

Pattern Language: Identification of design opportunities for the child with Autism Spectrum Disorder (ASD) to develop his/her social skills.

THESIS

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By

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Abstract

Children with ASDs (Autism Spectrum Disorders) have different cognitive disorders.

Social interaction is the most discussed area that they fail to establish and develop. Social skills help the child to establish his/her social interaction.

This research proposes a set of patterns. In these patterns situation (problems and context) and design opportunities (solutions) of social skills for the children with ASD at the early ages will be discussed. These social skills and related issues are discussed in the proposed patterns: communication of needs and ideas, joint attention, entry/approach skills, eye contact, maintenance skills, play, social interaction, and emotional expression.

Pattern language – uniform structure and format – was developed based on the literature review, informal observations and industrial design perspective on the issue; these patterns helped to present the problems and solutions of the social skills. First drafts of the patterns were discussed in sessions with parents and instructors of children with ASDs. Eight revised patterns are the final outcome of this research project to be used by the parents of children with ASDs, as well as by designers and experts or therapists who are involved in area of working with the children ASDs.

Dedication

This document is dedicated to
the families of the children with Autism Spectrum Disorders.

Acknowledgments

This research project would not have been possible without the support of many people. I wish to express my gratitude to my supervisor, Dr. Chan who was abundantly helpful and offered invaluable assistance, support and guidance. Deepest gratitude is also due to the members of the supervisory committee, Dr. Sanders and Dr. Case-Smith, without their knowledge and assistance, this study would not have been successful.

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Table of Contents

Abstract	ii
Dedication	iii
Acknowledgments	iv
Vita	v
List of Figures	viii
Introduction	1
Chapter 1: Autism Spectrum Disorders	3
Chapter 2: Pattern Language	5
Chapter 3: Identification and Framework of Design Opportunities	9
3.1 Objectives	11
3.2 Target Users	12
3.3 Methods	12
3.3.1 Summary of Literature Review: Case Studies	13
3.3.2 Informal Observation	20

3.3.3 Discussion Sessions.....	23
3.3.3.1 Participants	23
3.3.3.2 Patterns Sheets	24
3.3.3.3 Discussion Sessions Guideline	34
3.3.3.4 Results	35
3.3.3.5 Social Skills Guidelines for Children with ASDs	41
Chapter 4: Proposed Patterns	46
Chapter 5: Conclusion	74
References	77
Appendix A: Annotated Bibliography.....	80
Appendix B: Discussion Session 1 Transcript, Participant X1.....	87
Appendix C: Discussion Session 2 Transcript, Participant X2.....	102
Appendix D: Discussion Session 3 Transcript, Participant X3 and X4	113
Appendix E: Discussion Session 4 Transcript, Participant X5	135
Appendix F: Discussion Session 4 Transcript, Participant X6	143

List of Figures

Figure 1. Conceptual framework of design issues around social interaction	9
Figure 2. Place of autism in developmental disabilities	14
Figure 3. Prototype of the chair (Case Study 1).....	18
Figure 4. Children can link blocks (Case Study 2).....	20
Figure 5. Patterns hierarchal mutual inter-relationships	25
Figure 6. “Multi-sensorial toy animals” idea	50
Figure 7. “Ball” idea	53
Figure 8. “Greeting hats” idea.....	57
Figure 9. “Set of birds” idea.....	60
Figure 10. “Eye cards” idea	61
Figure 11. “Face stickers” idea	64
Figure 12. “Box of play” idea	67
Figure 13. “Scenario based solutions” idea	70
Figure 14. “Peek-a-boo package” idea	73

Introduction

Children with ASDs (Autism Spectrum Disorders) have different cognitive disorders.

Social interaction is the most discussed area that they fail to establish and develop. Social skills help the child to establish his/her social interaction.

Enhancement and improvement of existing instructional tools, methods and techniques being used to teach social skills to the children with ASDs can help to provide effective early childhood intervention. Enhanced instructional tools can help children with ASDs to learn social skills that could help them with their social interaction with parents, friends and instructors in their future social lives. Providing enhanced instructional tools could help to save the cost and time invested by the educational systems and the parents of the children with ASDs.

The research proposed is qualitative and exploratory. A literature review and informal observations helped to establish the first draft of patterns that were used for the discussion sessions. Pattern language is a structured method of describing good design practices within a field of expertise. People of ordinary intelligence can use this design approach to successfully solve very large, complex design problems (for this research, identification of design opportunities that could help parents and instructors to teach social skills to the children with ASDs). Eight patterns were identified and developed consisting of problems and solutions for each of five social skills and three related issues.

A social skill is any skill facilitating interaction and communication with others¹. In this research five basic social skills and three related issues are considered. These five skills and three related issues are critical for the child with ASD to establish his/her social skills. The social skills are communication of needs and ideas, entry/approach skills, joint attention, eye contact and maintenance skills. And the three related areas are social interaction, emotional expression and play. All these eight social skills and related issues have been considered through the industrial design perspective (creating design opportunities) and within the pattern language structure.

Discussion sessions – conducted in five sessions with six participants – helped to refine and redefine some of the design opportunities and situations in the patterns. Eight proposed patterns – along with recommendations and guidelines – are the final outcome of the research.

¹ National Association of School Psychologists,
http://www.nasponline.org/resources/factsheets/socialskills_fs.aspx

Chapter 1: Autism Spectrum Disorders

Autism Spectrum Disorders (ASDs) are characterized by impaired social interaction and communication, and by restricted and repetitive behavior. In U.S. 1 percent of the children ages 3-17 have ASD. It is the fastest-growing developmental disability with about 1% growth rate and 10 - 17 % annual growth. There is \$60 billion annual cost with 60% of costs in adult services². Failure to establish typical social interactions is one of the major issues for children with ASDs at early ages. Different elements of qualitative impairment in social interaction are considered as diagnostic criteria for autistic disorder (Shapiro & Accardo, 2008, p.3):

- a. Marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.
- b. Failure to develop peer relationships appropriate to developmental level.
- c. A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., a lack of showing, bringing, or pointing out objects of interest).
- d. A lack of social or emotional reciprocity. Children with ASDs have pervasive disability to establish and maintain age-typical relationships, particularly with peers preventing successful social engagement (Shapiro & Accardo, 2008, p.139).

² Pediatrics, October 5, 2009, based on a National Children's Health Survey done with 78,000 parents in 2007.

Two of the main characteristics of Autism Spectrum Disorders are:

1. Delayed or impaired social skills.
2. Impairment in functional communication.

Within the domain of socialization, behaviors of interest include a lack of peer relationships; impairments in nonverbal behaviors to communicate and regulate social interaction, such as the use of eye contact and facial expression; impaired shared attention with others. (Shapiro & Accardo, 2008, p.191).

Chapter 2: Pattern Language

In the first volume of his central work, *The Timeless Way of Building* (Alexander, 1979), architect Christopher Alexander argues that buildings and towns that people enjoy living in have a certain, timeless “quality without a name” that cannot be reduced to a single dimension. Instead, he proposed that the design of these environments has succeeded in supporting the “patterns of events” that frequently happen there, by implementing a number of according geometric patterns, or relationships between their spatial constituents (Borchers, 2001, p. 11). This is how the very first pattern language was established.

The elements of this language are entities called “patterns”. Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice (Alexander, 1977, p. x).

These patterns generally solve a problem of conflicting “forces” or interests. Of course these can also be of a social, economic, natural and physical nature.

To recreate knowledge of appropriate and good design solutions for buildings, towns, and construction, Alexander describes how these patterns can be made explicit, tested and gradually improved. The goal is to re-enable the inhabitants of buildings and towns to participate in the design of their environments.

This is strikingly similar to the idea of participatory design, which aims to actively involve end users in the design process.

Patterns are not isolated: they refer to the other, smaller scale patterns for the solution they describe, and they can only be used in a certain type of context, which is the result of applying larger-scale patterns. This structure links patterns together to form a hierarchal pattern language for the design of a certain building, and further to a language for the design of a whole town.

When this pattern language is shared and used by a whole community, suitable patterns can be applied at all levels of design, from town planning to a rebuilding of a single room in a building. Alexander considers design and building not a process in which performed parts are combined but rather an unfolding process in which space is differentiated to create a complex solution.

By applying a sequence of such patterns, entire buildings and towns are gradually created. They are iteratively magnified, fixed, and improved (Borchers, 2001, p. 11-12).

A central property of patterns is their uniform structure and format. Each of Alexander's patterns consists of the same types of components, presented in the same sequence and form:

- The *name* of the pattern,

- A *ranking* of its validity,
- A *picture* as an example of its application,
- The *context* in which it is to be used,
- A short *problem statement*
- A more detailed *problem description* with empirical background,
- The central *solution* of the pattern,
- A *diagram* illustrating the solution,
- And finally *references* to smaller patterns.

Name, ranking, and context create the introductory part of each pattern. Problem statement, problem description, solution and diagram form its central part, and the references are the closing part. These major parts of each pattern are divided by line of three asterisks (Borchers, 2001, p. 18).

According to cognitive theory, patterns might be a particularly effective way to organize complex information (Barsalou, 1992). Patterns in a broader sense can be found in architecture, organizational behavior, history of science and even basic text writing (Borchers, 2001, p. 44). Several others have noticed the potential of pattern languages for interdisciplinary design. Denning and Dargen (1996), for example, suggest a technique called Pattern Mappings as a basis for cross-disciplinary software design. Granlund and Lafreniere (1999b) use patterns to describe business domains, processes, and tasks.

For this research, ranking of the patterns and “reference” section of the Alexander’s patterns were not used because the proposed patterns were closely inter-related and of the same importance. And also, proposed patterns are not final and they can be improved and

enhanced over. Different sections of each proposed pattern are titled with the names of “patterns relationships”, “situation”, and “design opportunities” for the better communication and understanding of the patterns.

Chapter 3: Identification and Framework of Design Opportunities:

Patterns for the Social Skills of Children with ASDs

This research intends to provide a new perspective on defining, analyzing, and refining existing problems in and developing solutions for the social skills of the children with ASDs. Industrial design perspective could provide opportunities for the parents and instructors of the children with ASDs to challenge the existing issues related to the social skills.

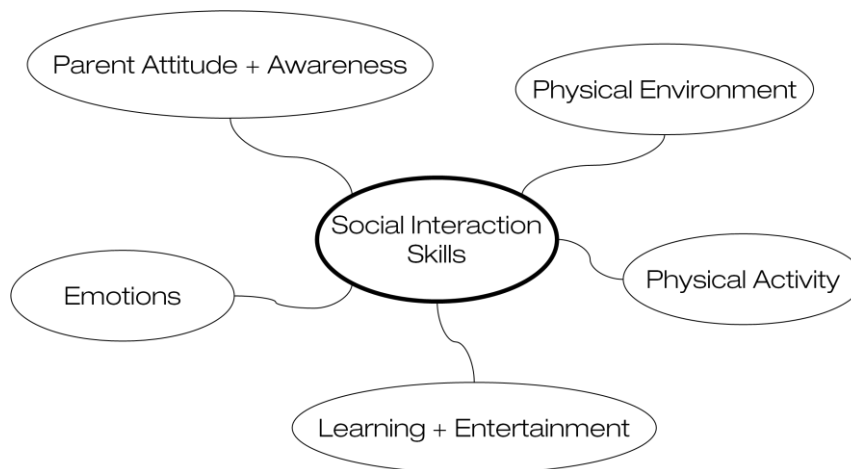


Figure 1. Conceptual framework of design issues around social interaction

The conception of a design is not simply a representation in visual form of predetermined values, but a creative, catalytic process in which external factors interact with the beliefs, talents and skills of individual designers or design-groups. The influence of external factors is generally greatest in establishing parameters for the utilitarian function of design – that is, the criteria by which it will be judged suitable for an intended working purpose. Individual creativity is predominant in determining the extent to which the resulting form offers aesthetic experience and has a psychological or symbolic function (Heskett, 1984, p. 8). As Heskett states in his book, industrial design results in creative solutions for the psychological or symbolic functions. When practiced with a participatory mindset, industrial design can provide a different perspective allowing parents and instructors or therapists and experts to communicate issues and potential solutions around social skills for children with ASDs, with each other and with parents of the children.

In this study, pattern language helped to structure ideas around social skills. It helped to organize and prioritize ideas for each social skill and three other related issues. It provided steps of the process from problem to the solution: title, problem description, solutions and relationships of the whole process (each pattern) to the others.

It also helped in analysis and organization of complicated inter-relationships between the social skills and related issues. For example, “eye contact” skill is important to “joint attention” and play can be a joyful experience for the child while he/she is learning the skills.

Pattern language helped the parents and instructors to communicate ideas, solutions, and problems in social skills in children with ASDs. The Patterns were used in the discussion sessions (3.3.3.2 Patterns Sheets) with the parents and instructors and were helpful in allowing the participants to more readily contribute ideas and identify issues. Participants could clearly understand what was meant by each social skill, what problems exist and what potential solutions were indicated. The pattern structure was clear enough that it helped to have more focused conversations with the participants and they provided valuable information for the research in short discussion sessions.

In the following sections objectives of the research, target users and methods used in the research will be discussed more in detail.

3.1 Objectives

The intention of this study was to discover what problems exist for the children with ASD when they are learning social skills; and what needs and ideas parents and instructors have teaching those social skills to the children with ASDs. Identification of these problems was the first goal leading to the identification of design opportunities. Identification of design opportunities followed by understanding and suggesting how form, color, and the function of tools, toys and devices used in ASD interventions, could be enhanced and supported with more visually motivating and interesting ideas. Communication of these ideas was a challenge. Unique form and structure of the pattern language helped me to reach the format that could communicate ideas, problems and solutions with parents and instructors. At one level, patterns were used with parents and

instructors to discuss social skills issues. Later the patterns were revised and refined as for the final outcome of this study meeting all three of the following objectives.

1. Identify design opportunities that could help parents and instructors to teach social skills to the children with ASDs.
2. Suggest complementary and supportive “design opportunities” from the industrial design perspective, and provide possible design tool for industrial designer who would be interested in this subject.
3. Communicate of “design opportunities” and “situations” for teaching social skills to the children with ASDs by the help of pattern language structure.

3.2 Target Users

Parents/caregivers, instructors, therapists and experts are the target users; and generally those who are involved in the area of teaching social skills for children with ASDs could benefit from using the outcome of this research (such as designers). The final product of this research is set of eight patterns – five social skills and three related areas – that could be used by the target users.

Social skills discussed in the patterns are for the children with ASD at the early ages.

3.3 Methods

I have used different sources of information for the literature review that will be presented in the appendix A. The literature review helped me better understand the topic of “autism”, the learning contexts for the children with ASDs, and existing ASD projects.

I have also conducted several informal observations in the special classes at Nisonger Center at The Ohio State University. Those observations helped me to have a better understanding of the children with autism in real life while interacting with instructors and the peers in the class. Unobtrusive observation was used, i.e., method for studying behavior in which individuals do not know they are being observed³. These informal observations were complemented with discussions with instructors of the classes. Discussion sessions with parents and instructors of children with ASDs were the main method used for this research and are presented later in this section.

3.3.1 Summary of Literature Review: Case Studies

Autism

How common is autism?

Before 1985, population-based samples estimated the prevalence of ASDs at 4-5/10,000.

