Efficacy of The Peer P.A.L.S. Program

Social Validity and Effects of a

School Program for Autistic Children

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Abstract

Challenges arise in schools when peers and adults lack skills and strategies for effectively communicating and interacting with autistic students. The Peer P.A.L.S. program trains non-autistic peers and supporting adults in evidence-based strategies that are effective with autistic children. The program provides animated video modules in a lunch and learn training, followed by coordinated peer-mediated activities with autistic children. The purpose of this study was to investigate the effects of the program on participants. There were three objectives; 1. Measure knowledge gains for peers and adults, 2. Measure change in targeted skills for autistic children, and 3. Evaluate social validity among participants and stakeholders. Methods: A quasi-experimental design compared (pretest) to (posttest) scores for autistic students, non-autistic peers, and adult staff. Exit surveys were used to evaluate social validity. Results: Findings for peers and adults included knowledge gains in autism awareness and usable strategies. Findings for autistic children included increased scores in 5 domains: Play, self-management, learning, communication, and socialization. Conclusion: This study informs educators about an effective peer-mediated program based on research principles and demonstrates high social validity, making it more likely to be implemented and maintained.

Keywords: Autism, peer-mediated intervention, school, social validity

Autism spectrum disorder (ASD) affects 1:44 children (Centers for Disease Control and Prevention [CDC], 2022). Autistic children need to be around non-autistic children and adults who understand and support them. The earlier inclusion begins, the more natural diversity becomes. Implementation of evidence-based research is required for school programs to meet the needs of autistic children. However, implementing and sustaining available social skills programs with fidelity is often challenging in schools. Locke and colleagues (2015) report the tangled web of staffing, prioritizing needs, support, and availability of programs that can be implemented and maintained. There is a need for ease of implementation as manualized programs are only effective if used. It takes teachers time to implement and maintain programs with fidelity. The easier it is to implement, the more likely they will use the program. In addition, they must see results. Social validity is the social significance of goals in treatment and the acceptability of procedures, and the social importance of effects (Wolf, 1978).

The Peer P.A.L.S. Program was developed while working alongside teachers and school staff since 1998. The program has been implemented in three school districts in southeast Florida. The program evolved to incorporate animated video training and lessons with coordinating activity challenges. Each lesson includes a checklist to increase fidelity and ease of implementation. The theoretical foundations for this program and study are based on Social Cognitive Learning Theory (SCLT). This theory bridges the ideas that behavior is learned through observation, imitation, modeling, and reinforcement; with the understanding that environment influences behavior; learning occurs by paying attention, repetition, and practice; and retention is aided by visuals (Bandura 1986, Nabavi, 2012)

This study reports on a peer-mediated intervention (PMI) with strategies to train others to support autistic children in Pre-k through 5th grade. According to Platos and Wojacezek (2018),

PMIs are treatment approaches that involve typically developing peers in teaching and reinforcing social skills for individuals with disabilities, such as ASD. PMIs can take many forms, such as peer tutoring, modeling, and training (Hume, Sam, Mokrova, & Reszka, 2019). Peer tutoring involves teaching academic or social skills through instruction and reinforcement (Hume et al., 2019). Hume and colleagues (2019) also report the importance of peer modeling with the demonstration of appropriate behaviors by typically developing peers resulting in imitation. Social skills training involves teaching social skills through instructional materials, role-play, and feedback.

Sperry, Neitzel & Engelhardt-Wells (2010) report that peer-mediated instruction and intervention (PMII) is based on social learning theory and principles of behaviorism. Teaching typical peers to interact with autistic children in the natural environment increased social opportunities, resulting in increased social skills. The authors suggest ways for developing educational settings to implement PMI, such as carefully selecting peers and systematically training them.

PMIs have several benefits for children with ASD, including improving social skills, communication skills, and overall quality of life (Matson & Wilkins, 2016). PMIs can increase social interactions and friendships for individuals with ASD (Hume et al., 2019; Joseph & Strain, 2019). Hume and colleagues (2019) observed children with autism interacting more with peers during small group activities or pretend play, particularly when adults stepped back. Joseph and Strain (2019) found that positive relationships with adults and peers positively affected children with autism. Implementing PMIs with guidance from professionals while considering the needs and preferences of individuals with disabilities, their peers, and families in the planning are recommended (Hume et al., 2019).

Overall, research on PMIs for autistic children consistently demonstrates their effectiveness in promoting social skills (Hume et al., 2019; Platos & Wojaczek, 2018; Strain & Joseph, 2019). Despite numerous articles promoting PMI, more research is needed to determine the effectiveness of PMIs (Platos & Wojaczek, 2018). After 40 years of study, there remain challenges with selecting interventions and implementation in the school, yet Odem and colleagues (2021) are hopeful of closing the gap of bringing research to educational settings.

Overview and purpose of this study

The Peer P.A.L.S. Program is a PMI program designed to teach non-autistic peers and supporting adults how to support autistic children in five core domains: play, self-management, learning, communication, and socialization. The program aims to improve targeted skills in children with autism and measure increased knowledge and understanding of autism for non-autistic participants. This study aimed to investigate the effects of the Peer P.A.L.S. Program (independent variable) on participants. There were three objectives; 1. Measure knowledge gains (dependent variable) from training for peers and adults, 2. Measure change in targeted core skills (dependent variable) for autistic children, and 3. Evaluate social validity (surveys) among participants and stakeholders.

Research must provide practitioners with information on program effectiveness. Also, the implementation must be efficient and available to all schools. More importantly, the people who use the program, including autistic children, are satisfied with the treatment approach and outcomes. Studying the social validity of the Peer P.A.L.S. Program is important as it can contribute to the field of education, providing usable information and programs for practitioners and those choosing a program.

A "fidelity checklist" was created for facilitators to ensure the program was consistently run as intended and avoided behavioral drift (see Appendix A). Program fidelity was evaluated on 18 quality indicators. Components included the response to intervention, routine tasks, general teaching strategies, structured supports, reinforcement, and data collection. Adult participants were randomly selected to monitor program fidelity. The behavior analyst verified the interrater reliability of the data collected and checklist completion.

Methodology

The purpose of this study was to investigate the effects of the Peer P.A.L.S. Program on participants. There were three objectives; 1. measure knowledge gains for peers and adults, 2. measure change in targeted skills for autistic children, and 3. evaluate social validity among participants and stakeholders. A quasi-experimental design compared (pretest) to (posttest) scores for autistic students, non-autistic peers, and adult staff. Checklists for fidelity were instituted, and exit surveys were collected and analyzed to evaluate social validity.

Setting and Participants

The Peer P.A.L.S. Program was implemented as a summer extended school year program in district elementary schools in southeastern Florida. In the natural environment, data were collected during three summers, 2009, 2010, and 2021. The tropical island tribal theme and outdoor childhood activities created a fun and supportive environment for all.

This research spanned 2009, 2010, and 2021 and included 106 autistic children ages 3-12 in pre-k and elementary school (see **Table 1).** We refer to autistic student participants as "s*tudent*" in this article. Ninety-six non-autistic peers referred to as "*peer pals,*" and 52 supporting adult staff or "*adults,*" were trained. A total of 254 participants were included in this study. Social validity (survey) participants included parents and *students*, *peer pals, and adult participants.*

[Table 1]

Inclusion and Exclusion Criteria for Autistic Students

All students received Exceptional Student Education and were recommended for extended school year services. Participants had a diagnosis of ASD, and 70% of the 2021 cohort of autistic *students* were non-speaking or minimally speaking. Eligibility was determined through recoupment and retention data. Parent consent and medical and dietary needs were obtained, and video and photo releases were signed for school and program use.

