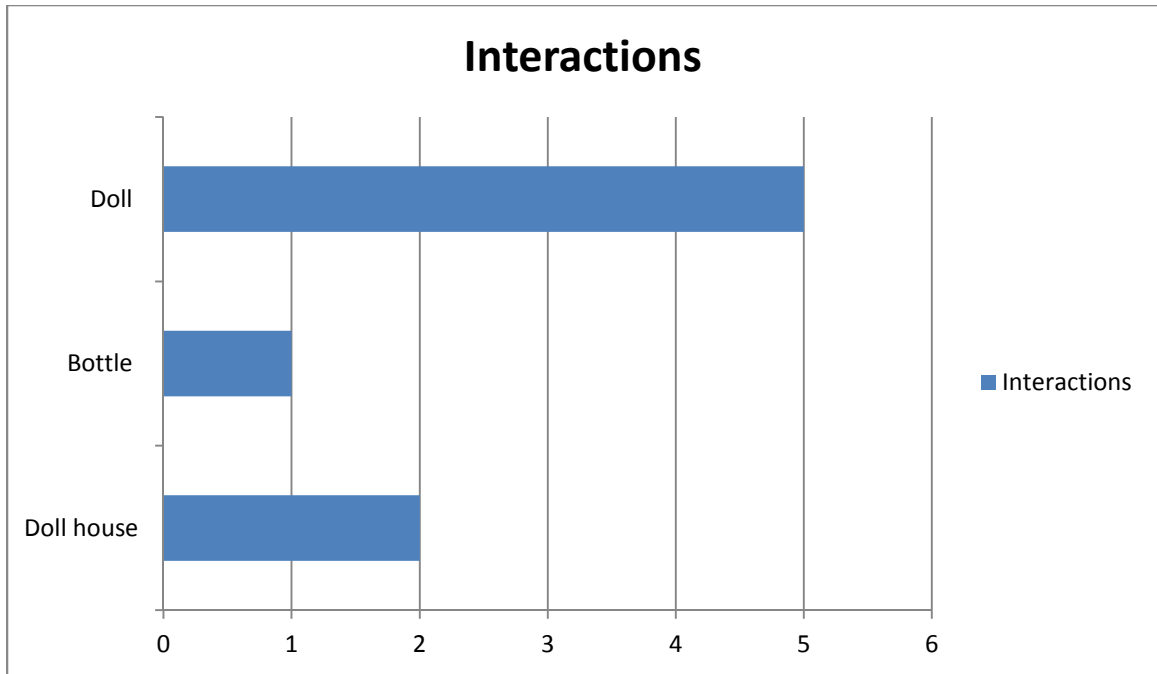
Table 3 compares the results of both Group One and Group Two. Both groups met the same number of times and were given the same guidance and review in the beginning of each session. Group One needed more reminders during the session and Group Two was very independent from Session Three on. The teacher also noticed that the children interact, with and without PECS, more with each other now.