Over the past 25 years, estimates have increased and are currently in the area of 34-67/10,000. The cause of this increase has been controversial and has raised many important questions. Whatever the cause, there has clearly been an increase in the number of children who qualify for services under the category of autism (Shapiro & Accardo, 2008, p.23)

³ <http://www.socialresearchmethods.net/tutorial/Brown/lauratp.htm>

Place of autism in developmental disabilities (Shapiro & Accardo, 2008, p.22):

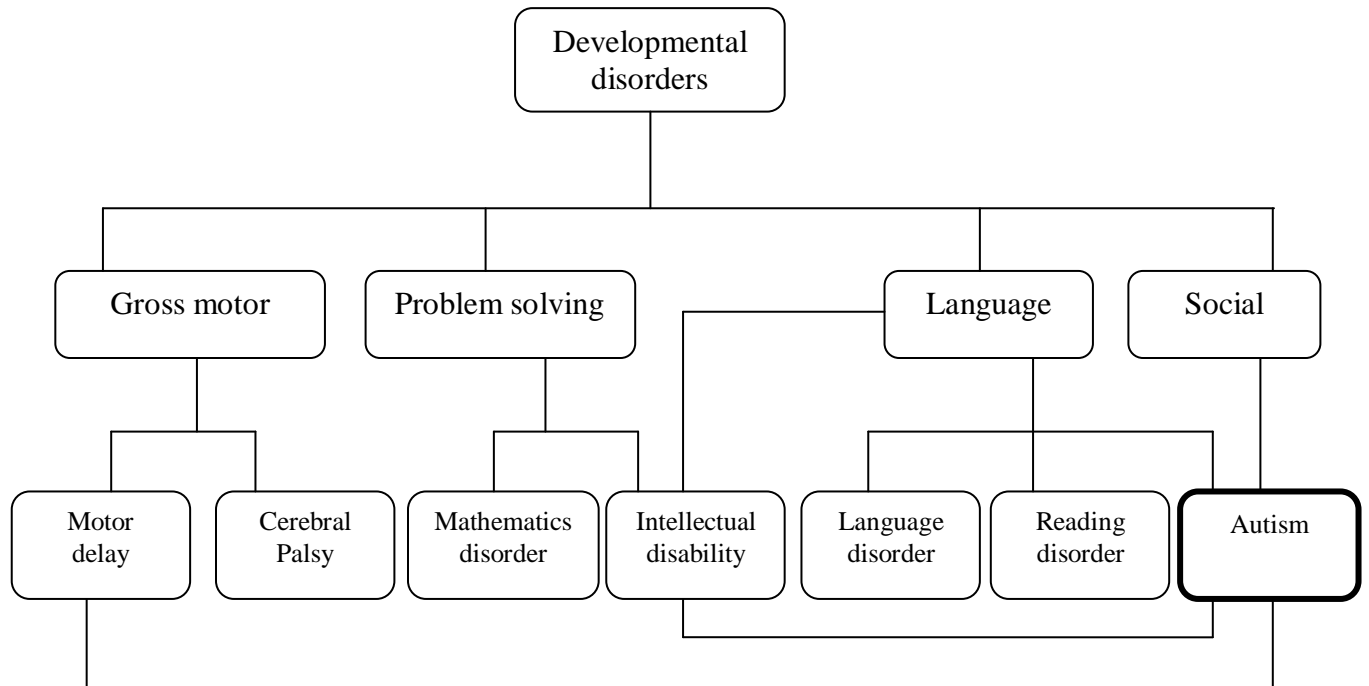


Figure 2. Place of autism in developmental disabilities, 2006. (Note: All disorders are more interrelated. Autism is considered primarily related to both language and social streams of development with lesser connection to cognitive and motor disorders.)

Social Stories

Several researchers have begun to evaluate the effects of using Social Stories to teach social skills to children with ASDs. Gray and Garand (1993) described a Social Story as a

brief story that helps individuals understand social situations by describing a situation and teaching the desired responses. Gray (2000) identified the four basic types of sentences that should be included in a Social Story (Shapiro & Accardo, 2008, p.132):

- 1- Descriptive: And accurate, assumption-free statement of observable facts.
- 2- Perspective: A sentence that describes the thoughts and feelings of other people.
- 3- Affirmative: A statement that enhances the meaning of surrounding sentences and may express a commonly shared opinion.
- 4- Directive: A statement that identifies a possible response and/or gently directs behavior.

Empathic design for difficult-to-reach user

With empathy in design it is not the aim of the designer to fully understand the user, but it is an attempt ‘to achieve a greater awareness, an extended imagination and sensitivity to another person’s world in a powerful and memorable way’. Designers need to put more time and effort in this attempt, when users are very different from themselves, such as users with cognitive disabilities. Designers can get insight into the lives and experiences of these difficult-to-reach user groups in different ways. They can read literature, books, and blogs, watch documentaries and movies, and physically meet the people and their caregivers, or even become a caregiver him or herself. Caregivers, such as relatives, pedagogues, and therapists, deal with these people on a daily basis and can serve as information source for design. Along with several other authors, we believe direct contact is a valuable source when designing for these user groups, because seeing

their situation, condition, and behavior with your own eyes provides an understanding you cannot retrieve from other information sources. Experiencing their mental disorder or disability is almost impossible, but a glimpse into their context and behavior might support designers to get a feel for them. The degree of possible understanding is influenced by the individual empathic ability and willingness of the designers (Van Rijn, Helma, Froukje Sleeswijk Visser, and Pieter Jan Stappers, 2009).

Industrial Design and Autism: Case Studies

According to The International Council Societies of Industrial Design (ICSID), Industrial Design is a creative activity whose aim is to establish the multi-faceted qualities of objects, processes, services, and their systems in whole life cycles. Industrial design is an inter-disciplinary practice and the application of it can be used to improve the lives of children with ASD in different ways. Designing special complementary devices and tools could help the children with ASDs to learn language more efficiently. It could be a complementary tool for therapists, educators and parents so that they could provide a creative life for the child. Two case studies are presented on how industrial design can be used as an intervention tool for the children with autism.

Case study 1 - Sensory Integration Chair.

A team of design students at the Stanford University conducted ethnographic research over a 10-week period in the home of a girl with Autism Spectrum Disorder (ASD). The goal was to design a product that could help her cognitively, physically or emotionally. The main person for whom they were initially designing was a 9 year old girl, Alice,

who was diagnosed with severe autism. After having met Alice and her family the design team broadened their user group to include her entire family (parents and younger brother). In the initial field visit they learned that the family was planning to add an addition to their house where Alice would be given her own room (she currently shared a room with her younger brother).

As they started their user research and conducted their first in-context interviews with the family in their home, they learned that each parent had a different perspective about the needs they should address in their design. Alice experiences severe challenges cognitively, socially, and emotionally on a daily basis. Alice has a busy daily schedule with speech therapy, occupational therapy, and adaptive P.E. in addition to attending a full school day. After spending time with Alice and her family, they decided that her emotional needs would be their main focus, but that this in turn might benefit her socially and cognitively.

They brainstormed and decided to investigate ways to incorporate sensory integration ideas into a piece of furniture that Alice could go to for respite.

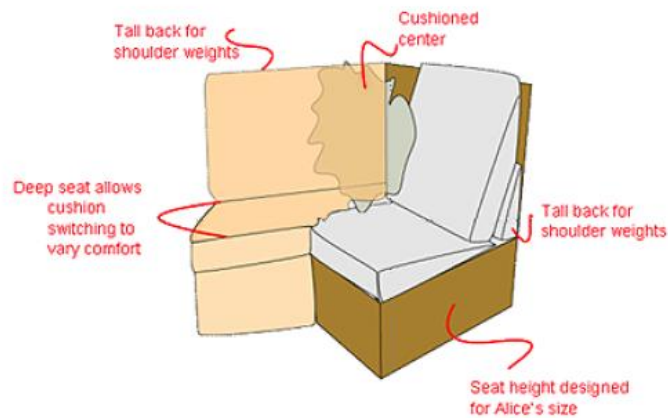


Figure 3. Prototype of the chair, including the beanbag arms tested with the child with ASD and her family.

One of the goals of the design was to allow the child and a family member to sit together in the chair. Alice enjoyed being read to by her parents when trying to calm down and it was important to include space for another person.

Case study 2 - LINKX for toddlers with ASDs

Helma Van Rijn concluded her master's degree in 'Design for Interaction' at the Technical University at Delft with research on how children with ASD can be triggered to learn new words. She explored how the children with ASDs like to play and what would be a good way for them to learn language. By means of interviewing, context-

mapping techniques and observations she gained insight in their experiential world (van Rijn and Stappers, 2007). She realized that these children have trouble with giving meanings to words. Therefore they should learn the words of physical objects around them. For these children repetition, direct feedback, and rewards are very important. They have an excellent memory and like toys which they can organize (van Rijn and Stappers, 2009).

The project resulted in the concept design LINKX. LINKX aims to teach the children with ASDs the words of objects in their own environment. This helps them learn the meaning of words. This is done by means of speech-o-grams (pictograms with speech). Parents record words inside speech-o-grams and attach them to objects before play starts. Children can link blocks to these speech-o-gram (see Figure 4). Each link results in lights that go on and a sound that is played. The sound moves into the block. Blocks and speech-o-grams can be linked over and over and this will eventually make them remember the word.



Figure 4. Children can link blocks to these speech-o-gram. Each link results in lights that go on and a sound that is played.

3.3.2 Informal Observation

I started observing children with ASDs at the special classes at The Ohio State University's Nisonger Center during the months of March, April, May and June 2011. These observations were conducted so that I could have a better understanding of the social interaction of the children with ASDs with their instructors and peers in real life and in a class setting. It helped me to observe the children in the real environment where they play and learn.

There are two types of observations within natural settings: Direct (Reactive) Observation and Unobtrusive Observation.

In direct observations, people know that you are watching them and they may react to you; and there is a concern that individuals will change their actions rather than showing you what they're really like. A long term observational study will often catch a glimpse of the natural behavior. Other problems concern the generalizability of findings. The sample of individuals may not be representative of the population or the behaviors observed are not representative of the individual.

There are two commonly used types of direct observations:

Continuous Monitoring:

Continuous monitoring (CM) involves observing a subject or subjects and recording (either manually, electronically, or both) as much of their behavior as possible.

Continuous Monitoring is often used in organizational settings, such as evaluating performance. Yet this may be problematic due to the Hawthorne Effect. The Hawthorne Effect states that workers react to the attention they are getting from the researchers and in turn, productivity increases. Observers should be aware of this reaction. Other CM research is used in education, such as watching teacher-student interactions. Also in nutrition where researchers record how much an individual eats. CM is relatively easy but a time consuming endeavor. You will be sure to acquire a lot of data.

Time Allocation:

Time Allocation (TA) involves a researcher randomly selecting a place and time and then recording what people are doing when they are first seen and before they see you. This

may sound rather bizarre but it is a useful tool when you want to find out the percent of time people are doing things (i.e. playing with their kids, working, eating, etc.). There are several sampling problems with this approach. First, in order to make generalizations about how people are spending their time the researcher needs a large representative sample. In addition, questions such as when, how often, and where should you observe are often a concern. Many researchers have overcome these problems by using non-random locations but randomly visiting them at different times.

Unobtrusive Observation:

Unobtrusive measures involve any method for studying behavior where individuals do not know they are being observed. Here, there is not the concern that the observer may change the subject's behavior. When conducting unobtrusive observations, issues of validity need to be considered. Numerous observations of a representative sample need to take place in order to generalize the findings.

There are two types of unobtrusive research measures:

Behavior Trace studies:

Behavior trace studies involve finding things people leave behind and interpreting what they mean.

Disguised Field Observations:

In Disguised field analysis the researcher pretends to join or actually is a member of a group and records data about that group. The group does not know they are being observed for research purposes (Babbie, 1992) and (Gall, 1996).

3.3.3 Discussion Sessions

Discussion sessions were conducted with 6 participants: 3 parents or caregivers, and 3 instructors in 4 weeks. Discussion sessions were 45 to 60 minutes long (depending how the session proceeded) and they were conducted in 5 sessions. In each session the social skills for the children with ASDs were discussed. Participants were presented with eight sheets (i.e. the eight patterns in draft form) and they commented on and discussed each of those sheets. The purpose of the sessions was to gather parents' and instructors' ideas about the patterns. It was also intended to have their feedback on the components (situations and design opportunities) of each pattern. As parents and instructors of the children with ASDs, these participants provided valuable information on how problems and solutions of the patterns were or were not practical and how these problems and solutions could be enhanced.

3.3.3.1 Participants

Six participants attended the sessions and they are coded as X1-X6 in the transcribed interviews (enclosed as the appendices at the end of the document). Three of the participants were parents and three of them were instructors. Some of the sessions had more than one participant and that way – for example a parent and expert/instructor – they could discuss their ideas on the pattern sheets and challenge each other's comments. In the third discussion session a parent of child with ASD attended the session with an instructor and in the fourth session a parent attended the session with her daughter (the

sister of the child with ASD). Two of the parents were also experts in the field of autism as they have been involved in training parents about autism and raising their awareness for several years. In this way they also provided valuable feedback on the ideas and design opportunities that were presented in the patterns sheets.

3.3.3.2 Patterns Sheets

The eight preliminary patterns were created based on the literature review, as well as informal observations and interviews. The following pattern sheets were presented and discussed during the discussion sessions with parents and instructors. There were eight sheets and each consisted of the “situation” or “problem description” and “design opportunities” or “solutions” for instructors, parents, and peers. It was decided to use “situation” title instead of the “problem” title in the patterns to respect parents’ concerns. And also “design opportunities” title was decided over “solutions” not to imply that the ideas presented in the patterns are final or proven solutions. Symbolic introductory pictures were used for the patterns so that the participant could easily understand the purpose of each pattern.

The term “Situation” has been used in this research to describe the problems of teaching social skills to the children with ASDs. The term “design opportunity” has been used in this research to describe solutions from the industrial design perspective that may help parents and instructors to teach social skills to the children with ASDs.

Some of the patterns are related to each other (figure 5). For example, Play pattern relates to all the social skills; there are mutual relationships between the patterns of eye contact

and joint attention; emotional expression and social interaction; mutual relationship means that they are highly connected when they happen.

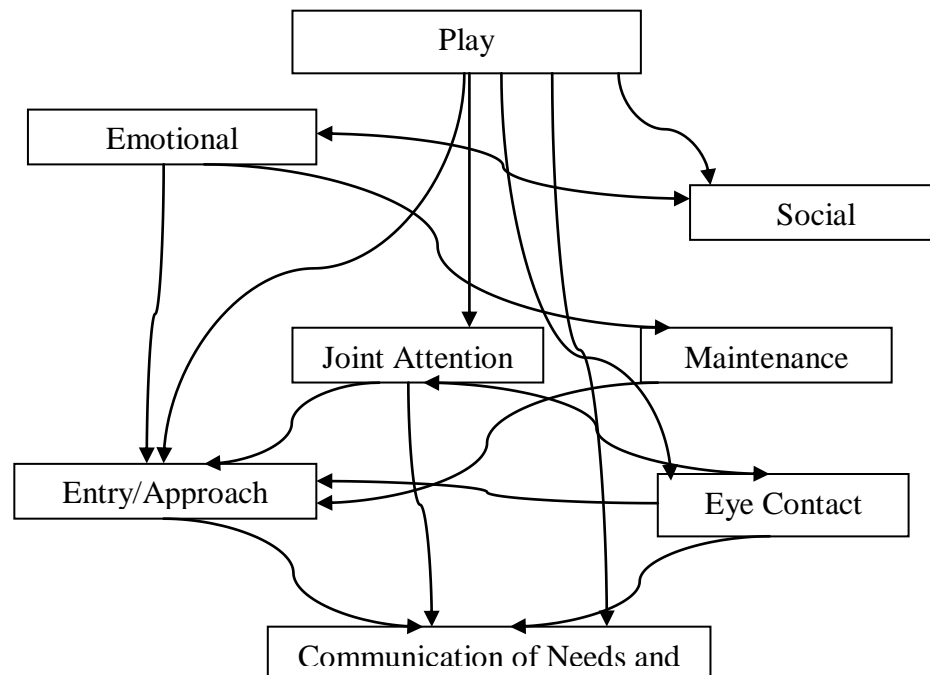


Figure 5. Proposed patterns and their hierarchal mutual inter-relationships.