Inclusion and Exclusion Criteria for Peer Pals Participants

Peer pals participants were recruited for the program from schools district wide. Candidates were non-autistic peer volunteers recommended by teachers, using a list of common successful characteristics for working with autistic children. Requirements included being in at least fourth grade, attending all trainings, and volunteering time for the summer program. Volunteers without a teacher referral completed a self-screen form to determine eligibility and were screened individually by staff. All *peer pals* were given a pretest prior to training. Those who did not pass the knowledge posttest were excluded from intervention until a passing score was achieved. Parent consent and video and photo releases were obtained for all *peer pals* participants.

Adult Staff Selection

The district administration chose summer, extended school year program staff from year-round school employees. Qualified candidates were teachers of students requiring extended school year and specialists providing services like speech-language pathologists, occupational therapists, mental health professionals, behavior analysts, and other *adult* staff working directly with children with autism.

General Procedure and Data Collection

A quasi-experimental pretest-posttest design was used in the study. Field researchers and teachers often use this design. The researcher was unable to implement a study with a control group due to the educational rights of students. The school coordinator scheduled all program training. *Peer pals* and *adults* were administered a pretest, then received video training and a posttest. Analysis of the difference between pretest and posttest scores was made to measure the effect of the training.

The program training modules (see Figure 1) were completed in sequence. Data was collected from 2009-2021, with statistical analysis in 2009, 2010, and 2021. A fidelity checklist was used by teachers and facilitators and was randomly checked by the behavior analyst who provided oversight of program data.

[Figure 1]

Data collection began with a 10-question pretest to establish baseline knowledge before viewing modules. Each *adult* staff member was provided a three-and-one-half hour training on program expectations and a DVD of Lessons, videos, and curriculum materials. Facilitators were also given a startup packet, posters, token economy (reinforcement) beads, and challenge activity materials. *Peer pals* and *adult* video lessons, practice, and challenge activities completed with students were organized into play, communication, learning, and social activities.

Training and Data Collection of Peer Pals: Pretest and Posttest

A pretest established baseline knowledge, and a posttest was taken at the end of training to evaluate gains in learning. The training program includes seven 15–20-minute video modules teaching play, communication, learning, and socialization strategies to support autistic students. The training was done in one day for the summer camp or infused into the week. The program

uses the lunch-and-learn model with short videos so that academic time is not interrupted during the school year programs. Exit survey data from *Peer pals* were also collected.

Data Collection of Autistic Students: Pretest and Posttest 10-Skill Assessment

Data was collected on targeted skills at baseline and end of the program (pretest and posttest). The researcher developed the 10-skill assessment used in this study specifically for the target skills in the program (see Appendix B). This assessment tool consists of commonly found skills on developmental checklists, curriculums, and social skills assessments. Baseline data (pretest) were collected by teachers using a 10-skill assessment with rating scale (see Appendix C). Recommendations were made to limit targeted behaviors during shorter summer sessions to three skills, one in each domain: play, communication, and socialization. Skills were specific to each *student*. All skills were rated using a Likert scale, and data were transferred from paper to an excel sheet for analysis by the coordinator and behavior analyst. A final 10-skill assessment (posttest) was recorded and analyzed. Exit survey data was collected from *students.*

Protocol

The summer program ran four days a week, Monday through Thursday, for four weeks total. Staff arrived at 7:30 AM and stayed until 1:00 PM; s*tudents* arrived at 8:00 AM and were dismissed at 12:30 PM along with *peer pals*. The *peer pals* volunteered for 1 - 4 weeks and were assigned to classrooms or specific areas. The coordinator arranged weekly schedules. Facilitators implemented the Peer Pals Program as pre-planned lessons and technology-aided presentations and then stepped back. Then *peer pals* and *students* engaged in social experiences, including eating meals together. There was an average of 7 classrooms each summer. Each classroom and specialist area had two to three *peer pals*. Facilitators decided where *peer* support was needed throughout the day. A typical classroom might have *peer pals* who lead a center-based activity,

assist with challenge activities, model expected behaviors, and prompt and reinforce *students* for success.

Environments affect behavior. The tropical island tribal theme created a sense of fun, adventure, and connection providing an environment conducive to social interactions. Learning was fun, and the camp-like setting created a sense of adventure. A "Bead Token Economy" was used and increased motivation for *students* to acquire social skills. Tokens were earned for approximating targeted skills and later exchanged for preferred activities and reinforcement breaks. *Peer pals* and *adults* reinforced skills with beads. *Students* were also reinforced at the end of the week with a "treasure box." These two forms of reinforcement were necessary to shape behavior and motivate autistic *students* who were not motivated by social activities and interaction with peers.

Therapists continued to provide services and were infused, providing a multidisciplinary approach. Observing the specialists working with the children provided valuable information to everyone. Speech-language pathologists supported communication needs, meeting in the *Tiki Hut*, and they developed a song to present at a tribal celebration performance for parents and administration. Occupational therapists used fun activities to support fine and gross motor skills and sensory needs that impact the students. A sensory lab, a calming place, an outdoor obstacle course, and a scooter board track helped students regulate. Free community resources were sought, resulting in a ranger and wildlife show, a Humane Society staff and dogs show, and readings with Paw Pals. Outdoor, chalk, face painting, bubbles, and water activities occurred at least once a week and were individualized to the *student's* ability. Weekly home notes were used to communicate with parents and review skills learned. At the completion of the program, a celebration showcased skills and songs.

Results

The Peer P.A.L.S. Program had an impact on the skill development of autistic children. Data collected from assessments during 2009, 2010, and 2021 illustrates the program's effectiveness by comparing each student's baseline and post-program assessments. The skills were assessed using a Likert scale, and data analysis demonstrated improvements in targeted skills for autistic *students*. The results of the baseline assessments will also be compared to the post-program assessments to show the progress made by the students.

Analysis of 2009 Pretest and Posttest 10-Skill Assessment of Autistic Students

Each skill type's mean, median, and standard deviation were compared to analyze the results of the pretests and posttests in 2009, shown in Table 2.

[Table 2]

The mean scores for all skill types increased significantly from pretest to posttest, with a 100% increase in "play using a variety of toys - skill 1" and a 103% increase in "reciprocal play - skill 2." The median scores also increased for all skill types, with a 100% change in "waits & take turns - skill 3" from the pretest to the posttest. The standard deviation remained relatively stable, indicating that the improvement of skills was consistent across participants and not just a few individuals. There was a significant improvement in all skills from the pretest to the posttest. Skill 7 showed a 48% change, which was still an improvement.

Table 3 represents the results of the pretest and posttest 10-skill assessments for the 2009 cohort of autistic *students*. It includes total scores for each skill type and percentage change between pretest and posttest scores. Note that percentage change is calculated by dividing the difference between posttest and pretest scores by the pretest score and multiplying by 100 to allow for comparison of relative improvement.

[Table 3]

The results of the pretest and posttest 10-skill assessments indicate that all skills improved (figure 2). The skill that demonstrated the least increase was skill 7, with a 48% improvement. Conversely, skill 9, "greets or initiates," demonstrated the most significant increase, with a 129% improvement. Overall, the average increase across all skills was 81.1%.