Table 3

*Group One and Group Two results*



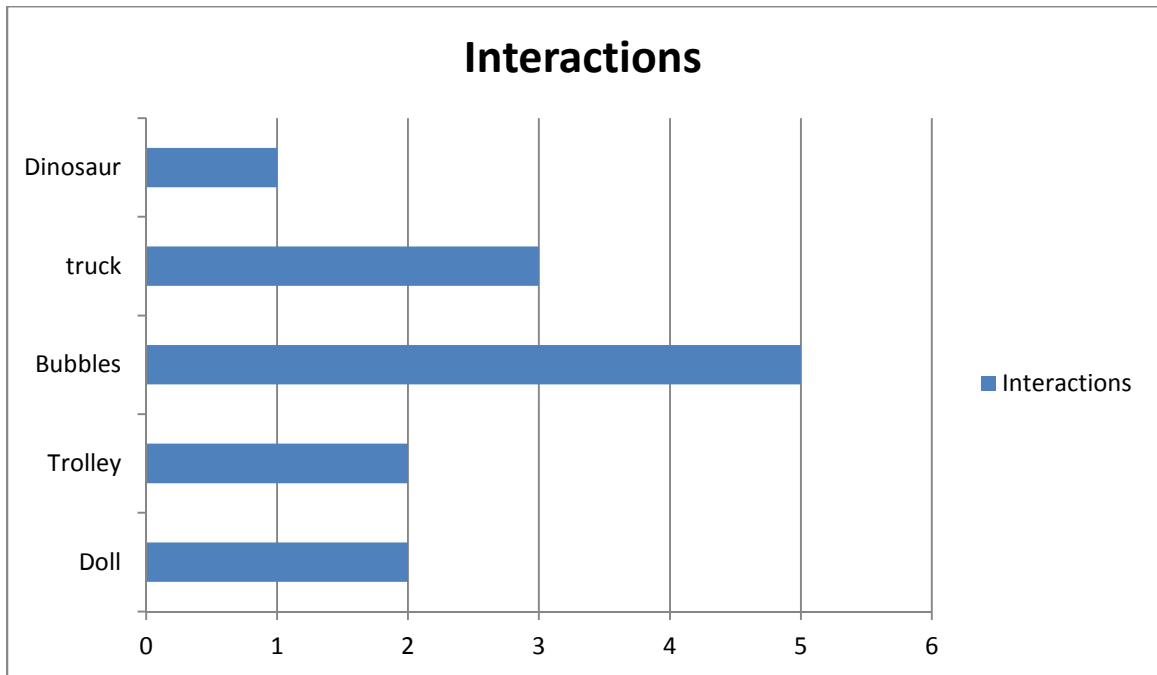
During the study, a pre-test and post-test were also completed. During the pretest in Group One, the children were given three toys on a table and the amount of times an interaction occurred using just three PECS with the toys was recorded. For Group One, the three toys used were a doll, bottle, and doll house. The results were as follows: doll five times, bottle one time, and doll house two times.



*Figure 3. Group One Pretest Results*

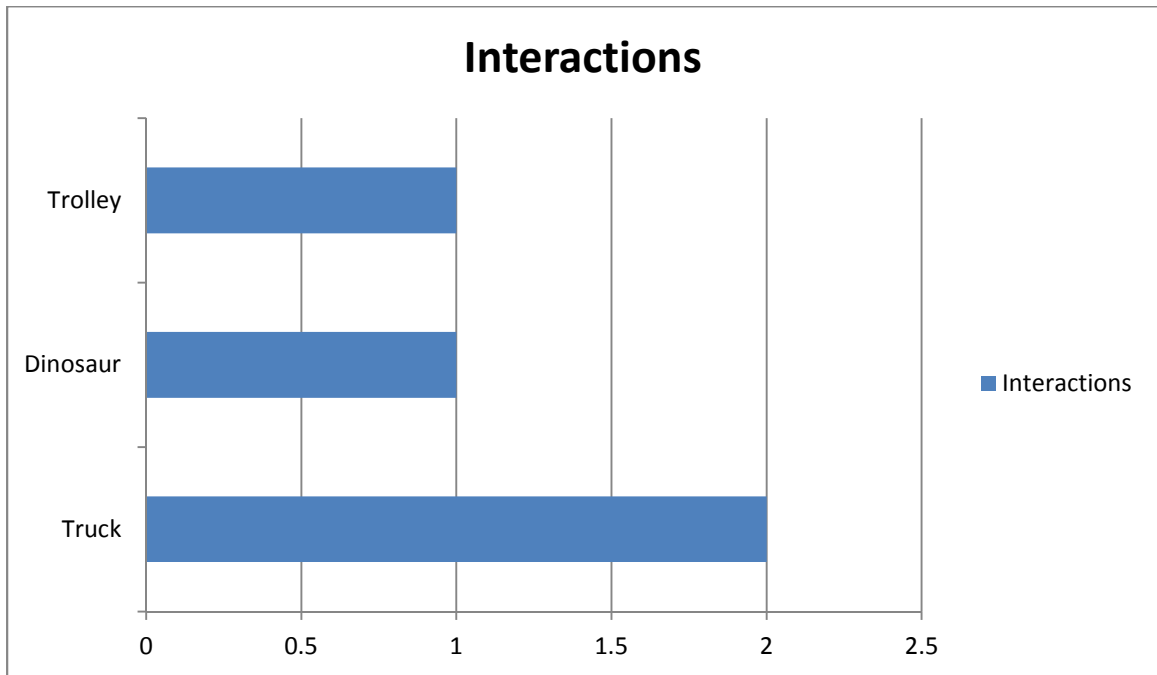
After the last session, the children were given a post-test. In Group One, there were five PECS and five toys: a doll, bubbles, trolley car, truck, and dinosaur. Results were recorded each time an interaction was made. They interacted with each other using the doll twice, the trolley twice, the bubbles five times, the truck three times, and the dinosaur once.