Communication of Needs and Ideas



The Situation

The most intensive period of speech and language development is during the first three years of life, a period when the brain is developing and maturing. These skills appear to develop best in a world that is rich with sounds, sights, and consistent exposure to the speech and language of others. At the root of this development is the desire to communicate or interact with the world.

Children with autism often are self-absorbed and seem to exist in a private world where they are unable to successfully communicate and interact with others. (1)

Design Opportunities

for Instructor

- special animal toys: when the child touches the toy, the color of the toy changes and it tells the name of the animal as a way to learn language. This way the child will learn the names of the animals. Change of color and touching animal involve senses of the child.

for Parent

- communicating by means of a symbol system such as picture boards. For example, child will be provided with basic shapes to make the shape of a bathroom by the help of the parents. This way the child learns to communicate with parent and also later on could use (make) the same symbol to tell his/he need for bathroom.

for Peer

(1) National Institute on Deafness and Other Communication Disorders : <http://www.nidcd.nih.gov/health/voice/autism.asp>

Emotional Expression



The Situation

Facial expressions of emotions help to understand different situations and events; for example, understanding the right time to approach a stranger to shake hands and socialize. If this understanding of emotional expression is not well developed, it may make difficult times for the child's future life to understand different social situations, such as making friends at school or socializing at different events.

Design Opportunities

for Instructor

for Parent

- Peekaboo package: consisting of faces of different emotions; parents will play peekaboo with the child. For example, parent will hold "happy face" in front of his/her face and show his/her happy face in the peekaboo play.

for Peer

Entry/Approach Skills



The Situation

How the child joins a group of children and the welcome they provide for children who want to be included in their activity is related to the entry/approach skills. Autistic children are less likely to exhibit such social skills as how to approach an individual socially or join a group, how to approach others spontaneously. However, they do form attachments to their primary caregivers. (1)

Design Opportunities

for Instructor

- using “hello” hat: children - autistic and non-autistic in a group of more than 5 - will put the hat on peer’s head and make the eye-contact and say the “hello” randomly.

for Parent

for Peer

1 Attwood, Tony; Gray, Carol; Understanding and Teaching Friendship Skills, 1999

Eye Contact



The Situation

Children with autism spectrum disorder typically make less eye contact than other children and may not use their eyes to attract attention, to direct other people's attention or to check that they have (or do not have) the attention of another person. Often the child will not look at the person they are talking to and may feel uneasy about the way an adult uses eye contact towards them.

Design Opportunities

for Instructor

- eye cards: special cards with two holes on them that instructors and children hold in front of their faces and say hello or goodbye or other basic greetings or communicating statements.

for Parent

for Peer

Joint Attention



The Situation

Joint Attention is the process of sharing one's experience of observing an object or event, by following gaze or pointing gestures. (1) Joint attention is vital to social competence at all ages.



Design Opportunities

for Instructor

Thread and colorful ball nodes: there will be a thread with ball nodes in different colors. Instructor will start talking about one color ball (for example red) and then will guide the child to find ball on the thread (while they are both holding the thread), to remove it from the thread and give it to the instructor. It will be the same for the other ball on the thread. For the next level of engagement, the instructor could engage the child by describing the quality of balls of different colors and textures.

for Parent

for Peer

(1) DCNlab: Developmental Cognitive Neuroscience, University of Connecticut: http://eigsti.psy.uconn.edu/jt_attn.html

Maintenance Skills



The Situation

Maintenance skills such as how to share, take turns, follow rules, co-operate. (1)

Design Opportunities

for Instructor

Face sticker: childrens' faces will be printed on stickers. They will be called by names one at a time to match the face printed on the sticker with the right face and attach the sticker to that person. This way children will learn how to follow simple rules and take turns and share this experience enjoyment with other children.

for Parent

for Peer

(1) Ocampo, Alaine; Sell, Mitra; Willis, Tyra Social Skills Training for Students with Autism Spectrum Disorders: The Multi-Disciplinary Way, 2010

Social Interaction



The Situation

Children with ASD have fewer interactions and language and some of them may not be able to use verbal as well as non-verbal behaviours for communicative purposes.
(1)

Design Opportunities

for Instructor

for Parent

There will be picture of different actions of different situations and each time child will be guided to show a picture to parent and then parent will do an action in response to the picture; for example child will show a picture of chocolate and parent will become happy in response to that with the right gesture and facial expression; or parent will be shown a picture of hungry person and will bring food.

for Peer

(1) Plumet, Marie-Helene; Tardif, Carole; Understanding the functioning of social interaction with autistic children, 2005

Play



The Situation

Most children pretend in their play. Autistic children do not exhibit pretend and play skills. This is usually demonstrated by a child who:

- repeats playing with unusual objects
- develops interest in one or two objects.

Appropriate play skills may be the right behaviors to target to replace the repetitive behaviors.

Design Opportunities

for Instructor

Finding toys invisibly hidden (put object in box, and dump out under a scarf).

for Parent

A package of toys for grandmother character: including a stick, old big glasses, gray hair wig. Parent will give the toys to the child and guid him/her to play. Parent will remind child of the grandmother and how she is. Familiar characters could help the child better identify himself/herself with them.

for Peer

Cooking toys could be provided for children in a group of two or more to play and pretend different cooking scenarios.

3.3.3.3 Discussion Sessions Guideline

The following is the guideline for each of the discussion sessions:

5 minutes | Introduction:

There will be 5 minutes introduction to the session and its process.

20 minutes:

Participants will be provided with 8 sheets for 8 patterns (enclosed with the documents).

They can write or draw their ideas and opinions related to pattern “situations” and “design opportunities”.

30 minutes:

Participants will discuss the ideas with the facilitator (Majid Dadgar). This time will be extended to 45 minutes depending on how the session proceeds.

45 Minutes | Conclusion:

Final ideas, sketches, opinions and comments related to each pattern will be finalized and organized.

3.3.3.4 Results

In the results section data from the discussion sessions will be analyzed and the key ideas and keywords that the participants mentioned will be provided. Participants' main ideas for each pattern will be analyzed and provided in separate tables as follows. These ideas will be reflected in the final patterns. And in the next section guidelines and recommendations for the social skills will be suggested that help to structure and inform the final patterns.

In the following tables ideas for the patterns are underlined. These ideas helped me to refine and revise the “design opportunities” for the patterns.

Participants	Comments about the concepts and Ideas for the pattern: Communication of Ideas and Needs
X1	<u>Chameleon toy animal with changing colors; using hand symbol and sign language (if they don't have problems with fine motor skills and it should be decided based on the level of dexterity), such as using sign T for Toilet when they want to go to restroom; using PECS (Picture Exchange Communication System) and the child gives the symbol for what s/he wants; there should be actual pictures not abstract; magnet pictures puzzle to put on the board and children understand the context of the actions.</u>
X2	<u>Multi-sensorial toy animals with light (changing color), sound, vibration; using picture to tell what they need and it is better to be interactive; making puzzles to tell what you need is difficult;</u>
X3 and X4	<u>Using PECS; showing the pictures for what they need; repetition flash cards to learn language, such as ball, bat, baby; immediate response/reward to what they need; picture exchange should be paired with learning language; picture schedule of routine activities; solutions may involve helping mix of social skills; exit or termination social skill, that is when to stop (e.g. the eye contact);</u>
X5	<u>Moving toys (animal toys with changing colors); learning communication should start with learning basic words and then sentences; toys telling the action being done, like saying “the dog jumped” when the dog moves; picture of actual things will help;</u>
X6	They are not self-absorbed but has less awareness; “part to whole” problem, e.g. making the whole puzzle out of the parts of pieces; pictures and symbols are fantastic; individual differences to communicate what they need; <u>PECS</u> ; they should be motivated to communicate; ideas should be consistent for home and school; Temple Grandin visual thinking and seeing everything in pictures.

Participants	Comments about the concepts and Ideas for the pattern : Entry/Approach Skills
X1	<u>Sensory defensiveness to wear hats for some children; structured solutions help; transitioning from structures training into real life use of skills; peers could model different steps of the skill, e.g. hello and then my name is; putting hats on head might be aggressive for some children;</u>
X2	<u>Hat solution should start with instructor and peer; solution depends on individual development of children and the level of progress in social skills; introductory explanation for the hat solution; first one-on-one sessions then group sessions to use the solutions; using hello hat at the beginning of the day because that is when they should say hello; using hello badge that does not rub on skin;</u>
X3 and X4	<u>Pay attention more to the basic skills (esp. for the group part of the solutions), like sitting still in the circle in the class; consider age group; training typical peers about autism and interacting with the children with ASDs; seeing hello hat solution in the broader context; using soft ball instead of hat and talking about favorite animal each time one has the ball; if you get the ball and say hello, you get the reward (like emblem); motivation to learn by rewards; blow bubbles as rewards;</u>
X5	<u>A ball with handles instead of hat; making crackling noise for the solution;</u>
X6	<u>They will over-generalize hello using hello hat solution; have hat outside the classroom and any child comes in wears the hat and says hello; pay attention to appropriate time to say hello, e.g. introducing yourself and saying hi; individual differences; the children with ASDs have significant speech delays; differences are about how they process the information; reinforcement factor: punishment or ignoring the child for negative response and reward the behavior for the positive one; social stories;</u>

Participants	Comments about the concepts and Ideas for the pattern : Eye Contact
X1	Eye contact is not just looking into the eyes but social awareness that you should look towards people when they are talking to you; it should be looking at you and paying attention to what you are saying (joint attention); people communicate with eyes; <u>bird on the shoulder to look at when they are talking with someone</u> ;
X2	<u>Having faces with special characters and cartoonish faces on the eye cards</u> ; <u>blowing bubbles and making eye contact</u> ; social interaction is different for children at different levels; concept of rewarding for what they are expected to do; eye contact for peers are not important when they are playing;
X3 and X4	<u>They will focus more on the eye card and play with it rather than use it the way they are expected to</u> ; cards block the interaction; if they make eye contact they should <u>get immediate rewards (such as goldfish emblem)</u> ; repetition of behavior and then it becomes natural process; to learn how long have the eye contact; <u>cut-out cartoonish faces instead of small holes in the cards</u> ;
X5	<u>Putting stickers on the forehead and look at them when talking to someone</u> ; positive feedback/reward if they make eye contact; <u>solution should be consistent for home and school</u> ; short instructions (and not wordy) for what they are expected to do;
X6	They will over-generalize eye contact as staring at someone; eye contact should be looking at someone when they are talking to you (not into the eyes); how long to have the eye contact; <u>stickers on the forehead</u> ; paying attention to the conversation (joint attention) should be along with eye contact; <u>big to small birds to put on shoulder to be looked at when the child is talking to you</u> ; eye contact is not an issue for peers and even typical peers do not do it;

Participants	Comments about the concepts and Ideas for the pattern : Joint Attention
X1	<u>Peers can model listening and paying attention; more colorful balls and balls that light up or have balls inside them, adding sound and maybe some liquid inside the balls;</u> child safety; <u>level of social development for the child should be considered for the solutions;</u> sometimes even they need to be under instructional control to be maintained still in the class and it is a basic skill to learn;
X2	When the child follows the direction there should be a reward; <u>for example balls could light up or there could be a sound;</u> for the restless, joint attention is different and sitting still or making a quick eye contact will be a basic skill to learn; it is difficult for the child to listen to the instructions; <u>ideas should be motivating e.g. balls will light up.</u>
X3 and X4	If they are interested in something they will contribute to the ideas; specific cues (like snapping, touching throat) to remind the child of social behavior; it is a building process and after a while the framework for the social skills will be built; it consists of steps and then it becomes a natural process; <u>there should be facilitator when they are playing with toy or computer games in order to achieve the goal of interacting with human being.</u>
X5	<u>Necklace instead of the thread and balls idea;</u> they learn social skill in a robotic way at first but then it becomes a normal behavior;
X6	Perspective is part of the joint attention; it is hard for children to tell you instructions; <u>playing any game has joint attention, memory, take turns in it;</u>

Participants	Comments about the concepts and Ideas for the pattern : Maintenance Skills
X1	<u>There will be tactile sensitivity for stickers; using necklace instead of stickers; cord with emblem that could be a souvenir too (instead of stickers that will become worn out); stickers of emotion of parent's face; emotional thermometer to teach the child about gradation of emotions as the next level of teaching basic emotions; wearing a badge as winning a medal as a reward;</u> Sitting still, eating skills are issues to consider; <u>They love water play; they like taking bath more than shower;</u>
X2	<u>Cause and effect schedules; children love stickers and they are good motivators; actual picture of the child is better than cartoonish faces; sticker charts for home for the routine activities; interactive schedule that will light up, vibrate, has pictures.</u>
X3 and X4	<u>Board games; games will help to build the pattern for social skill; video modeling (parents and siblings video tape each other and then show it to the child to follow); peer prompting to watch the children when they play and take turns;</u>
X5	<u>Singing for teaching taking turns and following instructions; taking pictures of children when they do activities and then showing them so that they could follow the rules and instructions; using timer for taking turns and sharing; hyper dash toy that helps them to follow instructions with numbers and colors and sound; individual differences;</u>
X6	Facial recognition pragmatics; they look at parts not the whole, e.g. when you talk to them they look at the mouth; <u>calendar to match the faces to those who present and absent;</u>

Participants	Comments about the concepts and Ideas for the pattern : Social Interaction
X1	<u>Video modeling versus photo prompting; the whole video is less effective than the series of pictures; picture magnets; move location of different activities with pictures slowly and gradually;</u>
X2	<u>Picture exchange symbols could be a game at circle time; first with the instructor and the child ASD and then class-wide game; motivation;</u>
X3 and X4	<u>Scenario based solutions, such as, Joey falls, does he cry or laugh?; chasing game; one-on-one interaction first; hide and seek game; play with the children whom they know;</u>
X5	<u>Pictures are best for non-verbal children; they are visual learners; Safety skill; using solutions that could make them verbal.</u>
X6	<u>Using 3D object instead the pictures for food; using both actual faces and abstract faces;</u>

Participants	Comments about the concepts and Ideas for the pattern : Play
X1	<u>“Many” children with ASDs do not exhibit play (stated in the situation description of pattern); reciting videos or cartoons is not pretending; rigidity in playing and try to make the child more flexible; to have the child predict (advanced skill) what may happen in the story and teaching before, after, yesterday, tonight;</u>
X2	<u>Using cartoonish characters that they like; modeling activities by peers; using props for the show or cartoon so that they can play it.</u>
X3 and X4	<u>Package of pretend and play toys for those events and occasions that they are familiar with such as birthday celebration or Christmas; basic pretend and play like airplane flying and making the sound of it; placeholder games, e.g. replacing frog toy with a block;</u>
X5	<u>They have to be led to play; they may interact better with adults than peers; they may not use things as they are expected to pretend characters (they will not use stick, big glasses and gray wig to pretend grandmother character).</u>
X6	<u>There should be a script in each box of play and pretend set of toys so that they could follow the script and know how to use the toys in the box and the script will be the social story; social story could be in pictures;</u>

Participants	Comments about the concepts and Ideas for the pattern : Emotional Expression
X1	<u>Playing peek-a-boo idea with song; teaching them special occasions, e.g. you can talk to mom when she is on phone (showing the emotional expression in that situation), e.g. when somebody has time to play, or when they are ready to talk; it should start with concrete situation and build up to reach the abstract ones; reinforcement and rewarding component; simple emotions.</u>
X2	<u>Felt boards, stickers, magnets to make the faces; a book with different faces on each page that they could change the faces and they can show how they feel at school or home; using esp. costumes to show the reasons for their feelings, e.g. they are sad because they are hurt;</u>
X3 and X4	<u>Using simple contrast of basic emotions e.g. happy and sad; peek-a-boo has the mix of social skills in it; baby doll who is sad or happy or crying; shouldn't be abstract faces; faces of children in the class to match to them; they pay attention more to the faces of children in the class rather than grandma;</u>
X5	<u>Cards with printed real photos; more texture and more color for the ideas; learning emotional expression is a very long process;</u>
X6	<u>Using videos to show emotions, e.g. the child fell down and cried; let them know about the reasons of emotions, e.g. someone is sad because of some reason; having emotion cards and ask them how they feel and they will show cards; using their own pictures or videos so that they could follow the rules and be interested.</u>

3.3.3.5 Social Skills Guidelines for Children with ASDs

In this section some guidelines for teaching social skills to children with ASDs will be provided for the parents and instructors of the children with ASDs. Designers or experts involved in the same area of social skills for the children with ASDs also could use these guidelines. Guidelines can help parents to better understand social skills, problems and solutions. They could apply these guidelines using intervention tools for teaching social skills. Instructors can use these guidelines for teaching social skills in the class setting. They will know about priorities and concerns reflected in the guidelines. Designers who

are involved in the projects designing products and tools for children with ASDs to address their social skills, will benefit from using these recommendations.