[Figure 2]

Analysis of 2010 Pretest and Post-Student Skill Assessments

Seven of the ten skills showed significant improvements from pretest to posttest in the 2010 data set, with the most significant percentage changes seen in reciprocal play, self-management, follows direction, motivation to participate, greets or initiates, and appropriate language, all showing more than a 100% increase in scores. However, some skills did not show as much improvement, such as play using a variety of toys and attends to the lesson, showing 83% and 54% increase, respectively. All skills improved from the pretest to the posttest, as seen in Table 4.

[Table 4]

Median scores improved in all skills, and standard deviation scores slightly improved except for "motivation participate - skill 7" and "appropriate language - skill 10," which showed significant improvement. S*tudent* participants in the 2010 program saw significant improvements in their skills, as seen in Table 5 and Figure 3. For example, the percentage change for the skill "reciprocal play - skill 2" increased by 126% from the pretest to the posttest, indicating that the *peer pals* and *adult* supporting staff significantly improved their ability to engage in reciprocal play with the autistic *students* during the program. Similarly, the percentage change for the skill "self-management - skill 4" increased by 133% from the pretest to the posttest, indicating that the

peer pals and *adult*s made significant progress in their ability to support autistic children in self-management.

[Table 5]

[Figure 3]

The Peer P.A.L.S. Program showed improvement in all *students'* skill areas, but not all skills improved equally. For example, "attends to lesson - skill 5" only increased by 54%. This result may be because this baseline skill was higher at 48 and increased to 74, giving a 54% increase.

In summary, the 2010 assessments suggest the program was successful in improving the skills of autistic children. Skills that improved include reciprocal play, attention, self-management, following direction, motivation to participate, imitating *peer pals*, initiating greetings, and appropriate language. These improved skills suggest that the Peer P.A.L.S. Program effectively implemented strategies for interacting with and supporting autistic children.

Peer P.A.L.S. Program Impact on Peer Pals and Supporting Adults

The Peer P.A.L.S. Program has been operating for over 25 years, and the data collected across time from 2010 and 2021 is shown. Knowledge gains from pretest and posttest scores for *peer pals* and *adult* participants are reported in Figure 4.

[Figure 4]

In 2010, the *peer pals* participants took the pretest and posttest after participating in the program. The results of these tests are as follows:

- The average pretest score for *peer pals* in 2010 was 52 out of 100 points. The range of scores was between 30 and 80, with a low score of 30 and a high score of 80.

- The average posttest score for *peer pals* in 2010 was 88 out of 100 points. The scores range between 80 and 100, with a low score of 80 and a high score of 100.

In 2021, a new cohort of *peer pals* took the same pretest and posttest. The results of these tests are as follows:

- The average pretest score for *peer pals* in 2021 was 57 out of 100 points. The range of scores was between 30 and 80, with a low score of 30 and a high score of 80.
- The average posttest score for *peer pals* in 2021 was 96 out of 100 points. The scores range between 80 and 100, with a low score of 80 and a high score of 100.

In addition to the *peer pals* training, the program also trains supporting *adult* staff who work with autistic children and help them learn and grow. In 2010, *adult*s also took a pretest and posttest. The results of these tests for *adults* are as follows:

- The average pretest score for *adult* participants in 2010 was 58 out of 100 points. The scores range between 30 and 80, with a low score of 30 and a high score of 80.
- The average posttest score for *adult* supporting staff in 2010 was 94 out of 100 points. The range of scores was between 90 and 100, with a low score of 90 and a high score of 100.

In 2021, the *adult* staff also took another pretest and posttest to measure their progress. The results of these tests are as follows:

- The average pretest score for the *adult* staff in 2021 was 67 out of 100 points. The range of scores was between 50 and 80, with a low score of 50 and a high score of 80.
- The average posttest score for the *adult* staff in 2021 was 96 out of 100 points. The range of scores was between 90 and 100, with a low score of 90 and a high score of 100.

The *peer pals* had an average 69% increase in scores in 2009 and 2010 and a 68% increase in 2021. Supporting staff also saw increased scores, with an average increase of 61% in 2010 and 43% in 2021.

The Peer P.A.L.S. Program has consistently improved knowledge and skills over the years. Scores on the posttest have remained stable, mostly between 80 and 100%, indicating knowledge and skill improvement with the potential for further growth. It is essential to monitor and analyze data to identify trends or patterns that may emerge over time.

Results: Description of Social Validity

Social validity is the social significance of goals in treatment, the acceptability of procedures, and the social importance of effects (Wolf, 1978). A collection of exit surveys from *students*, *peer pals*, *adult* staff, and parents were analyzed and shown in Table 6. The Table shows the average ratings on the Peer P.A.L.S. Program exit surveys by social validity groups (Students in Pre-K through grade 5 and *peers* and *adults)* in 2009, 2010, and 2021.

[Table 6]

The results suggest the social significance and acceptability of the procedures and outcomes of the program. The program has social significance in that it increases opportunities to engage in meaningful social and life skills. Evaluation of the program's acceptability showed consistently high levels of agreement with all participant groups averaging 91 - 95 percent in agreement with the program procedures and goals. Social validity remained high for the different groups, participants, and years. Each group's average score in agreement with the program's goals ranges from 87 to 95. These scores suggest that the Peer P.A.L.S. Program was well-received by all groups. 2021 had the highest average of 95% agreement.

Implementation fidelity and interrater reliability

The study assessed the Peer P.A.L.S. Program's implementation fidelity and interrater reliability to ensure consistency and integrity. Implementation fidelity refers to how well the program was delivered as intended, and interrater reliability refers to an agreement between the observer's ratings of the same behavior. The data on the program's implementation fidelity and interrater reliability is presented in Table 7.

[Table 7]

Overall, the fidelity of implementation and interrater reliability scores were high across all years, with an average of 92% for implementation and 91% for interrater reliability. These results suggest that the program was consistently delivered and accurately measured. Future research should continue to assess these factors to ensure the validity of the results.

Discussion

The Peer P.A.L.S. Program was replicated in the natural environment at school, and data were analyzed from three different years with different participant groups. The study objectives were met, and data has consistently shown that the program effectively improved targeted skills in five domains: Playing, learning, communication, self-regulation, and socialization. Results show knowledge gains for non-autistic peers and supporting adults and consistent fidelity scores over 90% with interrater reliability across years. These findings indicate consistently high levels of implementation fidelity and strong interrater reliability. Results indicate that the program was implemented with high quality and that the results can be generalized to other settings. Satisfaction with the PMI remained consistently above 90% among participants and stakeholders for all years. The Peer P.A.L.S. Program positively impacted social validity ratings from teachers, parents, and non-autistic and neurodivergent participants, suggesting the program not

only improves targeted skills for autistic students but also promotes an inclusive learning environment increasing opportunities for social engagement.

PMI is a well-known and well-researched intervention that can improve the social and communication skills of autistic individuals. Schools are mandated to use evidence-based interventions. Chang & Locke (2016) argue that autistic children benefit from PMIs that meet "evidence-based" intervention criteria. Only three studies in the review were rated as having strong quality indicators, such as a group design, manualized treatment, and fidelity; we will discuss two of the three studies. First, Kamps et al. (2014) and Kasari et al. (2012). The third study by Corbett et al. (2014), rated as having adequate quality and a pre-post design, will be discussed last. These three quality studies used PMI and data from direct observation of participants, similar to the Peer P.A.L.S. Program. Differences include the lack of a control group in the Corbett study and the Peer P.A.L.S. Program study, which used pretest and posttest designs.