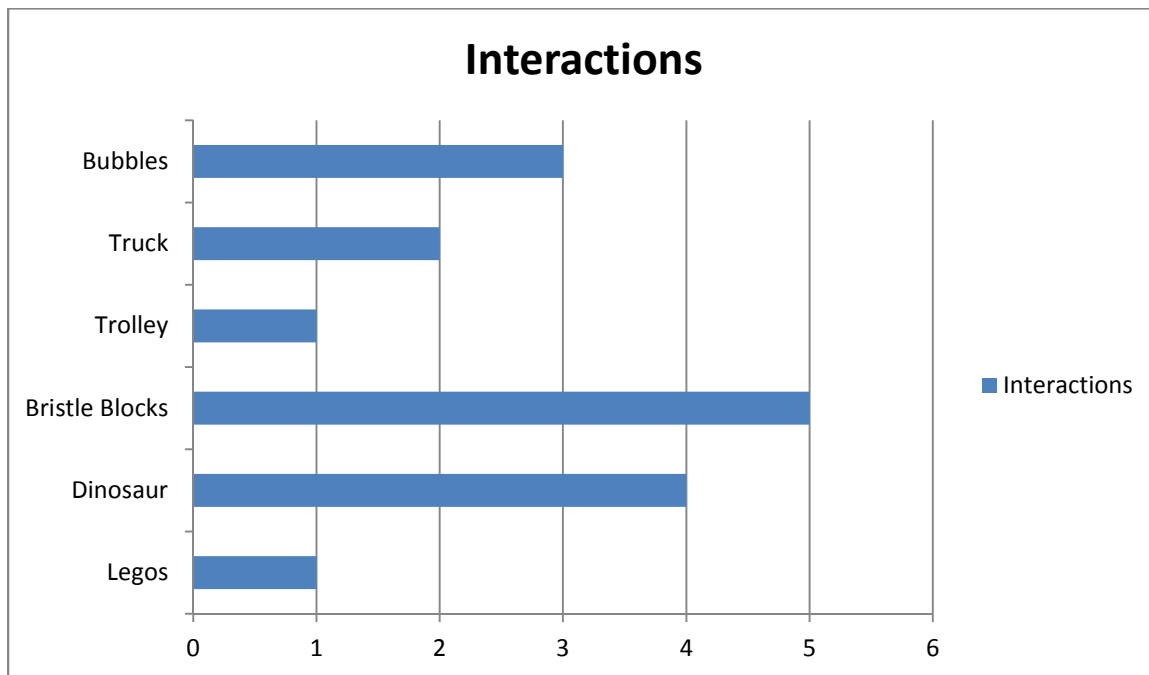
*Figure 4. Group One Post- Test Results*

During the pre-test in Group Two, the children were given three toys and the amount of times an interaction occurred using just three PECS with the toys was recorded. For Group Two, the three toys used were: dinosaurs, trucks, and trolley car. The results were as follows: truck two times, dinosaur one time, and trolley car one time.



*Figure 5. Group 2 Pretest Results*

After the last session, the children were given a post-test. For Group Two, there were six PECS and six toys out for them: Legos, dinosaurs, bristle blocks, trolley car, trucks and bubbles. Results were recorded each time an interaction was made. They interacted with each other using the Legos once, dinosaur four times, bristle blocks five times, trolley car once, trucks twice, and the bubbles three times.