1- There are individual differences for children with ASDs.

Participant X6: "some may love the hat and get mad when you take it off and some may not even want that."

There are individual differences for children with ASDs and each of them has different developmental capabilities. Higher functioning children at the early ages (around 3 years old) will respond differently to the solutions of teaching social skills than the lower functioning children. While higher functioning children may be able to follow some rules, lower functioning children with autism need to be taught at basic levels. For example joint attention for the lower functioning child could be starting to learn the eye contact.

2- Start with simple and concrete basic skills.

Participant X1: "They have to have concrete situations and it takes them a long time to go from concrete to abstract."

Teaching social skills should start with basic and concrete skills. It is a long process to achieve the goals in teaching these skills. During the long process children with autism will build up their understanding of social skills and interactions and could eventually understand abstract ideas, rules and instructions depending on where they are on the spectrum.

3- There should be immediate response/reward to the actions of children with ASDs.

Participant X3:” It has to be immediate. If not, they’re not gonna try to do it.”

There should be immediate responses for what they are expected to learn, follow or do.

Learning of social skills for children could be reinforced by providing immediate rewards, such as cartoonish emblems or favorite toys.

4- There should be multi-sensorial solutions designing products and tools for the children with ASDs.

Participant X2:” something that lights up or makes a sound is super cool.”

All the solutions should be multi-sensorial using sound, vibration, color, and/or light.

5- There should be motivation in all the activities for children with ASDs.

Participant X3:” You’re motivated to learn because you get something you want or you learn something you want. Like, you have to have the motivation.”

Motivation plays a major role in teaching social skills. If children with ASDs are not motivated, they will then not learn. Some children with autism have special interests (one of the participants mentioned a child whose parents buy him toilet toys since he likes them). If they are provided with what they like the most to have or to play with, they will have enough motivation to learn social skills.

6- There should be transition from class training to the real life.

Participant X5:” Clinical things that happen, you know, in educational setting, are completely different than seeing someone at Walmart.”

There should be consideration for the transition of what they learn at school based on structured training and education, and how they will use taught skills in the real life. This

transition to real life experience should be considered when planning long term goals for teaching social skills.

7- Social skills are inter-related.

Participant X3:” I think a lot of these things like, if you’re sitting at a table, playing those board games and the kid is looking to you “is it my turn?”; and then you have the eye contact and then you have the joint attention, you could see that he is spinning, oh, ... like they can kind of overlap but trying to break down each one is important too.”

Social skills should be considered at two levels. First, all the social skills are inter-related and teaching one skill will be required to understand other skills too. At the second level there should be a focus on each of the social skills separately. This way all the aspects of the social skills will be considered.

8- Digital technologies could help and not help children with ASDs to improve their social skills.

Participant X3:” I think sometimes it’s not done right. They’re not talking because they can just do this part. They can get away with not talking because they can use it and that’s when you need to make the transition out of that.”

Using digital technologies (such as iPad applications and video games) may block real social interaction with the human being. The instructor or facilitator should be involved when the child with ASD is playing these digital games, otherwise it may hinder the process of learning intended social skills.

9- Solutions should be designed to be used by children with ASDs and the peers.

Participant X1:”And peers can model listening and participating appropriately.”

The product opportunities/solutions should appeal to all children, not just the children with ASDs. This, too, will encourage social play.

10- Using real (i.e. photographic) pictures are recommended for teaching emotions.

Participant X6: "so we start with real pictures and then we go to the simple pictures."

The children with ASDs could hardly understand abstract pictures if they are learning about emotions. There should be real pictures of the faces and it will be more helpful if there are real pictures of themselves or the people whom they know.

11- Safety issues should be integrated in teaching social skills.

Participant X5: "Safety ... Teaching them to be safe ... Seat belt ... not running in front of the cars."

Children with ASD need to know more about the safety issues more than their peers because they are more likely to have accidents or hurt themselves or do dangerous behaviors. Safety issues should be taught to the older pre-schoolers; e.g. they may have difficulty crossing the street⁴.

12- Termination for social skills should be taught.

Participant X3: "I guess that kind of entry approach, I don't know how to call it but ... termination ... so like ... at the end of the conversation and when you leave so like ... get up, say good bye and leave ... I'm finished."

Children with ASD should learn when and how to finish some social activities or skills (e.g. when to finish eye contact).

⁴ MyHealthNewsDaily Contributor Date: 25 July 201, <<http://www.livescience.com/15201-trouble-traffic-kids-adhd-difficulty-crossing-streets.html>>

Chapter 4: Proposed patterns

In this section, proposed patterns will be presented. These patterns have been refined based on my reflection and interpretation of the issues around social skills, the industrial design perspective, the literature review, and informal observations. The patterns also reflect the ideas, comments and concerns of the parents, sibling, and instructors of the children with ASDs who participated in the discussion sessions.

Alexander's patterns follow this format: the name of the pattern, a ranking of its validity, a picture as an example of its application, the context in which it is to be used and the relationship of patterns, a short problem statement, a more detailed problem description, the central solution of the pattern, a diagram illustrating the solution, and finally references to smaller patterns. I have made few changes to this pattern structure. I have not used any ranking for the patterns and also I have mixed the last section - references to smaller patterns – with the fourth section of the pattern (which will be about the relationships of the patterns). This section of the pattern has been diagramed in figure 5. “Social Skills Guidelines for Children with ASDs” of section 3.3.3.5 should be considered for all the solutions stated in the patterns.

For example, consider the pattern “joint attention”; in this pattern, in the “design opportunities” (solutions and ideas) section, one of the ideas is “playing Chutes and Ladders”; for this idea, the first two guidelines - Individual Differences and Start with Simple and Concrete Basic Skills – should be considered as they apply. “Chutes and Ladders” might not be understandable for all the children. For all the other solutions, all these guidelines should be considered as they may apply.

In all the cases that children with ASD have been mentioned in the patterns, they are assumed to be at the early ages.

For each pattern, the section titled “situation” describes the context and problems, and the section titled “design opportunities” describes identified solutions and ideas.

All the solutions stated in the “design opportunities” sections of the patterns need to be gradually taught to the child with ASD; and these solutions should be managed based on the level of development of the child during the time.

In the following pages these patterns will be discussed: 1 Communication of Needs and Ideas, 2 Joint Attention, 3 Entry/Approach Skills, 4 Eye contact, 5 Maintenance Skills, 6 Play, 7 Social Interaction, 8 Emotional Expression.

1 Communication of Needs and Ideas



Patterns Relationships

“Social interaction” and “communication” are the most serious deficits characteristic of individuals with ASDs.

* * *

Situation

Communication impairments begin in infancy with disruption in babbling, gesture, language and social communication development (Shapiro & Accardo, 2008, p.99)

The most intensive period of speech and language development is during the first three years of life, a period when the brain is developing and maturing. These skills appear to develop best in a world that is rich with sounds, sights, and consistent exposure to the speech and language of others. At the root of this development is the desire to

communicate or interact with the world. Children with autism often seem to be unaware of their surrounding social activities and interactions and exist in a private world where they are unable to successfully communicate and interact with others.⁵

Communicative behaviors that distinguish ASDs from language disorders, developmental delays, and/or typical development in children over the age of 2 years include the initiation of social communication, the rate of communication, gestural communication, language comprehension, and symbolic play (Shapiro & Accardo, 2008, p.99). Integration of communication form with gaze and affect is also impaired in the first 3 years of life in children with ASDs.

Design Opportunities

Therefore:

- Parents and instructors could provide children with ASD with pictures so that they could communicate their needs in pictures. For example they could show the picture of restroom when they need to go to the restroom. These pictures could be in the form of an iPad/iPhone application and in the digital format.**
- Multi-sensorial toy animals (figure 6) could help the child with ASD to develop his/her language skills for communication. When the child holds the animal the color of the toy changes, it tells the name of the animal and/or it vibrates. If the child holds the animal for a long time, every 1 minute the toy will tell the name of the animal. It should be possible to turn the sensory features on and off so as not to**

⁵ National Institute on Deafness and Other Communication Disorders
<http://www.nidcd.nih.gov/health/voice/autism.asp>

overstimulate the child. Safety issues should be considered making the toy. The toy should be light, soft and made of safe materials. Sharp edges and small parts should be avoided in making the toy animals.

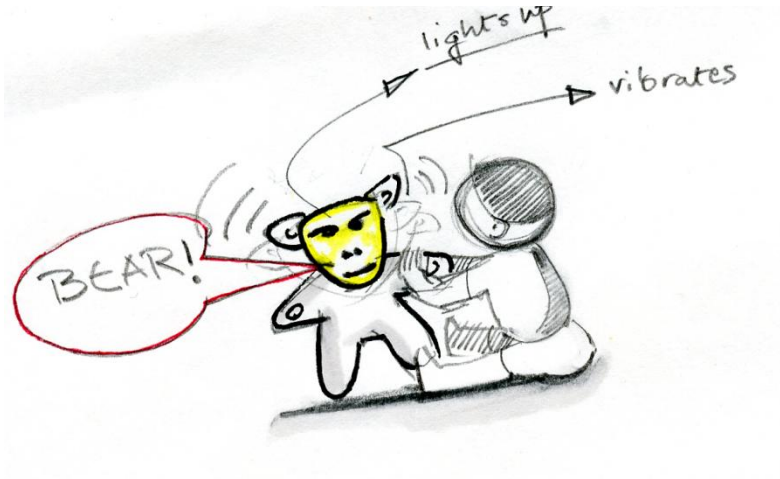


Figure 6. When the child holds the animal the color of the toy changes, it tells the name of the animal and/or it vibrates.

2 Joint Attention



Patterns Relationships

Joint Attention is the process of sharing one's experience of observing an object or event, by following another person's gaze or pointing gestures. Joint attention is vital to social competence at all ages.⁶ "Eye contact" and "joint attention" are closely connected as the goal of having "eye contact" is "joint attention". When children "play" they also need to have "joint attention".

* * *

Situation

Impairment in social orienting and joint attention (e.g. pointing, showing objects, looking at others, orienting to name) appear to be an important early marker of autism (Shapiro & Accardo, 2008, p.99).

⁶ DCNlab: Developmental Cognitive Neuroscience, University of Connecticut:
http://eigsti.psy.uconn.edu/jt_attn.html

One area that has received more attention in recent years is joint attention. Joint attention refers to a child's alternating attention between an object and a communication partner. Children display joint attention skills by initiating to others to pay attention to that which they are attending and by responding to another person's cues (e.g., pointing) to attend in a situation in which partner is interested. Joint attention skills are critical because they have been shown to be highly correlated with early acquisition of receptive and expressive language. Unfortunately children with ASDs show deficit in joint attention before they are 1 year old. In fact, impairments in the development of joint attention skills are considered by some as hallmarks of children with ASDs. Deficit in joint attention behaviors should be a high priority for intervention because their absence may be related to the core problems in social and communicative behavior (Shapiro & Accardo, 2008, p.129-130).

Design Opportunities

Therefore:

- Peers could model listening and paying attention. And then this modeling could be videotaped/pictured and could be presented to the children with ASDs.**
- Cartoon characters could model joint attention. The children with ASDs better identify themselves with these characters and they are motivating for them.**

- Joint attention is part of playing games (e.g., playing board games (such as Chutes and Ladders); children with ASD should follow basic instructions and pay attention to the co-players). But the rewarding part of the games (or any behavioral treatment) should be reinforced.
- There could be a “ball” to be controlled by the instructor/parent (figure 7); each time the child does what he/she is asked for, the instructor activates the “ball”, the color changes and it plays a song and makes them pay attention. This is an immediate pleasing response to child’s action.

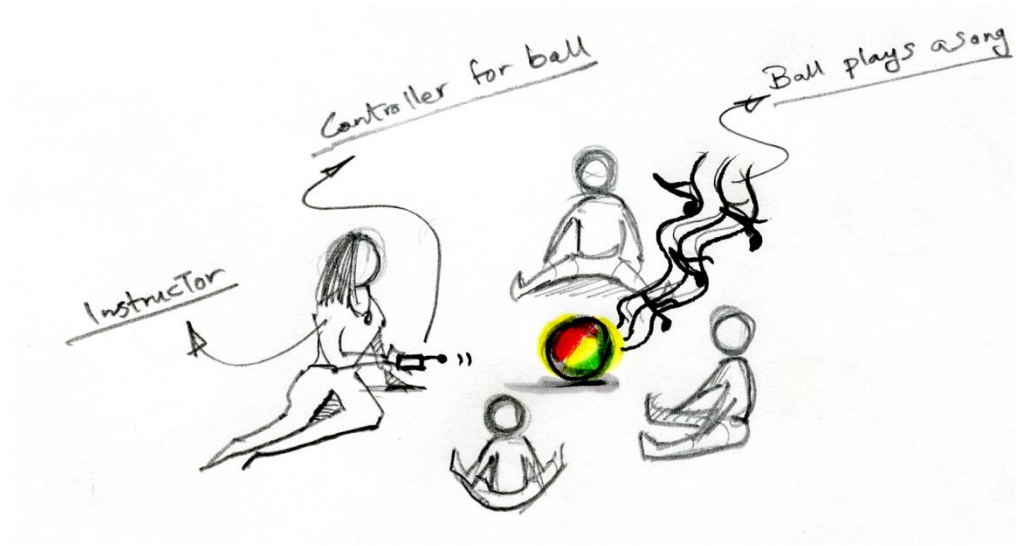


Figure 7. Each time the child does what he/she is asked for, the instructor activates the “ball”, the color changes and it plays a song.

3 Entry/Approach Skills



Patterns Relationships

If the child with ASD wants to approach a group of peers to play – entry/approach skills - ; he/she should make “eye contact” and then it will be important how he/she maintains – “maintenance skills” – the conversation or playing – “play” – with them to take turns and co-play and share.

* * *

Situation

How the child joins a group of children and the welcome they provide for children who want to be included in their activity is related to the entry/approach skills.