It is important to report and compare studies that meet the criteria of "evidence-based interventions" (Chang & Lock, 2016). In a randomized control group study, Kasari and associates (2012) studied 60 children with high-functioning autism in 30 different schools with one three-month follow-up; 12 sessions of intervention dosage twice a week for six weeks, and two groups were observed on playgrounds. The study design included a control group using a randomized waitlist. Reported improvements in social skills came from students, peers, and teachers suggesting short intervals are effective and maintained over time (Kasari et al., 2012). Similarly, the Peer P.A.L.S. Program study was done over 12-day sessions, and groups did not have a control, but both of these studies found high implementation fidelity and effectiveness.

Another randomized control group study by Kemp and colleagues divided kindergarten and first-grade autistic children into an intervention group (n56) and 39 in a comparison group (Kamps et al., 2014). Findings observed that the intervention group showed improved language and communication and more initiation toward peers. Kamps and associates (2014) describe checklists to monitor implementation fidelity; the Peer P.A.L.S. Program also has checklists for fidelity and defined components of peer training in a manual.

There were different components for the study, and measures were also different. Chan et al. (2009) reported in a systematic review that out of 42 studies on PMI, they found differences in focus. For example, some focused on peer mentoring, friendship building, tutoring, and communication, while others were play-based. Importantly, environments for PMI were also different. One study was theater-based, and another a camp setting, while most PMI is implemented in school settings.

Corbett et al. (2014) used a pre-posttest design similar to the Peer P.A.L.S. Program; both were short-duration. Corbett and associates (2014) report on the SENSE Theatre program, which incorporates play and theater performance into a PMI for autistic children. In a 10-session summer program, peers and autistic actors were paired, resulting in improved emotional expression, imitation, and social interactions. Chang & Locke (2016) concluded that the three studies discussed PMI works, even in shorter dosages.

There is a need for more field research using a randomized control group in schools (Kasari et al., 2012) (Kamps et al., 2014). Applying field research in schools is complicated. All children have a right to free and appropriate education, and the exclusion of students is prohibited (USDOE, 2022). The challenge is choosing the best program and implementing and maintaining evidence-based programs in the school setting. Challenges remain in disseminating

research and implementing PMI in more rural communities that might lack funding. Age considerations and the exclusion of non-speaking autistic children are also of concern. The Peer P.A.L.S. Program welcomes non-speaking autistic children, and peer pals are taught about augmentative communication and devices.

Implementing theoretically founded evidence-based programs, including social validity and fidelity data, are indicators of a strong study (Chan et al., 2009). The Peer P.A.L.S. Program is a PMI with theoretical underpinnings of social cognitive learning theory (SCLT) in that the program utilizes peer modeling, observation, and reinforcement in a supportive naturalistic environment. Theoretical underpinnings of SCLT provide the framework for understanding how autistic children experience their world. The program's interventions with repetition, practice, modeling, and reinforcement coincide with this theory.

Conclusion: Summary of findings and their significance

The significance of the study is that it adds to the body of knowledge on PMI conducted in a natural environment with structured training and simplified implementation and data collection in the classroom setting. The Peer P.A.L.S. Program study reports on five domains and a measurement tool (10-skill assessment) that is practical to be used in schools. Excel provides visual printouts for student progress reports on skills. The Peer P.A.L.S. Program tools have been used for over 25 years. They measure what they intend to measure, thus showing validity. Teachers liked the assessment and data forms because they were practical and simple instead of needing multiple measurement tools to capture progress. The program provides consistency and standardization, using visual ship portal schedules and standard room setup for program routines such as the *tribal circle, peer pals time, and challenge activities with students,* creating predictability. Autistic children need predictability since transition is hard for them. Participants

reportedly enjoyed the tropical theme and fun childhood summer activities. Posters and step-by-step instructions help reinforce learning. Autistic children learn from peers through connecting, modeling, prompting, and reinforcement. They also learn about the *treasure within* as the Peer P.A.L.S. Program focuses on students' strengths, not deficits; within the framework of neurodiversity, *being different is ok.*

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Tables

Table 1

Number of Participants Across Three Years

Year of Study	Student	Peers	Adult Staff	Total Participants
2009	46	19	10	75
2010	22	60	10	92
2021	38	17	32	87
Total in Survey	**106**	**96**	**52**	**254**

Note. The Table represents the number of participants in the study. Although there were additional students and teachers on campus, this study only included data from the above.

Table 2

2009 Descriptive Statistics for Autistic Students 10-Skills Pretest / Posttest

	Mean		Median		STDEV	
Skill Type	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
PLAY USING A VARIETY TOYS - Skill 1	1.14	2.18	1.00	2.00	0.85	0.91
RECIPROCAL PLAY - Skill 2	1.11	2.26	1.00	2.00	0.85	0.86
WAITS & TAKE TURNS - Skill 3	1.50	2.84	1.50	3.00	1.10	1.07
SELF-MANAGEMENT - Skill 4	1.52	2.48	1.00	2.00	1.08	1.03
ATTENDS TO LESSON - Skill 5	1.48	2.71	1.00	2.00	1.33	1.38
FOLLOWS DIRECTION - Skill 6	1.65	2.90	2.00	3.00	1.23	1.07
MOTIVATION PARTICIPATE - Skill 7	1.71	2.53	2.00	3.00	1.16	1.07
IMITATES PEER - Skill 8	1.50	2.39	1.50	2.00	0.86	0.92
GREETS OR INITIATES - Skill 9	0.97	2.21	1.00	2.00	0.87	1.15
APPROPRIATE LANGUAGE - Skill 10	1.29	2.14	1.00	2.00	0.90	0.85

Note. The Table above presents the mean, median, and standard deviation for the pre and posttest scores for the student skills in 2009. The mean represents the average score for each skill, the median is the middle score when the scores are arranged in order, and the standard deviation indicates how much the scores vary from the mean.

Table 3

2009 Percentage change from pre-test to post-test 10-skill Assessment of Autistic Students

Skill Type	Pre-Test Total Score	Post-Test Total Score	% Change
PLAY USING A VARIETY TOYS - Skill 1	24	48	100%
RECIPROCAL PLAY - Skill 2	30	61	103%
WAITS & TAKE TURNS - Skill 3	39	71	82%
SELF-MANAGEMENT - Skill 4	32	52	63%
ATTENDS TO LESSON - Skill 5	31	57	84%
FOLLOWS DIRECTION - Skill 6	33	58	76%
MOTIVATION PARTICIPATE - Skill 7	29	43	48%
IMITATES PEER - Skill 8	27	43	59%
GREETS OR INITIATES - Skill 9	28	64	129%
APPROPRIATE LANGUAGE - Skill 10	36	60	67%

Note. The Table above shows the total score for each skill in the 2009 school year. The percentage change represents the improvement from the pre to post test.

