Picture Exchange Communication System

A Review of the Literature

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Thomas has been diagnosed as developmentally delayed is a six-year-old kindergarten student who uses gestures to communicate to his teacher because he is not able to use functional speech. Tammy, an eight-year-old diagnosed with Rett Syndrome has a speech defect which restricts her from letting her parents, teachers, and peers know what she wants every time she needs to perform an activity, and even more so when she wants an object that is out of sight. Cheryl is a seven-year-old student with autism who has limited speech. She verbally imitates words and phrases as her means of communicating to her parents, teachers, and peers. The commonality that these children face is the inability to communicate verbally/non-verbally their needs and wants. They have poor or lack of communication skills which is vial and necessary for daily survival.

Researchers have indicated that students with Pervasive Developmental Disorders (PDD) or Autism Spectrum Disorders (ASD) have been noted to display poor communication skills as well as socialization and language impairment (Ganz & Simpson, 2004; Heflin & Alaimo, 2007; Skokut, Robinson, Openden, & Jimerson, 2008; Spencer, Petersen, & Gillam, 2008). Students ASD have significant communication deficits. As noted by Volkmar, Paul, Kliin, and Cohen (2005) in his *Handbook of Autism and Pervasive Developmental Disorders*, individuals with PDD or ASD have speech impairments that affect their spoken language. It is because children with autism and other pervasive disorders have communication deficits that they experience problems with speech and language acquisition, an inability to communicate verbally and/non-verbally, and difficulties expressing language. This statement is supported by the American Psychiatric Association who agrees that students with autism have an inability to speak or express language effectively (as cited in Tincani, 2004). It is for this reason that a child who is unable to communicate effectively will have difficulties expressing his/her self in any setting.

Communication is therefore an important tool that is needed by any student in order to convey emotions, feelings, wants, and needs to peers, parents, teachers, and other relevant

persons to help interact at home, school, play, the wider community, and for continual survival. As stated in a famous quote by Rollo May, "Communication leads to community, that is, to understanding, intimacy and mutual valuing" (Lewis, 2009, p.1). The earlier it is for a student to develop effective communication skills the better it will be for that student to function cognitively, and appropriately in the wider community. It is well known that most of a student's time is shared between school and home. A student spends at least six hours in the school setting on a daily basis and sometimes more depending on the level of involvement in after school activities. When they are not in school the rest of the time is spent at home. It therefore stands to reason that these two settings are the ones in which students must be taught communication skills in order to be effective. The method chosen must be one that will enable these two agencies to work together for the development of the student's effective communication needs, and the Picture Exchange Communication System (PECS) is such a device.

PECS is a device/strategy/ intervention that will help school and home work together to improve upon, and develop their students'/children's effective communication skills but this will entail the commitment of both agencies. Even though this device will primarily be used at school or home; it can be simplified to be used in any other setting. Studies have shown (e.g. Bock, Stoner, Beck, Hanley, & Prochnow, 2005; Frost & Bondy, 2002; Ganz et al., 2004; Horton, Matteo, Waegenaere, Frost, 2008; Kravits, Kamps, Kemmerer, & Potucek, 2002) that PECS is a communication device that can enable students without functional communication skills to communicate with other individuals.

The purpose of this paper is to show that PECS is an effective communication device through documented research. Since the development of the protocol by Frost and Bondy (2002), there have been numerous research studies conducted (Pyramids Educational Consultants, 2009) supporting the use of PECS as a communication device especially in the area of autism.

PECS was developed for children with autism because most children with autism have

astonishing visual memory, they are able to learn rote memorization easily, they are visual thinkers, they are able to process a greater amount of material at a very fast pace, and are meticulous in performing tasks to the point of perfection (Heflin et al., 2007). The device has now surpassed its original intent, and has been noted to be appropriate for all age levels irrespective of disability. As a result of some of the research that has been conducted by Pyramids Educational Consultants (2009), the findings in this research has shown that PECS is not only effective with children with autism, but PECS is also effective with children with other disabilities who have communication deficits.

What is PECS?