Children with ASD are less likely to exhibit such social skills as how to approach an individual socially or join a group, or how to approach others spontaneously. However, they do form attachments to their primary caregivers.⁷

Design Opportunities

Therefore:

- **Peers could model different steps of the entry/approach skill and then it will be shown to the child with ASD in videos or pictures.**
- **Child with ASD could be pictured or videotaped while doing each step of the entry/approach; e.g. he/she will say hello and instructor or parent will take a picture or videotape. And then at some other time he/she will tell his/her name and a picture of it will be made or it will be videotaped. Series of these pictures/videos will be shown to the child with ASD; this way he/she could learn the skill more easily since he/she will identify with him/herself.**
 - **The child with ASD could be pictured or videotaped in the social story context; e.g. for the social story of getting on the bus school, child with ASD will be pictured/videotaped at different steps; e.g. when he/she says hello to driver, and then peers and then he/she sits.**
- **Instructors could use a “set of greeting hats” (figure 8) in the class setting; these hats are in different colors and designed for: hello, my name is, and good bye; children with ASD will play with these hats as a game during the class time under**

⁷ Attwood, Tony; Gray, Carol; Understanding and Teaching Friendship Skills, 1999

the instructor's supervision. Children will start with the "hello" hat and each time they put the hat on the other child's head, they say hello; and then the child who gets the hat on his/her head, will do the same with the other child. The same will happen for the "good bye" and "my name is" hats. When the children use the "my name is" hat, they tell their names at the time that they put the hat on the child's head.

- all the names of the hats are written on front of the hats, but they will read and understand these names at the proper age. Pre-schoolers will understand the color codes of the hats.**
- Instructor should manage and facilitate using the hats; she/he should help to involve all the children in the game.**
- hello hat should be used at the beginning of the class and good bye hat should be used at the end of the class time; this way children with ASD do not generalize the idea and it helps them to use hello and good bye at the right time.**
- This idea should not be used for those children with ASD who are defensive and sensitive to hats.**



Figure 8. These hats are in different colors and designed for: hello, my name is, and good bye.

4 Eye Contact



Patterns Relationships

Children with ASD need to make “eye contact” when they switch attention between the partner of the conversation and the object – “joint attention”.

* * *

Situation

Red flags associated with ASDs for the eye contact may include gaze avoidance and infrequent and brief gazing at other’s faces.

Children with autism spectrum disorder typically make less eye contact than other children and may not use their eyes to attract attention, to direct other people’s attention or to check that they have (or do not have) the attention of another person. Often the child will not look at the person they are talking to and may feel uneasy about the way an adult uses eye contact towards them.

It is important to know that eye contact is not just looking into the eyes but social awareness that you should look towards people when they are talking to you. Children with ASD may over-generalize eye contact as staring at someone; it should be considered that eye contact is not the ultimate goal but it is a means to communicate with the eyes. It is important to teach children with ASD about how long they should have the eye contact in social situations; paying attention to the conversation should be along with eye contact.

Design Opportunities

Therefore:

- **Instructors could use the “set of birds” idea (Figure 9) for the eye contact. These are stickers in shape of birds in 4 sizes of small to big. Instructor or parent will stick these birds to his/her shoulders when he/she talks to the child with ASD. And they ask the child to look at the bird when they talk. Instructors will use different sizes of the bird based on the child’s progress. This way the bird sticker size becomes smaller and finally it fades away. This idea could help the child to look towards the one whom they are talking to.**
- **Instructors could focus more on the eye contact (looking into the eyes) by using the “eye cards” (Figure 10). These cards are in shape of different characters that the child likes the most, e.g. popular cartoon characters. Child with ASD will hold the card in front of his/her face and will look through 2 holes on the card. The card could make it easier for the child to make eye contact.**

- Instructor should facilitate using the eye cards. Using the card should start in one-on-one sessions between instructor and child with ASD; and then it will become the class-wide activity.
- Instructors should start with the bird stickers idea first and then he/she should use “eye card”. This way, child will first learn to look towards people when someone is talking and he/she will learn the reason of looking towards people; and then instructor will switch to the “eye card” idea to develop the first stage.

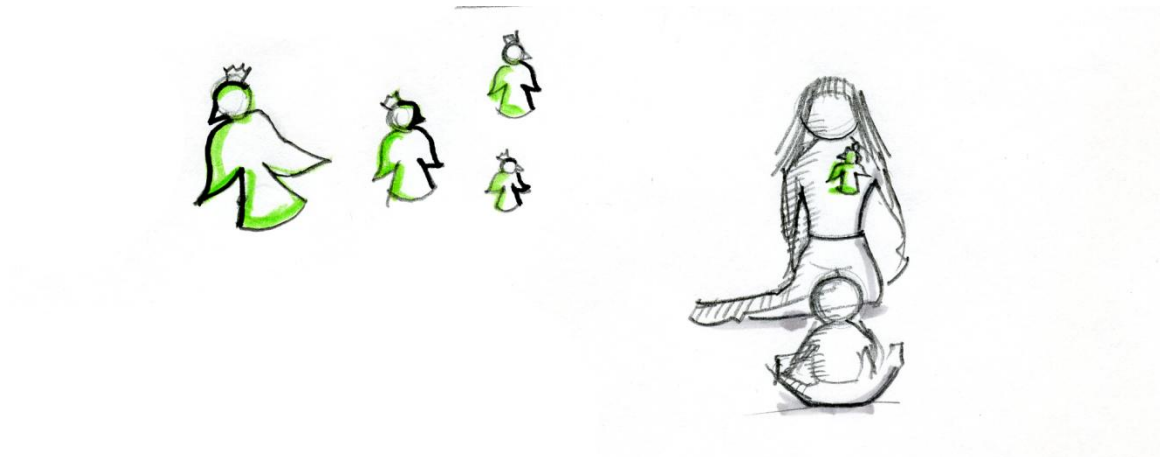


Figure 9. This is the “set of birds” idea for the eye contact. These are stickers in shape of birds in 4 sizes of small to big.

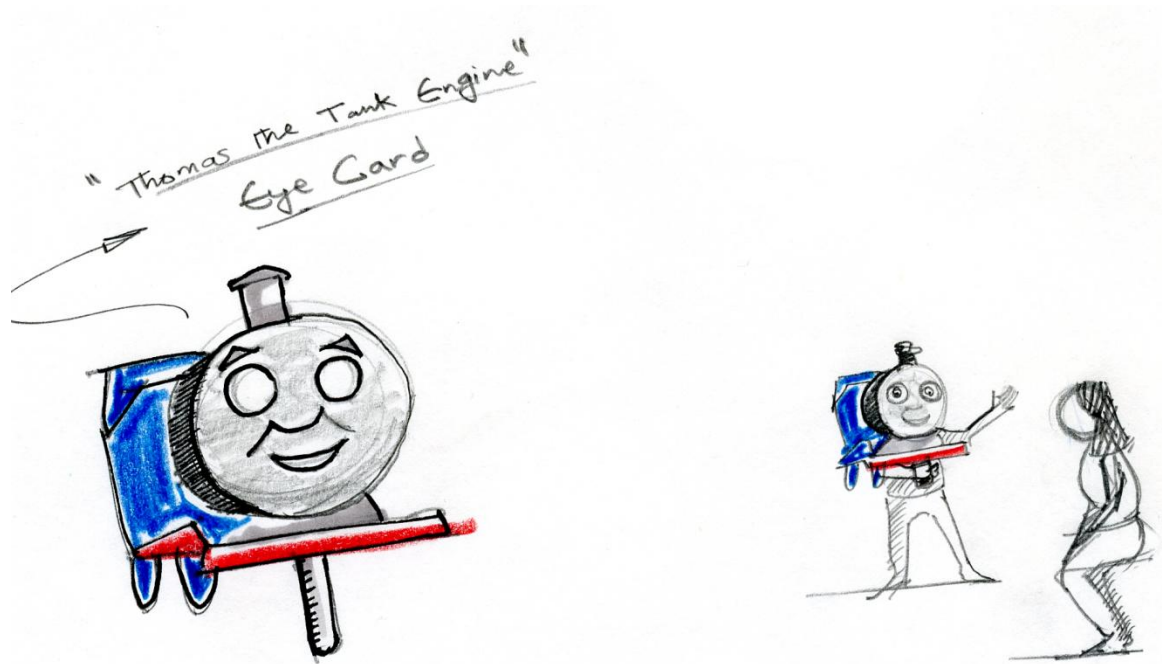


Figure 10. "Eye cards" are in shape of different characters that the child likes the most, e.g. popular cartoon characters.

5 Maintenance Skills



Patterns Relationships

Children with ASD need to maintain – “maintenance skill” – the conversation or activity after they have entered among the group of peers – “entry/approach skills”.

* * *

Situation

Maintenance skills such as how to share, take turns, follow rules, co-operate.⁸

Conversational skill is essential for human interaction. Typically developing children learn the basic turn taking and topic management skills necessary for conversational interaction during their pre-school years. By contrast, these skills remain challenging for individuals with ASDs in later childhood (Shapiro & Accardo, 2008, p.83).

It will be hard for the children with ASD to share their enjoyment with others or follow the rules. They prefer to be isolated and be involved in their own personal environment.

⁸ Ocampo, Alaine; Sell, Mitra; Willis, Tyra Social Skills Training for Students with Autism Spectrum Disorders: The MultiDisciplinary Way, 2010

Turn taking could also be an issue for them too. They may not understand pauses in conversation and how conversational partners typically talk to each other.

Design Opportunities

Therefore:

- **Any kind of game (esp. board game) has all the elements of maintenance skills such as sharing, turn taking and following rules. Parents and Instructors could play structured games with children with ASD to help them to practice these elements.**
- **Modeling turn taking by peers or parents/instructors could also help children with ASD to understand the context and timing of turn taking and sharing. Parents and instructors could model and videotape turn taking and they could show it to the child with ASD.**
- **Instructors could use “face stickers” (figure 11) for children with ASD (these stickers could be as an iPad/iPhone application. Instructor or parent should facilitate the process of interacting with these pictures. It should be considered, however, that computer applications and games are interesting for the children with ASD and there are chances that this interest will delay their learning). Children’s faces will be printed on stickers. They will be called by names one at a time to match the face printed on the sticker with the right face and attach the sticker to that person. This way child will learn how to follow simple rules and take turns and share the enjoyment of this experience with other children. Children with ASD**

better understand real (i.e. photographic) pictures and esp. if those pictures are the pictures of their peers in the class.

- Face stickers could be in different formats of drawing, digital and real pictures. Instructor will decide the right format based on the developmental progress of the child with ASD.**

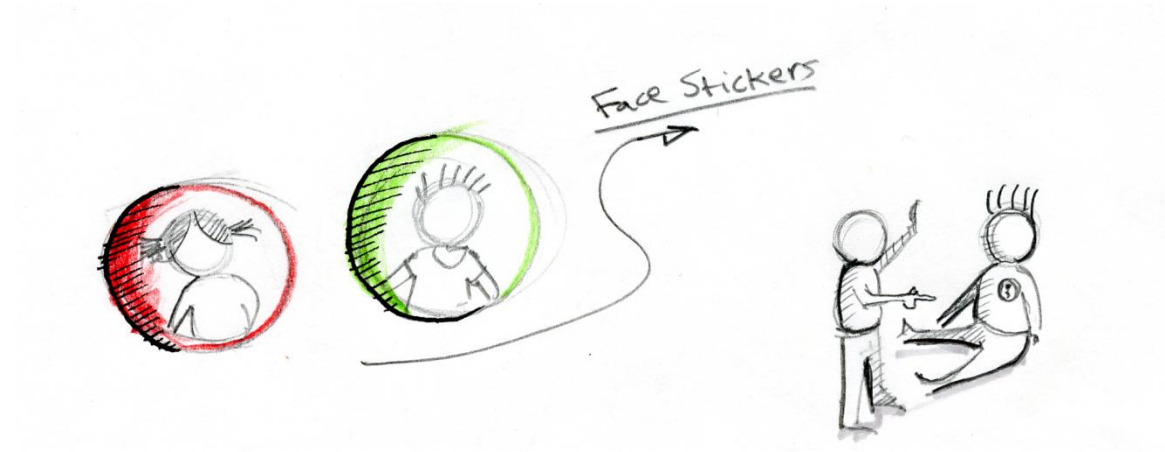


Figure 11. These are “Face stickers” for children with ASD. Children’s faces will be printed on stickers.

6 Play



Patterns Relationships

Playing approach – “play” – could help to improve most of the basic social skills such as “social interaction”, “eye contact”, “joint attention”, “entry/approach skills”, and “communication of needs and ideas”. Playing games help instructors and parents better involve the children with ASD in the teaching process of social skills.

* * *

Situation

Play is considered one of the primary occupations of a child – one that is not only expected but encouraged.

The ultimate goal for any child with an impairment or disability is to be able to participate fully with peers and adults within the roles and expectations of society and

culture. For all children, play is an expected domain of such participation. Although play seems to evolve naturally for most children, for children with ASD, there will be challenges that may disrupt the natural acquisition of play skills (Huebner, 2001, p. 314-5).

Most children pretend in their play. The children with ASDs do not exhibit pretend and play skills. This is usually demonstrated by a child who:

- repeats playing with unusual objects
- develops interest in one or two objects.

Appropriate play skills may be the right behaviors to target to replace the repetitive behaviors.

Design Opportunities

Therefore:

- Parents and Instructors could use “box of play” (figure 12). There are set of toys and script in each box. Set of toys are designated for different situations that children with ASD are familiar with, such as Birthday Celebration or it could be more neutral as “Going to School”. And the script in the box of play is about that situation, e.g. script of social story for the child’s birthday. This script will be a story of the social event and it shows what happens on that event and how people socially interact. Parent or instructor will follow the script and help the child to play with the toys inside the box and learn about that social situation.

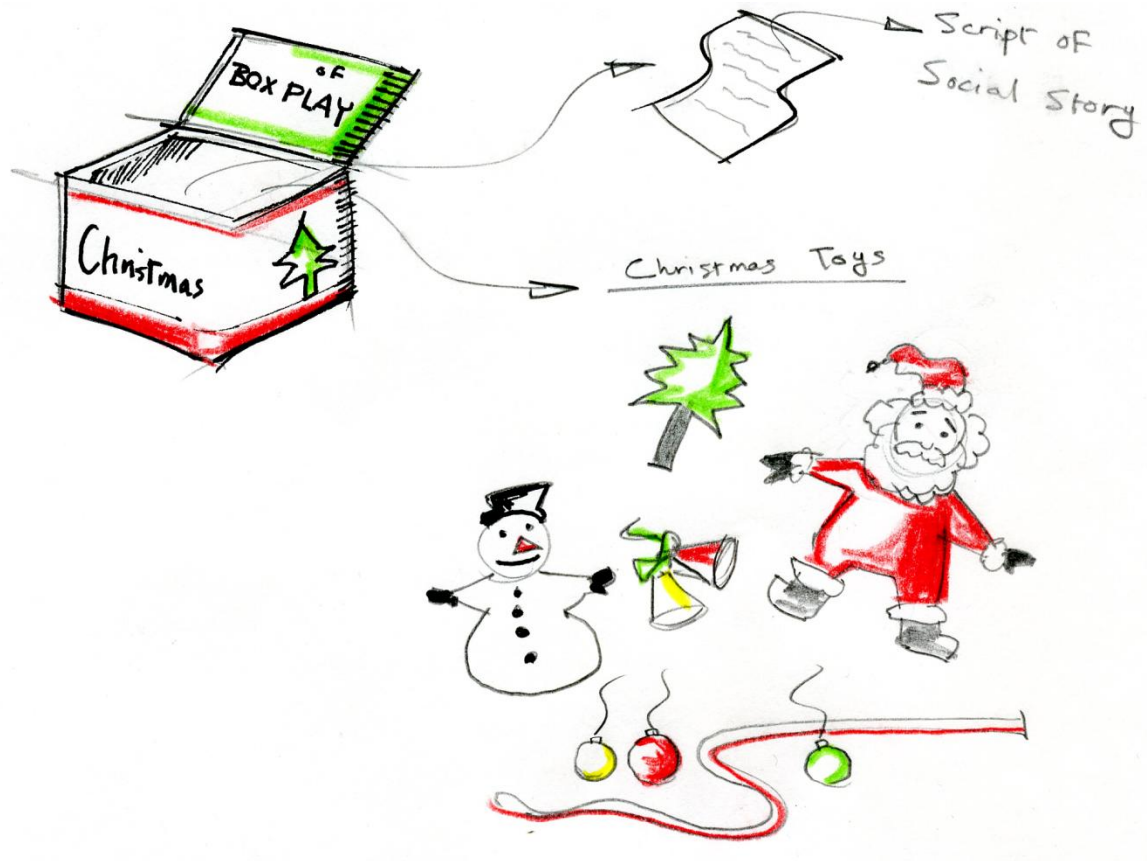


Figure 12. There are set of toys and script in each “box of play”. Set of toys are designated for different situations that children with ASD are familiar with, such as birthday celebrations.