Table 4

2010 Descriptive Statistics for Autistic Students 10-Skills Pretest / Posttest

	Mean		**Median**		**STDEV**	
Skill Type	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
Play using a variety of toys - skill 1	1.60	2.93	1.00	3.00	0.74	0.70
Reciprocal play - skill 2	1.17	2.66	1.00	3.00	0.60	0.61
Waits & take turns - skill 3	1.24	2.56	1.00	3.00	0.56	0.73
Self-management - skill 4	1.29	3.00	1.00	3.00	0.85	0.84
Attends to lesson - skill 5	2.29	3.52	2.00	4.00	1.01	1.08
Follows direction - skill 6	1.50	3.23	1.00	3.00	0.67	0.60
Motivation participate - skill 7	1.24	3.06	1.00	3.00	0.56	1.14
Imitates *Peer* - skill 8	1.21	2.43	1.00	2.00	0.43	0.51
Greets or initiates - skill 9	1.18	2.79	1.00	3.00	0.67	0.69
Appropriate language - skill 10	1.15	3.00	1.00	3.00	0.55	1.15

Note. The Table above presents the mean, median, and standard deviation for the pre and post test scores for Student 10 Skills in 2010. The mean represents the average score for each skill, the median is the middle score when the scores are arranged in order, and the standard deviation indicates how much the scores vary from the mean.

Table 5

2010 Percentage change from pre-test to post-test 10-skill Assessment of Autistic Students

Skill Type	Pre-Test Total Score	Post-Test Total Score	% Change
Play Using a Variety Toys - Skill 1	24	44	83%
Reciprocal Play - Skill 2	34	77	126%
Waits & Take Turns - Skill 3	21	41	95%
Self-Management - Skill 4	27	63	133%
Attends To Lesson - Skill 5	48	74	54%
Follows Direction - Skill 6	18	42	133%
Motivation Participate - Skill 7	21	52	148%
Imitates Peer - Skill 8	17	34	100%
Greets Or Initiates - Skill 9	40	95	138%
Appropriate Language - Skill 10	15	39	160%

Note. The Table above shows the total score for each skill in the 2010 school year. The percentage change represents the improvement from the pre to posttest.

Table 6

Social Validity Results

Year of Study	2009	2010	2021
Students	93	87	93
Peers	92	92	93
Adults	93	95	94
Parents	89		95
Avg. Agreement	**92**	**91**	**94**

Note. The Table shows the average ratings on exit surveys of the Peer P.A.L.S. Program by social validity groups (Students in Pre-K, K-2, and 3-5 and peers and adults) in 2009, 2010, and 2021. The average score from the group is reported on a scale of 0 to 100, with higher scores indicating higher levels of social validity. Average scores from participant groups range from 87 to 96. All participant groups averaged 91-95 percent in agreement with the survey questions.

Table 7

Year of Study	2009	2010	2021	Average
Implementation Fidelity	89	93	95	**92.333**
Interrater Reliability	90	90	95	**91.667**

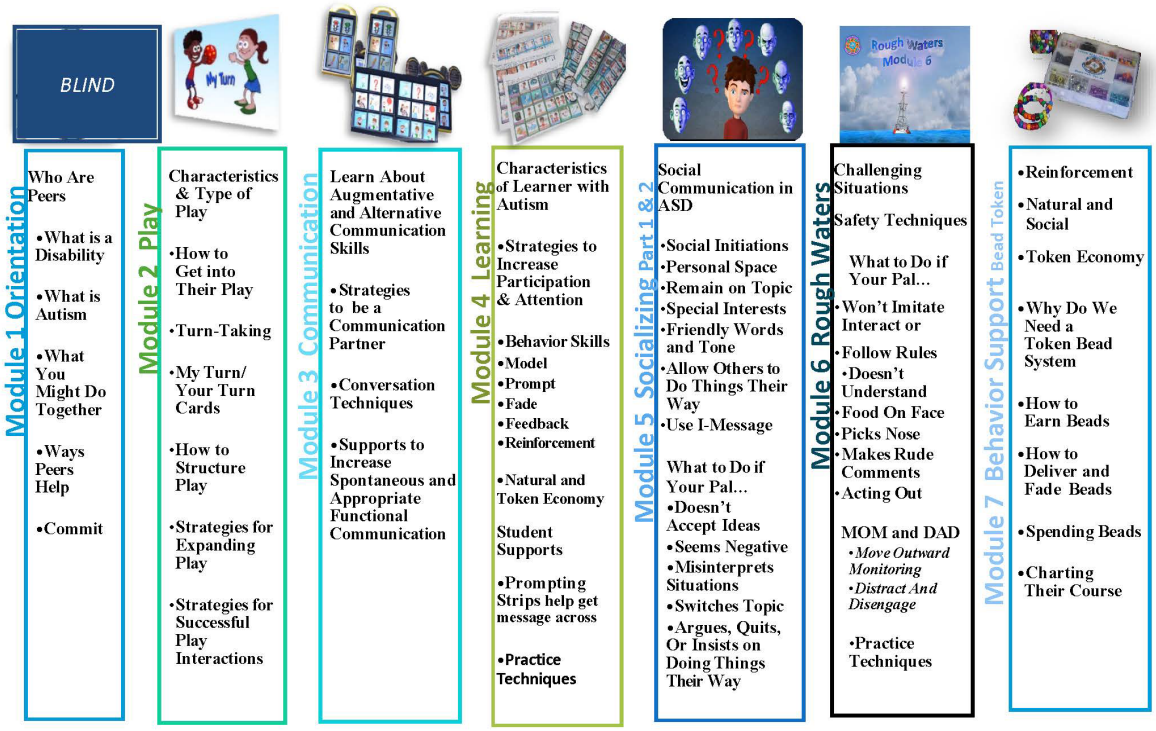
Implementation of Fidelity and Interrater Reliability Results for the Peer P.A.L.S. Program

Note. Implementation Fidelity – This measure reflects the extent to which the program was implemented as intended. Interrater Reliability – This measure reflects the consistency in ratings between different observers. A high score indicates good agreement between observers.