*Figure 6. Group 2 Post-test Results*

In conclusion, the research data indicates an effective increase in communication and interactions between vocal and nonvocal students, while using the PECS Program. By the end of the research study, both groups One and Two were interacting without direct supervision. Overall, this was an effective experience and, if time allowed, additional students could be utilized in the research to see if positive results could be obtained across the board.

## **Chapter 5**

### **Discussion**

#### **Review**

In this study the use of PECS was examined to determine if it could increase the communication and interaction between vocal and non-vocal students. The participants of this study were four preschool students who attend an urban central New Jersey school district. Two students chosen for this study have an IEP, are non-vocal, and they are in a self-contained classroom. The other two students are in inclusion classrooms and are typically developing children. Teachers recommended these students to receive the intervention in order to increase the interaction and communication between vocal and non-vocal students. The intervention was delivered using PECS and twelve sessions took place over the course of the six-week period. The intervention was broken into three sections based on the PECS steps. The intervention was implemented from February 2019 through April of 2019. Two groups of students met three times a week, for twenty-five minutes each. The students were pulled from make-believe play in order to work on the intervention. In Session 1, PECS training took place on Phase One, which consisted of the students exchanging one picture in return for the tangible object with their partner. The children were then given a pre-assessment, using five pictures, to see if they could automatically exchange pictures for the objects with their partner. A checklist was used to indicate whether the exchanges were made correctly, with a negative sign indicating no and a plus sign indicating yes for each picture. Every time a child would use a picture in

exchange for an object, s/he would receive verbal praise. The PECS pictures were based on the children's interests.

At the beginning of Session 2, the use of PECS was reviewed, and then the children were sent to the center for observation. A checklist was used to record the pictures they would exchange together. The checklist consisted of a total of five objects that could be exchanged amongst each other in return for the tangible object. The participants were evaluated on how many pictures were exchanged during the 15minute free play session. A tally mark would be made under the pictures that were exchanged.

During Session 3, the children were automatically sent into the center together to play. Using the checklist, tally marks were made for the amount of times they exchanged the pictures with the objects. The PECS were laid out in front of the students so they could easily pick out the pictures along with the object. A quick modeling session was done to remind the children how to use the PECS.

During Session 4, the children were trained in Phase Two of the PECS program. During this phase, the students were taught to generalize the skill by using it in different places, with different people and across distances. They were also taught to be more persistent communicators. This training was done by first presenting the non-vocal student with the PECS strip and by pointing out the objects in the different areas to the vocal student. A hand-over-hand approach was used to help the non-vocal students pick out the picture they wanted and handed it to their partner. The partner was then instructed on how to find the object to bring it to them. Data was recorded by using tally marks on any pictures that were exchanged.

In the beginning of Session 5, a refresher on Phase Two of the PECS program was given, using all the centers the children would play in. The children were then guided into the different centers to remind them of the PECS pictures and objects located there. The children were then allowed to play while the observer used tally marks to indicate which pictures were exchanged.

Session 6 was based on observing the children and taking data during the 25minute period. This time, one of the paraprofessionals took data as well, in order to ensure that every exchange was captured. One observer was back and forth in the table toys section and block center while the other was in between the science and kitchen areas. In the end, the results were combined into one record.

The beginning of Session 7 was based on the training of Phase Three of the PECS program. Phase three involved Picture Discrimination. Individuals learned to select from two or more pictures to ask for their favorite things. These were placed in a PECS Communication Book, a ringed binder with self-adhesive hook fastener strips, where pictures are stored and easily removed for communication. This time, the observer started with two pictures, a preferred and non-preferred item. The students were shown how to choose the picture they wanted from a field of two and hand it to their partner in exchange for the object. The entire 25 minute session was spent working on this phase at a table with the toys in reach.

Session Eight was dedicated to working on Phase Three in the different centers in order for the students to generalize the skill. After 15 minutes of direct instruction, data was taken on how many pictures they were able to exchange amongst each other. Once

again, a paraprofessional served as a second observer to ensure that every exchange was recorded.

Session Nine was an observation on Phase Three in the different centers. The two observers took data on the amount of exchanges observed within the 25minute period. The children were not given any modeling or guidance. They were encouraged to play in the centers and data was recorded by the observers on exchanges made.