PECS is a communication system used for teaching individuals who are non-verbal, echolalic, have limited speech, and are unintelligible, in order that they may develop functional and socially acceptable communication skills (Frost & Bondy, 2002). This communication device was first created by Frost and Bondy in 1985 for a learner whose inability to communicate through numerous varying methods and strategies at the Delaware Autism Program puzzled the professionals (Horton et al., 2008). It does not discriminate; it is simple, and easy to use, and it can be classified as an assistive technology. Assistive technology is an intervention tool that can be used in the classroom as part of Response to Intervention (RTI) because it is research-based, and it is also a device that has been mandated by the Individuals Disabilities Education Act (IDEA).

As mandated under the Assistive Technology Act of 1998 [Assistive Technology (AT) Act, 1998] which is embedded in IDEA, "assistive technology means any item, piece of equipment, or product system, whether acquired commercially, off the shelf, modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities (p.6). These items/equipment/systems can be from "low-tech to high-tech; cheap to expensive; require training or no training as long as it is researched-based, appropriate, and assists the

individual directly. PECS is therefore an assistive technology device approved by IDEA under federal legislations.

A distinctive feature of this device is that the desired item or activity is student-initiated. The student has access to the device in any setting that he or she interacts, and anyone can be a trainer provided that he or she adheres to the guidelines. When teaching the protocol, it must be noted that the objectives are based on principles of Applied Behavior Analysis (ABA) and B. F. Skinner's "Verbal Behavior" that relies on reinforcement and mastery. The protocol makes use of six phases plus one other training session which is not called a phase because it is taught simultaneously with phases three and four (Wallin, 2004).

Description of PECS

The six phases were adapted from Frost and Bondy (2002), where the phases are structured to ensure easy implementation of the training manual. The following descriptions of the phases were adapted from the training manual. In the first phase called "How to Communicate," there are usually two people who get the program started. These adults may be the child's/student's teachers or parents who act as trainers, the primary trainer (PT) who is in front of the student, and the secondary trainer also known as the "Physical Prompter" who remains behind the student and acts as the physical inciter. During that phase, the student is taught to respond to a desired item, pick up a picture of that item, reach towards the primary communicative partner/PT, and give the PT the picture. This phase is dependent on three things; an approach (getting the PT's attention), an action (directed specifically towards the PT which maybe utterances), and an outcome (getting a reward). The teaching strategy used in this phase is backward chaining which entails a sequence of behaviors that moves from one step to another every time one is mastered. Also in this phase, training takes place anywhere a communicative opportunity presents itself (e.g., cafeteria, playground, hallway)

The second phase is called "Distance and Persistence," and the student is taught repeatedly every time the initial attempts fail. The distance between the student and the PT/communicative board is lengthened in order that the skill be generalized in other settings. The student goes to his/her communicative board, removes the desired picture, takes it to the PT, gets the attention warranted, and hands the picture to the PT. The teaching strategies used in this phase are called (1) "Shaping" this is where a new behavior is built on by increasing the reinforcement/rewards, and (2) "Two-Person Prompting" which involves the secondary trainer guiding the student from behind; this will eventually fade after the student has gained independence. Social interaction between the two is non-existent, the "Physical Prompter" is only on hand to wait for the student to initiate communication where the student will be guided to the communication device or the PT if and when necessary. It is also during this phase that the student is taught to interact with peers but only after mastery has been achieved.

 The third phase is called "Picture Discrimination" and only the PT will be on hand to conduct the training since the secondary trainer will no longer be needed. Also during that phase, other persons are substituted as trainers, and settings are also changed. The teaching strategy used in this phase is called "Discrete Trial Instruction" which is based on the principles of ABA. The PT will entice the student with two pictures from which the student will select the correct one, give it to the PT, and receive the equivalent tangible item. It is during this phase that the student is taught to discriminate between a highly favored item versus a distracter.

In the fourth phase called "Sentence Structure" there is also "Backward Chaining" involved. The student has numerous pictures on his/her communicative device, and is communicating with more people. In this phase the student makes use of sentence strips by using the "I want" starter on the communication board. The student puts a desired picture with the starter, takes the strip to the person he/she wants to initiate communication with, and gives that individual the sentence strip. There is another teaching strategy used called "Delayed Prompting/Constant Time Delay."