Figures

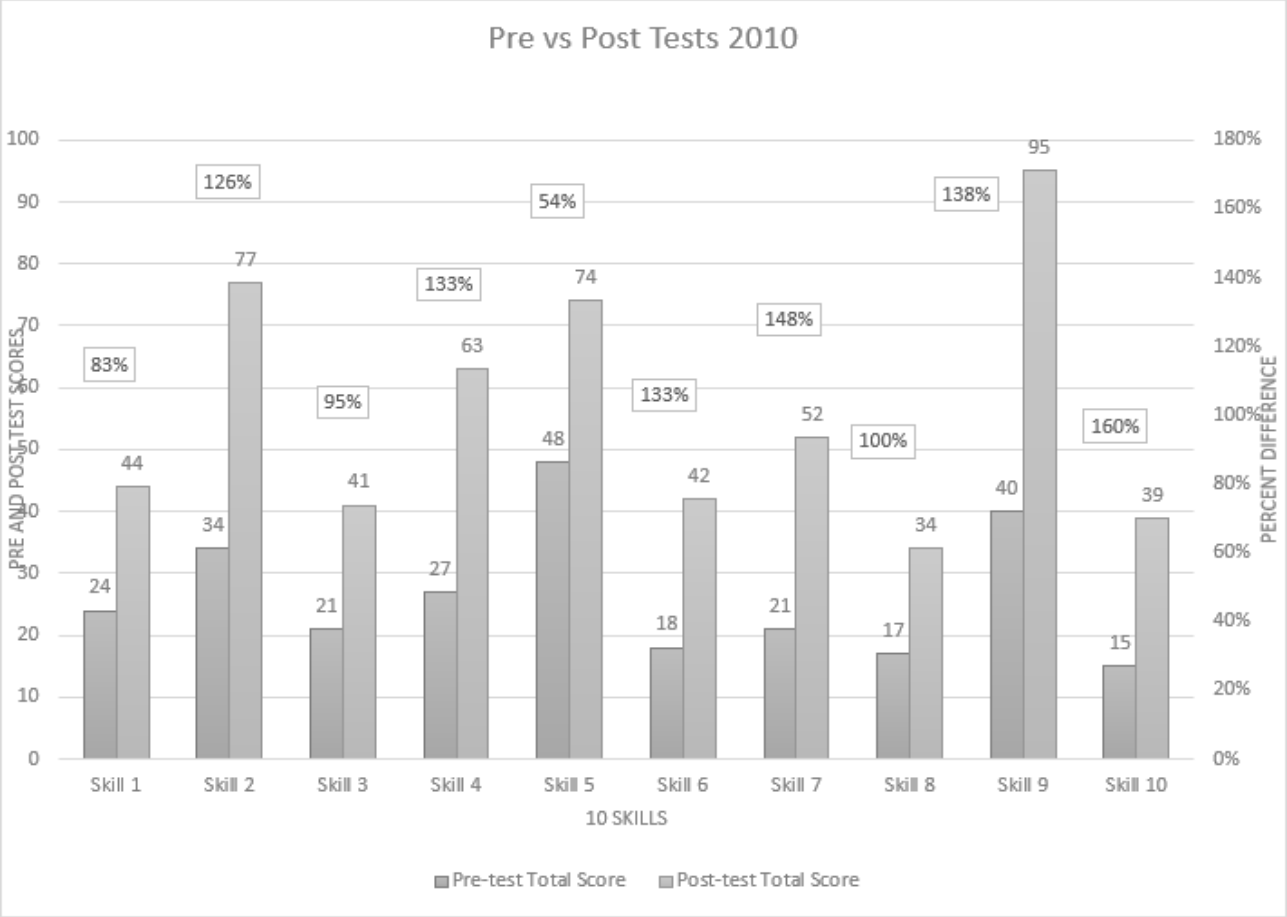
[Figure 1 top]

Training Module Descriptions



[Figure 2]

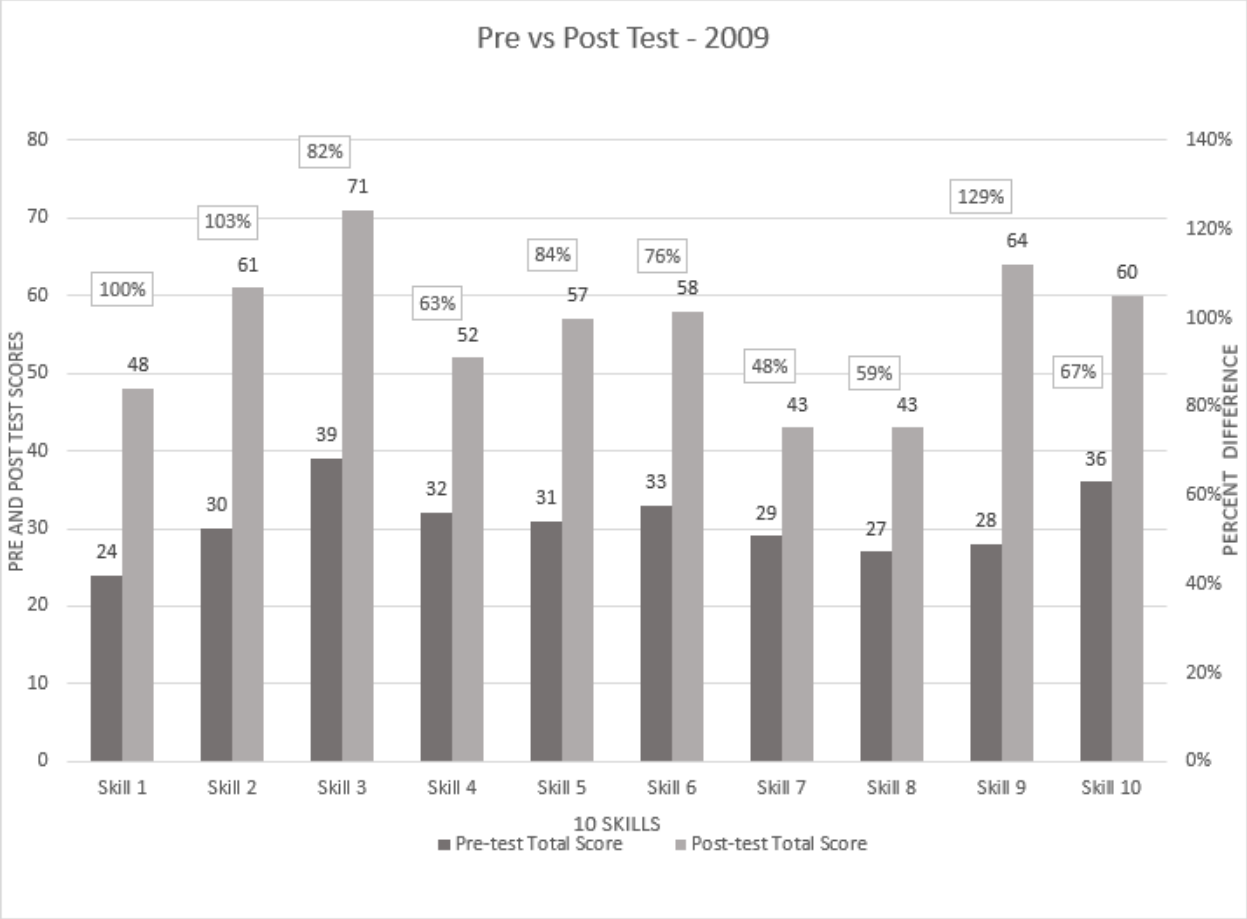
2010 – Skills Percentage Difference - Pre vs. Post Results



Note. The bar chart shows the pretest and posttest scores for 10 different skills. The data for this chart were collected during 2010.

[Figure 3 top]