Session Ten was used to add two more pictures to the field, now totaling four pictures to choose from and all were preferred items. The observers modeled for the children how to choose a picture from the communication board and hand it to their partner in exchange for the object. All of the objects were at the table so the children could practice with all four pictures and guidance was provided as needed. After 15 minutes of training, the toys were brought back to the different centers and the children were observed to see if they could exchange using four pictures. The children went into the four different centers during the remaining ten minutes of the intervention.

In Session Eleven, one more picture was added. Now, the children had five preferred pictures to exchange for five preferred items during the make-believe play block. Before being sent into the centers, the children were reminded that one more picture had been added. All data observed in the 25 minute intervention session was recorded.

During Session Twelve, a post assessment was given. The children were asked to sit at the table and they were presented with the PECS board and were shown the

different objects on the table. Next, each time they were observed interacting with a picture and an object, this was recorded on the tally sheet.

The results of this study reflected growth of interaction between vocal and non-vocal students when being taught the PECS program. Growth in the use of language was shown as well. The results of Group One and Two indicated that throughout this study a vocal and non-vocal student when taught, will interact with one another, and a surprising result was a few sounds and forms of words were coming out of the non-vocal students towards the end of the study.

It was hypothesized that students who are taught to use this system would be able to effectively communicate and engage with their peers better than students who are not trained. 100% of the Intervention Group showed improvement on their ability to interact with one another. The PECS consists of six phases: Phase One: How to Communicate. Individuals learn to exchange single pictures for items or activities they really want. Phase Two: Distance and Persistence. Individuals learn to generalize this new skill by using it in different places, with different people and across distances. They are also taught to be more persistent communicators. Phase Three: Picture Discrimination. Individuals learn to select from two or more pictures to ask for their favorite things. These are placed in a PECS Communication Book—a ringed binder with self-adhesive hook fastener strips where pictures are stored and easily removed for communication. Phase Four: Sentence Structure. Students learn to construct simple sentences on a detachable Sentence Strip using an “I want” picture followed by a picture of the item being requested. Phase Five: Responsive Requesting. Individuals learn to use PECS to answer questions such as “What do you want?” Phase Six: Commenting. Students are



taught to comment in response to questions such as, “What do you see?”, “What do you hear?” and “What is it?” They learn to make up sentences starting with “I see”, “I hear”, “I feel”, “It is a”, etc. ( Bondy, PhD & Frost, MS, CCC-SLP). Traditional peer buddy intervention emphasizes communication and engagement. One study examined the effects of a peer mediated intervention that provided training of speech- generating device for preschoolers with Autism who also had limited to no verbal skills. Three peers without disabilities were taught to stay, play, and talk using a GO Talk 4+ and, then, paired up with a classmate who had Autism. This particular intervention demonstrated improved communication, reciprocity, and engagement between children with Autism and typically developing peers. (Thiemann- Bourque et al., 2016) Communication and engagement can be very difficult for students who are non-vocal or who have limited language. These students need to be taught to communicate and engage in a way their peers understand. Using peers to properly teach them how to communicate and engage can be successful and rewarding if you are consistent and make it fun for everyone.

Several themes emerged as good practices for building interaction and communication between vocal and non- vocal students. Sulzer- Azaroff, Bondy, Frost Hoffman, and Horton (2009) found that the Picture Exchange Communication System (PECS) was originally designed to enable young children with Autism lacking functional communication to initiate requests and to describe what they observed. The picture exchange communication system (PECS) has been the subject of an ever-expanding body of research and development.

In this current study the two groups were taught the use of PECS in order to communicate to each other what they want to play with. A checklist was used to indicate

whether the exchanges were made correctly, with a negative sign indicating no and a plus sign indicating yes for each picture. Every time a child would use a picture in exchange for an object, s/he would receive verbal praise. The PECS pictures were based on the children's interests.