This strategy is used to encourage the child, and not to force speech from the child. The child may/may not perform the desired behavior, and a delay of three to five seconds is used to encourage a response after the initial prompt. The student is also taught 'no' in order to emphasize that it is not always when he/she wants an item that it must be given. During phases three and four, the student is taught different attributes (e.g., color, shape, size, position, temperature) to help with discrimination and differentiation.

Phase five is called "Responding to the question 'What do you want?'" In this phase, the student is requesting a variety of items based on impulse by answering the question "what do you want?" The communication during this phase is on a wider scale where other persons are encouraged to interact with the communicative device. The teaching strategy taught in this phase is "Delayed Prompting-Progressive Time Delay" where a "helping prompt" is added… to elicit the behavior that can be reinforced" (p. 210).

The sixth phase is called "Commenting" which allows the student to react to a variety of questions apart from "What do you want?"(e.g. "What do you see? What do you have? What do you hear? and What is it?" (p. 223). The student will respond through pictures with statements that involve the senses (e.g., "I see"). In this final phase only social reinforcement is given; the desired item is not given. Students are also taught to discriminate between questions. The teaching strategies employed are "Discrimination Training" which utilizes "the discrete trial format to teach the student to discriminate between various question forms and sentence starters" (p. 227), and "Delayed Prompting-Progressive Time Delay" is used where the method is the same as in phase five but the ultimate goal is to get the student to act before the prompt is given.

Based on the description, this device can be used with children of varying ages and disabilities. It makes provisions for accommodations and adaptations. According to Lund and Troha (2007), PECS can be adapted along with other instructional strategies to enable students with autism who were blind to respond to requests. PECS is also effective in increasing the

impulsive communication of students with autism (Kravits et al., 2002).

Discussion

In the majority of studies conducted (Bock et al., 2005; Heflin & Alaimo, 2007; Kravits et al., 2002; Skokut et al., 2008), a number of individuals' communicative skills increased as a result of using PECS. When students' communication skills increased, their behaviors also increased since behaviors were based on the contingent of the delivery of reinforcement and rewards concomitant on selecting the desired item or activity. Students' confidence was developed as a result of the self-initiated activities, and this lead to meaningful and motivating communication. Most students with autism have incredible visual acuity, and PECS uses that knowledge to its advantage by making use of visible sequences. When a student uses the device it becomes part of him/her so that he/she is able to carry it along anywhere in order that mastery be achieved. The protocol does not require any prerequisites, and the materials are easily produced. Although the preparation of the materials may be time consuming, when the materials are prepared they laminated or covered with plastic to ensure durability, repeated use.

What does using the Picture Exchange Communication System means? It means that PECS is a communicative device that is easily understood by trainers and trainees. According to Wallin (2004), the exchanges are intentional and clearly defined; communication is self-initiated; motivating; and causes significant improvement. Although there were a few limitations in their study, Kravits et al., (2002) found out that PECS increased the spontaneous verbalization of their subject. Despite the adaptations made (i.e. the materials used were three dimensional, and textured symbols instead of pictures because the three participants were blind) to PECS in the study, Lund and Troha (2007) noted that the participants were successful in responding to a combination of symbols and instructional strategies. Ganz and Simpson (2004) found that the three participants in their study mastered PECS, and as a result, they were able to utter more words than they did before. In the study conducted by Tincani (2004), one of the two participants

in the study showed remarkable improvement in speech when prompted along with the use of PECS.

PECS is a program that will enable students who have communication deficiencies to improve upon their expressive skills (Skokut et al., 2008). Whenever sign language is included with PECS the results is astounding. This was the finding in the study conducted by Spencer et al., (2008) which showed that with the inclusion of sign language, participants who were unable to communicate before were able to communicate a little. This study reiterates that PECS is an effective communication device to use whether on its own or along with another communication device.

Although there have been numerous research undertaken with PECS, there is still need for further research to investigate the correlation between the production of speech and PECS. There is still inconclusive evidence to suggest that PECS is the answer for all students with ASD because of the nature of students on the spectrum; no two students within the same category on the spectrum have identical characteristics. Nevertheless, some research showed that when PECS is combined with other devices that facilitate communication, the results are astounding.

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