7 Social Interaction



Patterns Relationships

Understanding facial gestures and “emotional expression” of the people in “social interaction” help the children with ASD to develop their social skills. Playing – “play” – could be helpful to make learning these skills more interesting for children.

* * *

Situation

Children with ASDs have fewer interactions and language and some of them may not be able to use verbal as well as non-verbal behaviors for communicative purposes.⁹

⁹ Plumet, Marie-Helene; Tardif, Carole; Understanding the functioning of social interaction with autistic children, 2005

Individuals with ASDs are commonly thought to prefer social isolation and children with prototypical autism may indeed withdraw from social contact (Shapiro & Accardo, 2008, p.139).

Design Opportunities

Therefore:

- Parents and Instructors could use “scenario based solutions” (figure 13) using pictures; e.g. there will be a scenario that tells about Joe falling down and then there is another picture of Joe crying; and another follow-up picture that shows mom is comforting Joe. (These pictures could also be on a computer application. They could be interactive for the child with ASD if he/she looks at the picture on iPad/iPhone while instructor or parent facilitates the process). These three pictures will be shown to the child with ASD. Then the whole story will be narrated from the beginning again. It will be a picture of Joe who has fallen down; and then with the help of instructor or parent, child will choose between the happy, crying Joe, or the picture of mom comforting Joe. Instructor or parent could opt to choose crying Joe and mom comforting Joe, depending on how the child with ASD is socially developed. This way child with ASD will learn the reason of facial gesture within the social context. There could be different scenarios for Joe too, such as, Joe’s birthday, or Joe with broken leg, and then the child with ASD will choose related facial expressions, such as happy, sad, or crying, for each of the scenarios.

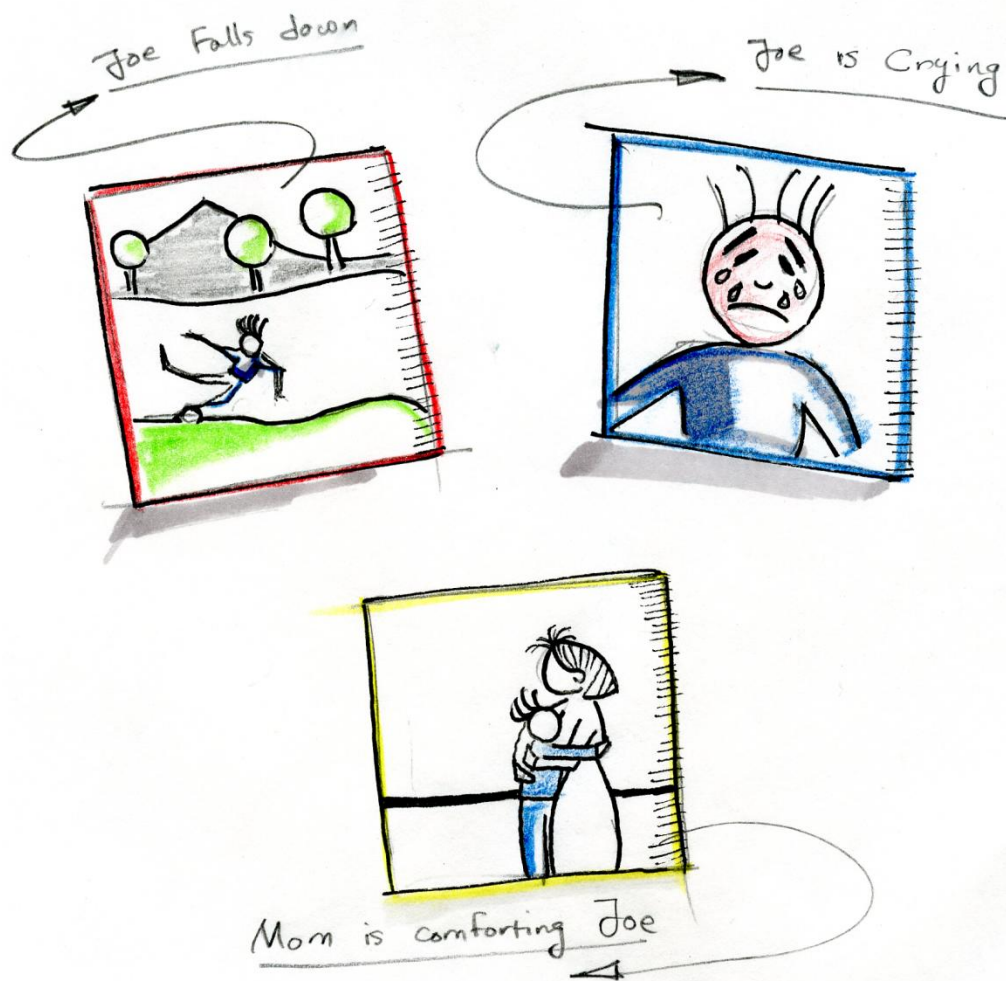


Figure 13. “scenario based solutions” using pictures; e.g. there will be a scenario that tells that Joe falls down and then there is another picture of Joe crying; and another follow-up picture that shows mom is comforting Joe.

8 Emotional Expression



Patterns Relationships

Understanding “emotional expression” and facial gestures of the people in different social situations helps the child with ASD to join the group of peers successfully- entry/approach skills; and also it helps to maintain his/her turn taking or sharing activities or conversations – maintenance skills.

* * *

Situation

Interactions that require understanding emotional reactions can prove challenging for individuals with ASDs.

Facial expressions of emotions help people to understand different situations and events.

E.g. understanding the right time to approach a stranger to shake hands and socialize. If

this understanding of emotional expression is not well developed, it may make difficult times for the child's future life to understand different social situations, such as making friends at school or socializing at different events.

Design Opportunities

Therefore:

- **Parents and instructors of the children with ASD could use “Peek-a-boo package” (figure 14). It consists of happy, sad and angry faces. Parent or instructor will hold the face in front of his/her and then he/she will make the same emotion in the face and will say peek-a-boo. E.g. instructor will hold the happy face in front of his/her face. Then he/she will peek-a-boo and will holding away from his/her face while he/she is showing the same gestural emotion. This way the child with ASD will know more about the basic emotional expressions when he/she plays peek-a-boo.**
- **Peek-a-boo package first should be used in one-on-one sessions between instructor and child with ASD; and then it could be class-wide experience.**
- **There could be empty templates in the peek-a-boo package so that parents or instructors could use the real pictures of the people whom child with ASD knows.**

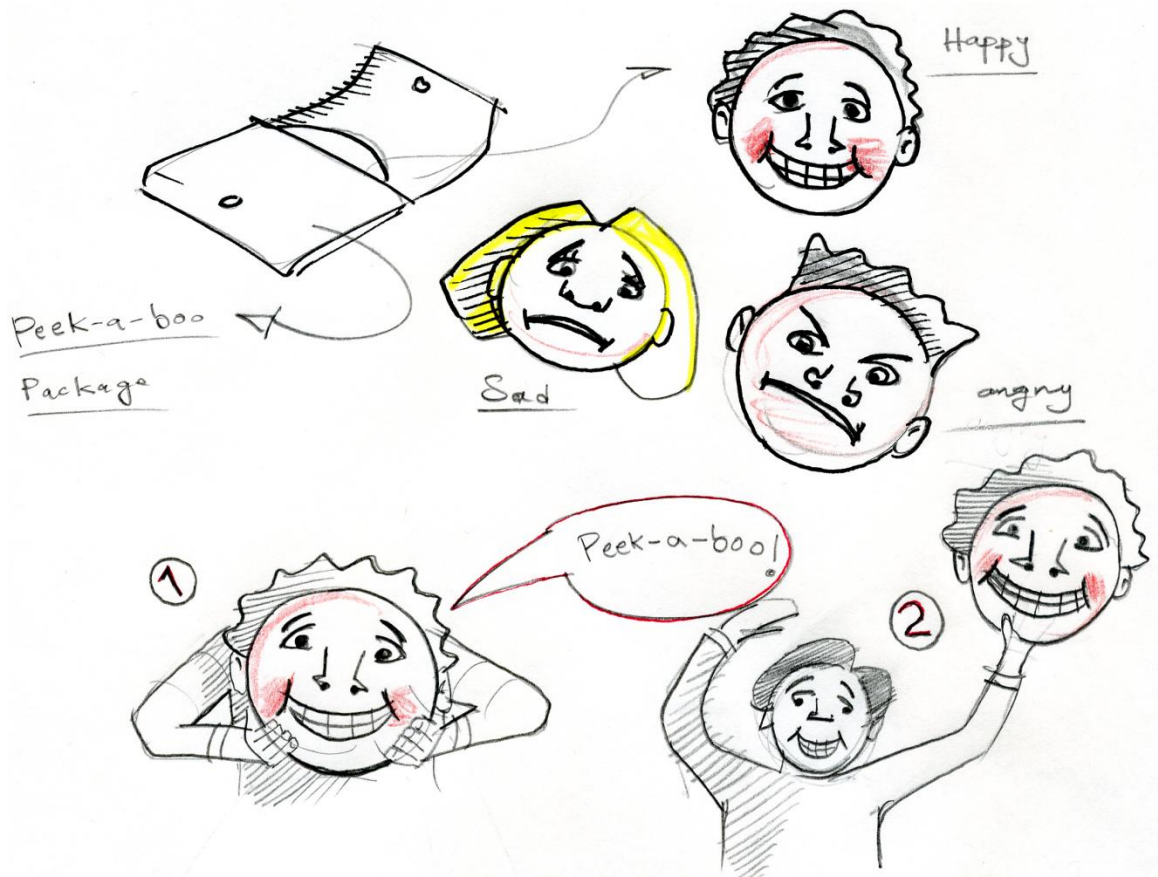


Figure 14. "Peek-a-boo package" consists of happy, sad and angry faces.

Chapter 5: Conclusion

Most of the methods and techniques being used in the classroom setting by the instructor and at home by the parents for teaching social skills to children with ASDs are based on eclectic principles and individualized to each child with ASD. Solutions for helping children with ASDs to develop their social skills are mostly based on one-to-one sessions with repeated trials of the preferred behavior. Ways of teaching social skills are unique for each the child with ASD, but parents and instructors all emphasized more colorful, interesting, multi-sensorial solutions and this is where industrial design – as an interdisciplinary field capable of providing creative solutions based on form, color, and function – could help parents and instructors to teach social skills. Visual cues, video modeling and picture-based interactions were mentioned by all the participants as potential ideas and possible solutions. Considering the children with ASDs at the early ages, all the participants mentioned that ideas and solutions should be simple and basic so that children could gradually build on their skills. Higher functioning children with ASDs will have different needs and conditions. And also each child may be at different stages of social development. All these variables should be considered while providing a solution for them.

It will be helpful if the children with ASDs could be involved at the first stages of proposing any design solution; making prototypes of ideas and/or solutions and testing them with the children with ASDs could provide better feedback on how effective the solutions are and what changes should be made; it could also help in understanding the learning curve of how children with autism learn to use the products over time.

The revised and proposed patterns of this research could be used by parents and instructors of the children with ASDs. Instructors could refer to these patterns when teaching social skills to the children with ASDs in the class. Parents could use the patterns to get ideas about how they could improve their children's social skills; and also instructors could use the components of pattern and pattern language to communicate problems and solutions of social skills with parents.

This research helped me to learn how I can provide information about the difficult-to-reach subjects. There are always other sources of information (such as, relatives or family members of the research subjects) that could help to provide accurate information for the research. In this research, parents and instructors – as the target users – provided practical insights about the subjects of the research who are children with ASD.

I also learnt how to apply industrial design ideas in the areas such as autism where the design role is not clearly defined; pattern language and its unique form and structure helped me to develop ways to approach target users of the research and research objectives. The pattern structure clearly organized different areas of each social skill and it helped me to understand how problems and solutions are related.

The next steps of this project are to further develop the ideas presented as the design opportunities of each pattern to make prototypes and test them with children. This iterative process will provide feedback for the ongoing design development and refinement process.

The patterns could be expanded to address other existing and emerging issues for the children with ASDs, such as learning language and interaction with new technology. More general design principles could also be developed as patterns to be used for different research topics and design problems.

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Appendix A: Annotated Bibliography

In this appendix annotated bibliography of the sources used in the research are provided. All these books, journals, and online references helped me to establish better foundation for my research. They helped me to defined the research problem and they directed me to the right objectives for the research.

Accessibility in Interaction Design. OpenLearn. Web. 2 Nov. 2009.

<<http://openlearn.open.ac.uk/course/view.php?id=2057>>. This article discusses what “disability” means. Some common impairment and disability groups are analyzed, considering people with visual impairments, hearing impairments, physical impairments, and dyslexia and other cognitive impairments. The relevant impairments and how they might affect a person's use of interactive devices are also described. Then the requirements that each disability group might have for computers, and for other interactive products are discussed. Searching and understanding the broader context of my research topic which is disability, this article helped me a lot to understand how people might fail in interacting.

It also helped me to know if assistive technologies could guide disabled people properly, providing a better life for them. Accessibility was the major component in this article and why it is important to be considered. Since there might be a interactive product in the end of my research proving the results and studies, it was critical to consider the issue from the interactivity of digital devices perspective.

Treating Autism. Autism Speaks Inc. Web. 5 Nov. 2009.

<<http://www.autismspeaks.org/treatment/index.php>>. It is about different established psychological methods for treating the children with ASDs. Applied Behavioral Analysis (ABA), Pivotal Response Therapy (PRT), Relationship Development Intervention (RDI), Training and Education of Autistic and Related Communication Handicapped Children (TEACCH), Social Communication/Emotional Regulation/Transactional Support (SCERTS) are some of the methods and treatments. It also discusses treatment for associated, biological and medical conditions associated with autism. It helped me better understand available proved and scientific treatments for the children with ASDs and helped me and will help me keep my solutions aligned and complementary to these treatments.

Cook, Albert M., and Susan M. Hussey. *Assistive Technologies: Principles and Practice*. St. Louis: Mosby, 2002. Print. One of the occupational therapist whom I interviewed, recommended this book to me. The book includes history of assistive technologies, special disabilities and the use of assistive technologies. This way I

learnt how assistive technologies could be helpful to overcome some of the problems for the people with special disabilities. This book has many case studies that help to understand the process, from finding problems to employing technologies to solve the problems.

Dixon, Pamela. "Autism, Educational Treatments." Encyclopedia of Applied Developmental Science (2004). Web. This article discusses what Asperger's symptoms are and how these disorders are defined. Then some project are introduced that have been done by some famous institutions that try to approach this cognitive disorder using Applied behavior analysis (ABA). Since I am studying different therapies, models and approaches treating Asperger's symptoms, this article helped me know how different programs at some famous institutions employ these methods.