In 1994, Bondy and Frost reported their development of PECS, a picture-based procedural package that taught children with limited to no spoken language how to request and describe what they observed. PECS is an applied behavior analytic approach that is designed for early communication training. This approach is to be used in the natural setting of the classroom and home in order to help those who would normally struggle with communication to have a true means of communicating with others. In this current study a non-vocal student was bringing a PEC to a vocal student in order to show them what they wanted to play with during free time. The two children would then sit with each other and use the toy together, while the vocal student was leading the play.

In 2016 a study done by Bourge, Brady, McGuff, Stump, and Naylor focused on developing and examining a combined PECS and speech generated device. This research as well used four minimally verbal preschoolers with ASD and four typically developing peers. These students were also taught to stay play, and talk during social activities. After this training, improved communication and peer interaction was recorded as well. During this current study two non-vocal students and two typically developing students were taught the use of PECS in order to socialize with each other during free play.

## **Limitations**

Although the results of this study yielded positive effects, the numbers of participants in the study were small in size. This group of four students provided a limited amount of data on the effectiveness of using PECS between vocal and non-vocal students in order to increase interaction and communication. When a student was out another day and time had to be available in order to implement the study. Increasing the number of participants could have provided a more thorough evaluation of the intervention.

Another limitation of this study was the implementation time. Other studies looked at the effects of the use of strategy instruction over longer periods of time. Running this study for a longer part of the school year could have provided more insight to the effectiveness of PECS and Peer Buddies, as well as having more opportunities to add more participants.

Finally, this particular study only involved participants from two classrooms. There are many children in the pre-school program in this specific district who are non-vocal. Pairing children up from other classrooms could have improved the intervention, and resulted in more interactions.

## **Practical Implications**

During this study the use of a Picture Exchange Communication System was examined to determine if it could increase the communication and interaction between vocal and non-vocal students. Vocal and non-vocal students were trained in the use of

PECS and a check list was used to keep track of how often an interaction occurred between the children. Throughout this study a vocal and non-vocal student when taught interacted with one another, and a few sounds and forms of words were coming out of the non-vocal students.

### **Future Studies**

There is a large body of research that supports the effectiveness of PECS and Peer Buddy Models especially at the elementary and middle school level. However, there are less studies on combining PECS and Peer Buddies at the early childhood level. Future studies could focus on combining the use of PECS and Peer Buddies between a vocal and non- vocal student and follow their progress or lack of progress from the start of Pre-Kindergarten to the end of Third Grade. A larger number of students should be included in future studies in order to gain a better perspective of the effectiveness of this specific intervention. This intervention was conducted in a smaller group but, would the intervention be as effective if presented to a whole class? Can the students generalize the skills they learn over the different parts throughout the day, and in different settings?

### **Conclusion**

In this study the question to be answered was, will preschoolers who are non-vocal or have limited language successfully communicate and engage with their typically developing peers if they are both taught how to communicate and engage using the Picture Exchange Communication System? The two students in Group One worked together over six weeks during 12 sessions. They were taught the first three stages of PECS and during each session the amount of times an interaction occurred was recorded.

The PECS pictures used during the study were: doll, legos, trolley, truck, bubbles, and dinosaur. The results of Group One indicated that throughout this study a vocal and non-vocal student when taught will interact with one another, and a surprising result was, towards the end of the study a few sounds and forms of words were coming out of the non-vocal students. During Session One the two students interacted twice during the 25 minute period. In Session Two the students only interacted once. During Session Three the students interacted four times, Session Four they interacted 12 times, Session Five they interacted 11 times, and during Session Six no interactions occurred. Session seven they interacted seven times, Session eight they interacted seven times, Session Nine they interacted five times, Session Ten they interacted four times, Session eleven they interacted eight times, and during Session twelve they interacted eight times.

The two students in Group Two worked together over the six week course during 12 sessions. As with Group One, they were taught the first three stages of PECS, during each session the amount of times an interaction occurred was recorded. The PECS pictures used during the study were: legos, dinosaurs, Bristle blocks, trolley, trucks, and bubbles. The results of this study reflected growth of interactions during vocal and non-vocal students when being taught the PECS program. Based on these results the use of PECS between vocal and non- vocal students can be successful even at a young age. PECS can be implemented and transferred throughout the entire school day with success.

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