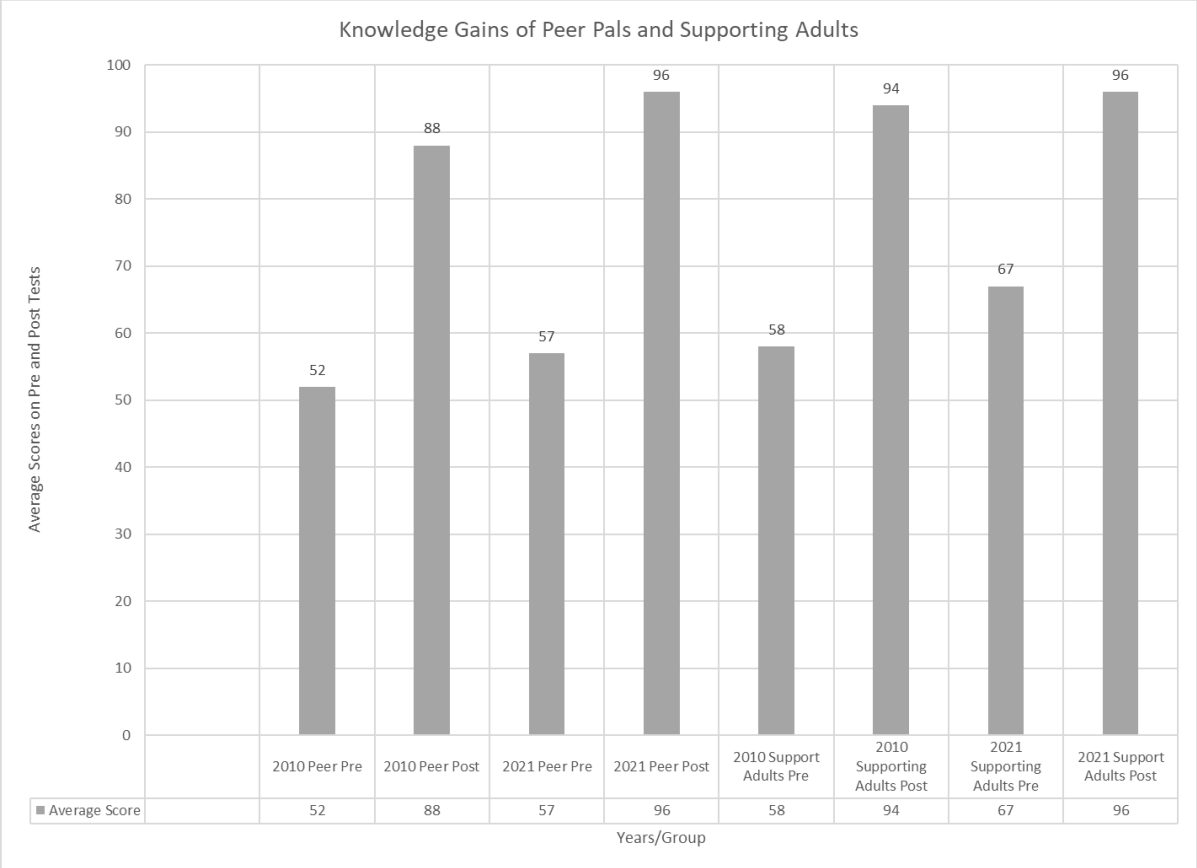
2009 – Skills Percentage Difference - Pre vs. Post Results



Note. The bar chart shows the pretest and posttest scores for 10 different skills. The data for this chart were collected during 2009.

[Figure 4 top]

Analysis of Pretest and Post Assessments for Peers and Supporting Adults



Note. The bar chart shows the pretest and posttest scores for Peers & Supporting Adult Staff. The data for this chart were collected *during* 2010 and 2021.

Appendix A

Fidelity Checklist

The checklist below is a self-evaluation that the staff checks weekly. This checklist will remind you of the program procedures to ensure your students and peers are successful.

Description of PEER Components **Date: Completed by:**	**In Place Consistently 5.5**	**Somewhat In Place 3.5**	**Not In Place**	**N A**
ROUTINE TASKS				
Did I remember attendance, lunch count, backpack check, homework/home notes (Thursday)				
Did I get my supplies for the day and return materials				
GENERAL TEACHING STRATEGIES				
1. The instruction is clear, appropriate to the task, uninterrupted				
2. The child is attending to the PEER, facilitator or task				
3. Multiple cues presented & pointed out for the child's level				
4. The child is given a key role in choosing the stimulus item(s)				
5. Peers are prompted and given a major interaction role with students				
6. Prompting ALWAYS given in close proximity to student (attention gained first)				
7. *Survival Kit items and* visual supports, *encouraged, prompted, used*				
STRUCTURED SUPPORTS				
8. Timer & structured supports used consistently with younger children				
9. Uses schedule, 1st/Then board or other visuals to prompt when needed				
10. Staff guides students as they rotate to next area or through routines (as needed to prevent roaming/going to the wrong center or making errors)				
11. If student leaves designated area s/he is prompted/guided back to area/ then reminded to listen/wait for timer or teacher (inform student how much time is left and what will be next). Staff remain in proximity or alter activity to motivate				
12. Self-management strategies are reviewed and practiced until students show mastery of the technique.				
REINFORCEMENT				
13. Token economy for students used consistently throughout the day with bead breaks				
14. Beads given contingent on responses & attempts (successive approximations)				
15. Specific praise is given with bead, so student knows what behaviors to repeat				
16. Uses variety of reinforcers (natural, primary, activities, sensory, tangible) to ensure the reinforcer is powerful enough to promote positive behavior				
DATA COLLECTION				
17. Data is collected on required dates & entered, assistance is requested if needed				
18. Paperwork and Data is turned in				
COLUMN TOTALS **# Total in place/implemented consistently 18**				

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Appendix B

10-Skill Assessment Rating

10 - SKILL ASSESSMENT RATING SCALE

PLAY			BEHAVIOR	LEARNING			SOCIAL INTERACTION			AAC
USE VARIETY OF TOYS/ THEMES USE OF OBJECTS As opposed to isolated play, restricted or repetitive themes or nonfunctional self-stimulation with objects or toys Example: only plays with trains, does not expand play	**RECIPROCAL PLAY** Responds to peers and appears to enjoy play with others If child has few friends, determine if it is due to difficulty performing and knowing the skills. Older child may only play video games, read or draw by self vs. social play	**WAITS and TAKE TURNS** Allows others to take turns and waits patiently, knows to pass objects and take turns (does not grab toys, objects, video game controller, passes ball to other players, does not tantrum or whine for turn)	**SELF-MANAGE** Maintains self control, remains calm or uses a strategy or item to cope with anger, disappointment, or frustration Examples: Counting, positive self talk, turtle technique, take a break, get adult to help, blow out candle, breathing, relaxation, safe space, use survivor kit items	**ATTEND TO LESSON** Rate how well the student attends to Peers play, lessons and social activities	**FOLLOWS DIRECTION** Rate student's compliance during Peer lessons and activities	**MOTIVATION PARTICIPATES IN LESSONS and ACTIVITIES** Rate during Peer lessons/activities. Is student motivated to participate/respond? Increase in motivation measured as increased responsiveness to social / environmental stimuli, increased number of student responses, decrease in time to respond, increased interest or enjoyment	**IMITATES PEER MODELS** When directed, or requested, rate how well student imitates peer to learn new skills, improve existing ones,	**GREETS INITIATES INTERACTIONS TO JOIN-IN ACTIVITY OR SOCIAL GROUP** Approaches and faces peer, makes eye contact communicates using verbal and/ or non-verbal communication to initiate or request to join-in an existing activity or group	**SOCIALLY APPROPRIATE LANGUAGE and ACTIONS** During social interaction with peer, student faces peer, gives eye contact, appropriate distance/ personal space, listens/ shows interest in partners conversation, takes turns in conversation, does not dominate or use restricted topics/interests Accepts limits or topic change by peer.	**COMMUNICATES USING FUNCTIONAL FORM of COMMUNICATION** includes AUGMENTATIVE ALTERNATIVE COMMUNICATION (AAC) i.e., PECS, AAC voice output devices, American Sign Language (ASL) communication boards, eye gaze and visual supports. Makes eye contact, but may not hold it.
SKILL RATING										
Skill 1	**Skill 2**	**Skill 3**	**Skill 4**	**Skill 5**	**Skill 6**	**Skill 7**	**Skill 8**	**Skill 9**	**Skill 10**	**Skill 10 A**
0=restricted/ nonfunctional or isolated play 1=requires adult/or peer pal support throughout **Plays with a variety of toys and varies the themes** 2=25-49% of time 3=50-74% of time 4=75-89% of time 5=90-100%	0=no reciprocal play or doesn't appear to enjoy play with peer 1=requires adult support throughout **Reciprocates in play** 2=25-49% 3=50-74% 4=75-89% 5=90-100%	0=grabs or doesn't take turns 1=requires adult/or peer support throughout **Waits and takes turns fairly independently** 2=25-49% 3=50-74% 4=75-89% 5=90-100%	0=challenging behavior or does not remain calm 1=requires adult/or peer support **Maintains self-control** 2=25-49% of time 3=50-74% of time 4=75-89% of time 5=90-100%	0=does not attend for most of activity 1=requires adult/peer support throughout **Attends with some prompts/support** 2= 25-49% 3=50-74% 4= 75-89% with minimal prompts 5=90-100% fairly independently to independent	0=doesn't follow directions for most of activity 1=requires adult/ peer pal support throughout **Follows directions for lesson/activities with some prompts/supports** 2=25-49% 3= 50-74% 4=75-89% with minimal prompts 5= 90-100% fairly independently to independent	0=doesn't appear motivated or participate in most of the activity 1=requires adult/or peer throughoutt **Participates during lesson or activity with some prompts** 2= 25-49% 3=50-74% 4=75-89% with minimal prompts 5= 90-100% fairly independently to independent	0= doesn't imitate 1=requires adult/ peer support throughout **Imitates with some prompts** 2=25-49% of opportunities 3=50-74% 4=50-89% with minimal prompts 5= 90-100% fairly independently to independent	0=doesn't greet , initiate interactions, or join in activity or group 1= requires peer or adult support throughout --- **Greets or initiates interactions to join in existing activity or group** with some prompts 2=25-49% 3= 50-74% 4=75-89% with minimal prompts 5=90-100% fairly independently to independent	0= **doesn't use appropriate language or actions with peers** 1= requires adult/or peer support throughout **Uses appropriate language or actions given opportunity with some prompts** 2=25-49% 3=50-74% 4= 75-89% with minimal prompts 5=90-100% fairly independently or sounds appropriate most of the time	0=no functional communication and or resists use of AAC 1= begins to use AAC, requires adult/or peer assist throughout --- **Uses AAC/ functional communication given opportunity with some prompts** 2=25-49% 3=50-74% 4=75-89% with minimal prompts 5=90-100% fairly independently to independent