Grandin, Temple. Thinking in Pictures, Expanded Edition My Life with Autism. New York: Vintage, 2006. Print. This book talks about autism by the one who is autistic. It clarifies how child with ASD visually thinks. It also helps us understand how autism could be diagnosed and what the sensory problems could be. It also helps us to know how people with ASDs struggle to communicate emotions and what are the signs and symbols for that. This book is my holy book in the research project that

I am doing and it is so invaluable because it is written by the person with ASD who has been able to reveal what she thinks and what she wants and how things could get changed and how people with ASDs should be understood.

Howlin, Patricia. *Autism: Preparing for Adulthood*. London: Routledge, 1997. Print. This book is about the problems that someone with ASD might have in adulthood. Book author is consultant clinical psychologist and senior lecturer in psychology and this provided me with information again by an expert who is trying to understand and study fundamental deficits of autism and the impacts these can have on the lives of affected adults. While I am spotting some of the major symptoms of the children with ASDs that I could relate them to the severe symptoms that might remain in adulthood and are of the most importance.

Perry, Nancy. *Adults on the Autism Spectrum Leave the Nest Achieving Supported Independence*. Philadelphia: Jessica Kingsley, 2008. Print. This book gives a broader picture of autism including how parents and the children with ASDs are involved dealing with each other and how family could play a role in improving autism. It also discusses adults with disabilities like autism and how it might affect their lives and others living with them and taking care of them. This book helped me at two major points I was looking for: the first one is considering the role of parents controlling and improving autism. The second point is what the situation is for adult with ASD and what the problems they have in daily life.

Rehfeldt, Ruth Anne. "Attention Training Procedures." Encyclopedia of Behavior Modification and Cognitive Behavior Therapy (2005). Web. This article discusses that attending to only a restricted number of relevant stimulus features, or stimulus overselectivity, is a common barrier for children with autism. Then some of the attention training procedures are included. It helped me to understand some of the major deficits of the children with ASDs within educational environments.

Sleeswijk Visser, Froukje, Pieter Jan Stappers, and Remko Vander Lugt. "Contextmapping: Experiences from Practice." CoDesign: International Journal of CoCreation in Design and the Arts 1.2 (2005). Print. This article talks about mapping the contexts of people's interaction with products. Some insights, based on conducting user studies with generative techniques, are shared, along with a case study showing the techniques in details. This paper generally introduced context mapping to me and what the process is. It helps me know how I can engage my audience with my research and document and preserve the observations and results.

Stappers, P.J, H. Van Rijn, S.C. Kistemaker, A.E. Hennink, and F. Sleeswijk Visser. "Designing for Other People's Strengths and Motivations: Three Cases Using Context, Visions, and Experiential Prototypes." Advanced Engineering Informatics, Special Issue on Human-Centered Product Design and Development

23 (2008): 174-83. Print. Participatory techniques in the early phases of design, and how they impact both the content and the methods of designing have been discussed in this paper. Key elements are found in the establishing of needs, requirements, design visions, and early experience prototyping. The paper describes three design projects in which intensive user studies, clear vision development, and a working prototype were realized. What I learnt from this paper was that how contextual push could give a direction to the design process and how it might be integrated into the human-centered product design.

"Topics in Design: Design for Autism." Stanford's First Official Classes for the New D.School, Stanford Institute of Design. Stanford University Official Website. Web. 13 Nov. 2009. <http://ldt.stanford.edu/~emobrien/autism_details1.html>. This article is about the attempts of a team who conducted ethnographic research over a 10-week period in the home of a girl with Autism Spectrum Disorder (ASD). The goal was to design a product that could help her cognitively, physically or emotionally. It helped me to figure out what the requirements of such a project might be, what are the needed for the in-depth research of the children with ASDs. I learned how ethnographic research of the person with ASD should be conducted in terms of their cognitive, social and emotional needs.

Van Rijn, Helma, Froukje Sleeswijk Visser, and Pieter Jan Stappers. Connecting through Interacting: Toys That Help Designers Learn from Children with Autism by Playing with

Them. International Association of Societies of Design Research, 2009. Print. This paper is about developing methods and tools that help designers bridge the gap between designers and people. In this paper, designers gained understanding for children with autism by means of direct contact. They used a set of toys to support and stimulate designers in interacting with these children. These interactions result in empathy for children with autism, helping designers to design products that better fit these children's needs. This paper discusses the role of these toys in structuring the interactions and bringing out learning points. This paper helped me understand how I could interact with the children with ASDs and how a product specially designed for these children could stimulate their emotions.

Appendix B: Discussion Session 1 Transcript, Participant X1

Participant “X1”, Parent/Expert | 06-20-2011

After a brief introduction – let X1 read and sign the consent form and saying thank you to her for accepting to be part of this research - that was not recorded, I started the discussion.

Majid: So basically I have 5 social skills and I have 3 - kind of - strategies, or methods or you know ways that could help these social skills. I have provided some situations for each of these that actually describe the social skill and the other one is the design opportunities that I am thinking about for each of the social skills. I have thought of some ways that could help the children with ASDs to improve those social skills. So basically that is two parts of each of these sheets. I have like 5 social skills like entry/approach, eye-contact, joint attention, maintenance skills, and communication of needs and ideas, and three ways or strategies , or approaches that I could take to help them, like social interaction, play and emotional expression. I am totally open to any kind of that you may have for each of them. If you are thinking that I am missing any kind of social skill or if there are some other ways that I have not thought about them yet.

That's the whole idea. We will discuss each of the situations for each of the social skills and the design opportunities that I have figured out; and what other design opportunities or solutions could be for each of the social skills, like for the instructor, how the instructor could use these kinds of solutions to help the child, to develop his/her social skills, I mean the child with ASD; or what could it be for parent or for the peer, I mean the one that the child is playing with. So these are five. Just feel free, if you wanna read through them one by one. You can use whatever you want. You can put some sticker note, or you can write, or draw, or you can just talk about it, because I am just recording.

Pattern 1: Communication of Needs and Ideas

X1: Ok. You may wanna pause when I read it. (Pat starts reading the first social skill sheet)

X1: I am a little confused here. They are going to draw this or they're going to ... to help the child learn to communicate with parent and also later on could use the same symbol. So they're gonna use like a PECS or they're gonna use the hand symbol and learn what the hand symbol is. Most kids learn this; for example when they want to go to the bathroom. So that's the symbol they generally use. Now, some people use PECS, Picture Exchange. Are you familiar with PECS?

Majid: No, if you could describe it.

X1: Picture Exchange Communication System. I haven't used, well I have used it just a little bit myself. Speech pathologists mention that. There is an exchange and the child gives a symbol to the person to get what they want. They start doing that with something desired item, like the food item, a treat of some sort, and they gradually they learn that if

they; they can do something or get something by giving this picture, stylized drawing.

And ...

Majid: And it is for the children ASDs in the market?

X1: yes yes. PECS. If you Google PECS, you'll be able to see what it is. So that's already the approach that ... and there are line drawings. For some children who also have intellectual disabilities, depending on the severity, that kind of a line drawing, is too abstract. And need a actual picture. So that's the option that depends on how developmentally where the child is. I think this is a great idea. My only concern could be, would it be more intriguing? Whether they get confused if the animal changes color? Like chameleon? But I think that ... because most children for cartoon they know things sometimes change. But in actuality what happens. Ok. So the symbol picture, Ok. That's really good. And that's what the PECS come in them. Or signing ...

Majid: You mean the sign language by hands?

X1: yes yes. That's T for toilet. This is what they do. This is what they do. That's the ... and signing, American Sign Language. It's T. It's a symbol for T. So they just do T for toilet. This is time out and this is T.

Majid: When you compare it to the pictures, images, would it be easier for the child to understand the language or they will understand the picture more easier, or it may depend on the child?

X1: Well the picture would be easier but if you pair them and say T, and especially if they in sort of a classroom situation or one-on-one and they see other children getting up to leave after they do this and get recognized; that becomes a little easier because they

don't have to actually do the trick themselves to see if that works. So they are seeing these other people did this, they said ok and get to go. Anyway, I just want to let you know that sign for T is already in use. As far as peers concerned, let's see, what are the opportunities?

Majid: yeah, so that they could communicate with eachother.

X1: you know what they could do is the puzzle too. A puzzle piece with the, either, or some sort of magnet with the picture of a child doing that. And that way they may not have to, some kids esp. kids with Asperger's, have poor fine motor. They may find it hard to do this. That's part of the problem with teaching signing because their dexterity is poor. So having something that they could hold up, this is will be easier. And then you could actually have a puzzle, that's a picture. A picture of bathroom, a picture of child going to the bathroom door or something; or washing their hands or whatever it is and they pull up that piece to show what it is and by having a picture board or a form puzzle, it would give them the context. I think you were in the same context there. And likewise for peers, for children this young, that form board kind of puzzle, is age appropriate for those children as well. Even in an inclusive setting they can use that. And I'm sure you've seen young children puzzles sometimes, depending on whether how they made it. Sometime they have little pegs on them or bigger pegs depending on the size will be easier for them to remove them from the place. So that's a toy that also teaching them skills, so anyway, I think that was good.

Pattern 2: Entry/Approach Skills

X1: This is certainly a challenge for children on spectrum. Ok, the challenge here is sensory defensiveness. Some kids refuse to wear hats, that's not everybody. I would have some sort of slightly tweaked or alternatives. Most of kids like to wear hats that's true but some might not. That's a great idea. I like the idea of that. The problem that kids run into this is ... this is good because it is more structures. If it is unstructured and they're playing they don't know, the child with autism doesn't know where they are in the game. Or with Asperger's syndrome or higher functioning kids as well. They see this kid is playing and they find themselves in the middle of the scenario of play. So this is good because it phased in. Because it is more structured ...

Majid: and that sensory defensiveness ...

X1: That would be a problem if they wear hat, because if the non-autistic child takes the hat put on the autistic kid's head, it's a negative interaction; it is bold and maybe it will be aggressive. I don't think that's gonna happen too often.

If you wanna have my feedback I'm just saying that's the only problem I see there. Now.. Ok. So that's a good introductory skill. Then the question is gonna be transitioning. That would go down to here (violet post-it note). A problem for lots of kids and some of the criticism for poor ABA programs is that they teach skills but then ... it only works in this context. So this is great for giving them approach and say hi but then there has to be the development of transition. So you could do this now what about if you're out of the playground; you can't put the hats on the stranger's head or adult's head that you wanna say "hello"! And then the next thing would be: what is the – moving beyond this is – then what? Ok they said hello; next get another exchange going. Another approach is –

strategic turn taking. My son roll the ball back and forth and then you can say ok, push the ball to you and then push it back to me and then they translate ... move beyond that conversation. So for those who don't talk, that's another option. Although this "hat" thing. It's a good thing; it could be lots of fun provided doesn't get out of hand ...

Majid: So do you have any idea for that transition? I think it's really important what they learn at school ... in the real life how they can do it?

X1: Maybe ... with the hand gesture for putting the hat on, just convert that to gradually to wave and say "hi" a greeting and then fade the hand gradually to just this ... from that to gradually to this (showing with her hands). I don't know but that's the possibility.

Majid: Any ideas for peers?

X1: I think the hat has implicit because they are all doing it. The peers could do that. For peer ... the peer could model ... model the next step ... so the peer could say ... hello, my name is ... or you know I'm 4 years old ... or I have a sister and a brother or I like Elmo, do you like Elmo? ... Some sort of conversation starts that they can work on

Pattern 3: Eye Contact

X1: Eye contact is very controversial. It used to be a huge special education for the good looking, they will reward them for good looking but as they approached adults with autism, they found while it's socially expected – that one person looks one another – some people adult with autism have said that they find listening and eye contact mutually exclusive; that if I am looking at you my ears are shut down. And sometimes they find it actually painful to look people in the eye. So, they teach them more refined strategies occasionally glancing. Even if they focus on your mouth, your shoulder, just they look

up, so they don't seem so impersonal, but they can continue to function. Teachers would spend a lot of time on trying to get a child's attention thinking that by having them look at them, that meant that they are paying attention. But not in actuality finding that it may not be the case. For some children they are looking at you, but they are not listening anymore because they force all the energy and try to look at you. So it may or may not be a good goal. So there has to be individual basis. Temple Grandin said that she was in her forties before she found that people communicate with their eyes at all! So if you don't see that as location to get information, they look at people's mouth to read the lips and follow the conversation! So, what suggestions do we have for eye contact? I would say find ... this is interesting ... I wouldn't exclusively do this but at least that's the possibility to get kids to use eyes for reference; and if the eye cards are complete failure, then that may indicate that the child is too painful ... but may teach them to look at people's eyes ... and the other thing ... and then I would try to find something ... like the pirate with a bird on the shoulder, so the child can't look at your eyes so they glance at that direction; they avoid the eyes but they look at your head ... so to pretend and walk around with the bird on your shoulder ... So I have a bird on my shoulder and gradually it gets faded ... one of the things that they use for school age children is that they try to use non-verbal cues so they don't have to make big deal out of the fact that child is different. So the teacher could end up doing this to remind that you don't have to look me in the face but I want you to remember to look toward me when you're talking because that's what social expectation is; and then it could fade the hand on shoulder. That's a little elaborate but it might work.

Pattern 4: Joint Attention

X1: Joint attention, yeah it is a real problem. I think one of the keys here with joint attention depending on the level of functioning of the child is trying to find a socially acceptable or more generalizable thing that the child is interested in than others are interested in; that the child likes so much; it is so motivational that they want to share; it's easier with Asperger's kids because sometimes they have a topic that really fascinates them and you can try to teach reciprocity; ok, I listen to all of the details you have about dinosaurs, thank you for sharing that; now I am going to share with you and would like you to listen politely just as we listened politely. And peers can model listening and participating appropriately.

I like this, the balls. It will be nice if the balls had something inside them that was colorful and spin around like the pin inside ... something that was encased in them, or perhaps something that lights up; or there are little balls inside. My children have toys like beads in jellies and they move them up and down. And I found that it's fascinating for all children. It's difficult to have the child safe. You want to make sure that it's tightly sealed and it's not gonna open up or it's not gonna break. So maybe the liquid would be a good thing. And add sound and light to make it more interesting because lots of kids they use heavy cords and balls to work on fine motor skills. This is supposed to be fun and you wanna add the fun thing.

Majid: So do you think that when they are playing they should be all kids with ASD or ...

X1: I would have the combination ... next level describe the qualities of the ball. That is good for language but you know, if they are ready for that obviously. If it's interesting

enough, if peers are young, and it's interesting they don't have to have disabilities they can watch it and enjoy.

Majid: In general, do you think that it is helpful if they play with other kids?

X1: it depend on the problem but it definitely helps if the play with other kids. Often ABA programs, my children didn't go to this program; the first skill that they have to work on depending on the child's level is being able to sit still and what being under what they call instructional control. So if they can't be maintained in the room then nothing is gonna happen. So I think at that stage, you know, and then they need one-on-one. Then another person could be a distraction. And they gradually increase that level. And once they teach some basic one-on-one skills then the idea is to gradually increase the number of children the child could be with ... I think ... but for the most involved ones it could be up to 35 to 40 hours a week one-on-one instruction with no one else. If they are higher functioning and they are to be in the school setting, school room, then they like to bring in typical peers to show what the expected behaviors are and to participate. And often higher functioning kids may be better academically; they may have better academic skills so that's an appropriate thing for them to do; they are behind with social skills. You know the place skills. But for kids with Asperger's syndrome, for example, a number of them, not a huge number but some, learn o read spontaneously. So reading instead of being the witness that it is for the children with learning disabilities; decoding words is the skill. Comprehension is more difficult but decoding, reading out loud is easy. Basic math skills may also be easy. So it's so abstract when it gets to word problems. There is a lot of

social knowledge that underscores lots of those problems and reading comprehension.

When it gets to that level those kids have a problem.

Pattern 5: Maintenance Skills

X1: take turns, follow rules. Ok, this is good; and co-operate.