Appendix C

Data Collection Form

If implementing as a summer, one-semester, or short course of intervention choose fewer skills for assessment and progress monitoring. Highlight skills chosen.

Student: _____ DATE OF BASELINE (B) _____ DATE OF PROGRESS MONITORING (P) _____ DATE OF COMPLETION OF PROGRAM (C)

In the boxes below, rate the learner by placing a hash mark (/) over the number 0-5. The 1st column in each skill is baseline **(B)**, the 2nd is progress monitoring **(P)**, the 3rd is completion of program **(C)**.

VARIETY & USE PLAY Skill 1 Beads Multicolor/Silver	RECIPROCAL PLAY Skill 2 Beads Multicolor/Silver	WAIT &TAKE TURNS PLAY Skill 3 Beads Multicolor/Silver	SELF MANAGES Skill 4 Gold Beads	ATTENTION TO TASK Skill 5 Black Beads	FOLLOW DIRECTIONS Skill 6 Black Beads	MOTIVATION PARTICIPATES IN TASK Skill 7 Black Beads	IMITATE PEER MODELS Skill 8 Beads Multicolor/Silver	GREET/INITIATE JOIN IN W/PEERS Skill 9 Multicolor/Silver	SOCIALLY APPROPRIATE LANGUAGE/ACTION OR AAC Communication ☐Skill 10 or ☐Skill 10A Multicolor/Silver
0 1 2 3 4 5 B	0 1 2 3 4 5 P	0 1 2 3 4 5 C							

At random,(about every 15-20 minutes) totaling 20 times throughout day say, "Are You Paying Attention?"
Put a (+) if learner is paying attention at that moment in time or (–) if not for each of the 20 boxes.

Progress + + - + + + + + + + + + - + + +

TOTAL (+) 13 OUT OF 20 13/20 =.65 x 100= 65%
Formula: Divide total (+) by total boxes x 100 to get %

On-task (+) or(-)	Baseline		TOTAL (+)	OUT OF = %
On-task (+) or(-)	Progress		TOTAL (+)	OUT OF = %
On-task (+) or(-)	Completion		TOTAL (+)	OUT OF = %

Student: _____ DATE OF BASELINE (B) _____ DATE OF PROGRESS MONITORING (P) _____ DATE OF COMPLETION OF PROGRAM (C)

In the boxes below, rate the learner by placing a hash mark (/) over the number 0-5. The 1st column in each skill is baseline **(B)**, the 2nd is progress monitoring **(P)**, the 3rd is completion of program **(C)**.

VARIETY & USE PLAY Skill 1 Beads Multicolor/Silver	RECIPROCAL PLAY Skill 2 Beads Multicolor/Silver	WAIT &TAKE TURNS PLAY Skill 3 Beads Multicolor/Silver	SELF MANAGES Skill 4 Gold Beads	ATTENTION TO TASK Skill 5 Black Beads	FOLLOW DIRECTIONS Skill 6 Black Beads	MOTIVATION PARTICIPATES IN TASK Skill 7 Black Beads	IMITATE PEER MODELS Skill 8 Beads Multicolor/Silver	GREET/INITIATE JOIN IN W/PEERS Skill 9 Multicolor/Silver	SOCIALLY APPROPRIATE LANGUAGE/ACTION OR AAC Communication ☐Skill 10 or ☐Skill 10A Multicolor/Silver
0 1 2 3 4 5 B	0 1 2 3 4 5 P	0 1 2 3 4 5 C							

On-task (+) or(-)	Baseline		TOTAL (+)	OUT OF = %
On-task (+) or(-)	Progress		TOTAL (+)	OUT OF = %
On-task (+) or(-)	Completion		TOTAL (+)	OUT OF = %

Student: _____ DATE OF BASELINE (B) _____ DATE OF PROGRESS MONITORING (P) _____ DATE OF COMPLETION OF PROGRAM (C)

In the boxes below, rate the learner by placing a hash mark (/) over the number 0-5. The 1st column in each skill is baseline **(B)**, the 2nd is progress monitoring **(P)**, the 3rd is completion of program **(C)**.

VARIETY & USE PLAY Skill 1 Beads Multicolor/Silver	RECIPROCAL PLAY Skill 2 Beads Multicolor/Silver	WAIT &TAKE TURNS PLAY Skill 3 Beads Multicolor/Silver	SELF MANAGES Skill 4 Gold Beads	ATTENTION TO TASK Skill 5 Black Beads	FOLLOW DIRECTIONS Skill 6 Black Beads	MOTIVATION PARTICIPATES IN TASK Skill 7 Black Beads	IMITATE PEER MODELS Skill 8 Beads Multicolor/Silver	GREET/INITIATE JOIN IN W/PEERS Skill 9 Multicolor/Silver	SOCIALLY APPROPRIATE LANGUAGE/ACTION OR AAC Communication ☐Skill 10 or ☐Skill 10A Multicolor/Silver
0 1 2 3 4 5 B	0 1 2 3 4 5 P	0 1 2 3 4 5 C							

On-task (+) or(-)	Baseline		TOTAL (+)	OUT OF = %
On-task (+) or(-)	Progress		TOTAL (+)	OUT OF = %
On-task (+) or(-)	Completion		TOTAL (+)	OUT OF = %