I'm not sure about the stickers. I think that this would be good, but it might be better if it were a necklace. Stickers are ok if people have stickers and you can put on clothes and take off. But again tactile sensitivity ... some children with autism refuse to wear band-aids. The limitation would be whether or not it's sticker or necklace. Plus if it were ... my elder son doesn't have autism. His first day in kindergarten, his teacher took slices of a branch of a tree and wrote their names on it. You can have something like this with sort of an emblem on a piece of cord and that would be more durable and sticker could get worn out. She gave everybody that so that children could learn and recognize their own names and others' names and it was a souvenir too.

For the parents, that works too. Maybe they could have sticker that teach them emotion as well. You know, the parents smiling, the parents frowning or something in that way. If they did something they were not supposed to do, you know, parents not happy, parent is happy ... I heard a story once about that they were using one of those souvenirs things you get at the souvenir shop, that was like "emotional thermometer" and they were trying to teach this child on spectrum that people have different gradations of happiness and anger ... so dad came by and always changed mom to be in the bad mood. Anyway, and that is strategy, actually that thermometer and option that they use now with five gradations try to teach kids: how appropriate it is and how to read people's expressions

and body language; so that would be the next level up for the sticker that if mom and dad are not happy put the sticker on; it looks like a reward of wearing a badge for winning a medal.

Majid: So is there any other social skills more than these five that I should consider and I haven't thought of?

X1: Pretend and play that's what I wanted to say that you have it here ... the imaginative play with their peers. Let me think. As far as interacting with others these are the main ones. There are some skills they need to learn and you might be able to address in industrial design ... such as eating is a real issue ... because many of them are really fuzzy about what to eat ... but in most schools they have snacks, sitting still during that time, ... I don't know but that would be something else you could address. Sometimes they try to address just the table setting ... you know to define your space ... and there might be some way to engage that because many of the children would qualify for hyper-activity and they don't wanna sit still; so how do you keep them sitting still and do something to reward them; that would be the other thing that comes to my mind.

And, ... they love water. Many not all ... they are all individuals. A lot of kids like water play ... and they like bathing; some kids refuse to shower because it feels that sensory thing is overwhelming. They like taking bath more than shower, many; there are no absolutes. So that's another thing just to keep in mind. Water play tends to be preferred activity. So that might be something that could incorporate it at some level as an option.

Pattern 6: Social Interaction

X1: this is good. Similar to the PECS. There is a professor here now. Helen Malone, she is in educational I think; she's been doing research on video modeling versus photo prompting. And they're finding that the ... I just heard her speaking on this briefly about some of her research that the whole video is less effective than the series of pictures. Once the child gets ... say it's like a seven-step activity ... if the child learns step five, you teach that and you add to that piece ... from wherever starting it, from the beginning or in the end. Just pick up near where they've got some accomplishment and build on that. What I'm saying is the picture is a good idea but you might wanna ... if necessary break that down even more. I like this ... this is similar to the PECS idea. So that seems to be good as far as I'm concerned. And, maybe again, you wanna try it even with magnets if you're talking about food magnets on the refrigerator. Show the desired food and get the food out of the red box or something ... so right there and then maybe gradually move it to another room so that you do not have to keep the kid in the kitchen to do the activity, to kind of fade it.

Pattern 7: Play

X1: I would say "many" autistic children do not exhibit pretend ...

Now, this is good. The only weakness, one of the problems in clinic with pretend and play, it's the weakness in strength that you build on. Many of those children they because they have could memories they recite videos or whole scenes from videos, things they saw on TV; and people think that they are pretending. That batman did this and that. If you bring a peer s/he will say: No, batman didn't day that he said this ... you know typical kids try to make up their own adventures ... No, this is what happened and if it

has happened in that order you can't change it. So, first of all, parents and relatives mistakes that the child is engaging imagination while they are only reciting something and they are not originating. And they are rigid. They are repeating not with usual objects but repeating the same usage for the same toy. My boy used to take a toy car and put it on the roof and just spin the car wheel and doesn't play with the car. Typical kids play with the car. But you might be able to reduce some of that rigidity. Grand ma is a good place to begin if they have grandparents and use to live with grandparents and build on it with some familiar characters that the child likes from the books or there is particular animal that they like; and try to work on that rigidity try to get the child to be a little more flexible. And reward them for willing to be flexible. And have the child perhaps – this would be for more advanced child – one of the problems they have at literature, they try to teach ... have them predictions we can call ... to predict what happens in the book. How do you think it could end based on very short story? So have them predict what could happen. That's very hard because it requires a lot of social knowledge. But maybe given the facts, give just the repertoire of stories that heard about that character, at least they can come up with some options to learn, mix and match. You know in episode 6 he did this, it wasn't in episode 2. We can pull out one and ask them about three things that could happen after this. And three things that could happen before. And you can use prepositions too, like before, after, yesterday, today. Tonight, later on today, soon ... you might be able to bring those things as well. And prediction is more advanced skill as I said for kids here in fourth grade that's one of the things they want to see them do and

predict what happens next. And that's peer part. And you are talking about the younger child and I'd see how you can extend that.

Pattern 8: Emotional Expression

X1: I like this one too. This is good. Doing peek-a-boo because they like doing peek-a-boo. Actually my middle son in pre-school used to do things like this that all the children like to do. And they had a song: too quick my friend in winter time as they go passing by, I hide behind my big snow man, and then I shout "Hi"; and then the little kid will say hi. So the kids love to do that. And that was a class of kids all with intellectual disabilities. So this is not too far from that. And they could play hide-and-seek and do it with physical things. And then you could build from what that faces and maybe have them choose from the array of faces, in situation you know. Mom's on telephone, you know every child wants to talk with mom when she is on telephone. Whatever happens and if the world comes to an end and if every mother is on the phone they wanna talk with the mom and mom will say that I'm busy call me later. So give them a doll as the mom on the phone and show different things "when somebody has a time to play" or "they are ready to talk" versus grandma sitting in the rocking chair, oh that's a good time to go and ask for something she might want to talk and she might have time to read to you now. When moms alone not a good time for that. They have to have concrete situations and it takes them a long time to go from concrete to abstract. So you build up, in my experience, they build a bunch of concrete experiences and then they can extrapolate from that. That's something that Temple Grandin talks about it too. Her mind works like a CD and when she has a problem at work, she search through all these experiences she has and tries to

see if there is one that matches. That's what we will be doing on a much more basic level. And then probably with the reward component, of some sort, if it's stickers like stickers, or the face, or keep getting the medal or badge, because they do the right one; as the reinforcement as they learn to match up the right one and then you could make the more sophisticated ones as they are successful matching up these emotional happy faces with ... and this is hard ... there are computer software programs ... there was one several years ago from England I think, that has different scenarios more for Asperger's; and you suppose to figure out how the person felt or what ... oh there is one for two different expressions, is this happy or whatever ... that's hard and I think some of them are hard for anybody. Some of them have solid differences but the simplified ones are not ... there are magnets that could put on them happy, scared, and that will be training, surprised, embarrassed ... you work with those first and then move them to get to some abstract.

Majid: So do you think that those applications and emotional faces are helpful or ...

X1: Some of them are abstract as just drawing of the faces. You know the embarrassed one has some pink cheeks ... but I think the few of these simple ones will be the start and then you move to act and poster and to going back to see whether the child is able to transfer one specific instance to another item; and to apply that knowledge correctly and to know whether they are ready or not to try a different approach.

Appendix C: Discussion Session 2 Transcript, Participant X2

Participant “X2” Instructor | 06-27-2011

After a brief introduction – let X2 read and sign the consent form and saying thank you to her for accepting to be part of this research and what sheets of patterns are, we started the discussion.

Pattern 1: Maintenance Skills

X2: Ok, as far as whose turn is it? So we’re talking about rules and turns. So it’s like say Bob’s turn he would take the Bob’s sticker and put it ... that will be a good interactive way ... I will just write it on a paper ...

First of all stickers are really like awesome for kids ... they love stickers and they are a good way motivator for them ... so it is great if it has the actual picture of the child rather than the cartoon picture ... esp for the kids with autism more realistic is better ... So I like this is sticker because all kids like sticker

Majid: So why do they like stickers?

X2: Stickers are a way to ... a lot of we use them as the reward ... they can put it on any where that they want it and sometimes it is the stickiness of the sticker ... I really like it if it has the real picture of the children because they can recognize it and say, ok this is my sticker ... this is my turn or this is where I should be ... because I use stickers a lot here ... sometimes they don't care if I am using stickers but I would say 98 percent of the kids will love stickers.

Majid: Are the kids with ASDs more interested in stickers? Or more interested?

X2: It depends on the child. Yes. I've seen where they are more interested. For example A doesn't care about stickers and he will eat them. But for higher functioning kids it is really interesting ... and stickers with the real pictures of the kids on it is really motivating ... for example stickers with the pictures of the cartoon characters ... for example like "Thomas the Tank Engine" ... it's a TV show ... but we use stickers with that picture and he got the sticker for each activity he did and he will do whatever for the "Thomas the Tank Engine" so stickers are good motivators.

For the parents they can use it at home as well. I have told parents to make sticker charts, like, bathroom, routine things they need do at home ... like structured routine ... so that's a good ...

Majid: Any other idea rather the stickers? Any other kind of solution or idea that you always wanted to use in the class or see in the market?

X2: I think interactive schedule is cool ... we use some schedule in the class but one that ... I know there are some schedule that could add pictures to them ... like you press it and then it says where you are supposed to go ... like maybe it's a picture of the block

and you press it and then it says block ... but something that it lights up ... I know that with some of my lower-functioning kids not autistic necessarily but ... something that lights up or makes a sound is super cool ... [she brings a device and talks about it] ... I don't know how to use this ... so you are supposed to put the picture and you somehow record and ... I kind of find it really hard to use it and it doesn't light up ... so that would be cool if it could light up ... or even vibrated ... I think A will like it ... as far as following a routine or even you may put a rule here like "walk" or something ...

Majid: You think that they will read it and do it?

X2: for this a picture ... I haven't worked with a lot of older kids ... for the younger ones pictures are the best thing ... or something that you can change the picture ... anyway you can make it interactive and have some kind of "cause and effect" thing is awesome ... I like the stickers that sounds really cool ... the stickers are awesome.

Pattern 2: Joint Attention

X2: I am thinking of A ... and this is really difficult for him ... he is really restless and it is really difficult for him to stick with one thing ... and eye contact is difficult for him ... attention in general is hard for him let alone if somebody is there ... if I am trying to do something with him ... it's difficult for me to see he can do it ... it's difficult for him to do ... but maybe will be good for older pre-school kids ... because right now I am working on the eye contact, for him, if he likes to swing, before he swings I will say A look here ... that's all about him right now ... as far as toys go ...

Majid: Any other idea that could help joint attention?

X2: I could see where that could be a really good idea ... but it's difficult to listen to the instruction and to follow it physically ... say, move the ball to a certain color ... when they actually reach that does something happen? I'm just gonna say [she writes down her idea] ... for example balls could light up ... I think it will make it motivating at least for certain age group ...

Pattern 3: Eye Contact

X2: Would they hold this in front of their head? In front of their faces, duh, ... eye contact is so hard ... I can see where that would be a really good though ... I think for younger kids almost like cartoonish ... you know cool characters on front of the cards ... to be more motivating to do it ... as far as technology goes ... because everything that we do is that if you do this you will get this ...but you don't always wanna do it like that ... so I think specially for older kids in pre-school this is a good ...it will be hard to see if they are actually making the eye contact.

Majid: Do you use some special tools to let them do eye contact?

X2: At one point they used bubbles ... when he looked they blow bubbles ... and then maybe started blowing bubbles and when he looked they were like good job A ... so things that he really likes ... I started with swinging ...I thought of all the things that were motivating to him ... and he didn't do a eye contact ... swinging is what he really loves ... like if you let him swing he will do it for all day and he will never stops ... and when I stop him, he has to do something to start again ... and so I would stop him and ask A look here and as he is doing it more regularly I will wait 5 minutes ...

Majid: How are they gonna do this in the real life in the social life? Do you have any idea for that? ... because when you focus more on eye contact ...

X2: Making eye contact is a big step for him now, like, for higher-functioning ... this thing will be a really good for the guy next door ... but for A ... he has not at the stage even hold that ... the social interaction for him is if does something he gets something ... he will not do it without the reward ... that child would do ... he is more higher functioning ... you can do that during the circle time for a while and interact that way and then you would say you can play with some games after that ... still he is getting some reward for that ... it's not such an immediate ... A has a long way before he could be doing anything like ... without getting a reward ... for eye contact ... sometimes I would say hey A come and give me a hug ... he does give me a hug and kiss but he doesn't look ... he looks in the other way ... it's almost like he is doing it because I'll leave him alone ... I'll be like A give me a hug, A give me a hug ... I think there is nothing other than this concept of reward that be worthwhile at this point ...

Majid: Is it the same for the peers? They don't have any eye contact when they play in the class?

X2: Oh yeah he doesn't care at all

Majid: And how about the parents?

X2: same. Gives them hug and stuff. And they are really happy with that. Like he smiles when he is hugging me but it's almost like ... I do love you but I don't want to be this close to you right now ... and that's why he averts his eyes ... he stays away from the kids a lot ... we had a new kid who wasn't familiar with A ... so he would go up and

kind of like touch him; and A didn't look at him but he smiled and he was kind of like ... he almost seems to be intrigued by the kids that are approaching him because most of them didn't ... he acknowledged him but not like visually, look at him ... if he did, it was like for a brief second and turned around ... it will finally work for him but not now. It's so far away for him now ...

Pattern 4: Entry/Approach Skills

X2: The child will say hello? Put the hat on the peer's head and make the eye contact? I would start with the instructor and the peer or the child with ASD... kind of doing something like one on one or have two instructors or ... but again it depends on where the child is ... and this is something that you can send with the parent to home too ... this is like with two instructors and one instructor will be in the back of the child and out the head on the autistic's child head and say hello ... and then I would say now it's your turn and I would have that instructor do it hand to hand and put the head of my head ... and then have them say or maybe even take the child's hand and say hello ... like take turns ... that for a while ... I don't know how long I would do ... maybe probably for couple of days ... depending on the child where the child is ... in 10 minute session each day ... and starting doing it at the circle time each day and maybe at the beginning of the day ... because that's when we say hello ... and doing that with child saying hello ... maybe explaining it first and then do it and let them other children to do it ... and you may need that second instructor with that child to help them do it and then eventually will catch on and watch it and learn it ... you also should think about ... certain children may not like having hat on their head ... A will probably rip it off ... but you could maybe have like

even smiley face on it ... or you could maybe have a badge that does not rub against the skin ... now I am thinking that the head is probably not the best thing because ... but there are kids that like the hat ... like the kid over there ... he goes through phases and likes to wear a hat when going to school every day, like the winter hat ... and all day every day , for him it would be, but like A they would hate it ... but something that they could hold in their hands or even the sticker ... I don't know ... something like that ... I like the idea that eventually involving everyone ... but it should start with instructors first ...

Pattern 5: Communication of Needs and Ideas

X2: That's cool. I like the way it changes the color ... The only thing I can think of right now is that we have toys like animals, but the color doesn't change, but they switch them and then they move ... I do like the idea that they move but they are bigger ... and also vibration is a good thing with this age any way ... like for the lower functioning is so cool ... these toys are good for the kids with ASDs because they do like multiple things and they are ... they don't wanna touch a button if they are not gonna get anything .. so something like vibration, or noise, or it lights up ...

But as far as the bathroom [idea], I have never seen anything like ... that would be cool ... something like schedule or certain activity will be really cool ... I've never seen that ...

Majid: How do they say it when they need something?

X2: just a picture ... which is not motivating all the time ... but if it is interactive would be better ... the thing that we use it pictures ... for food like PECS ...

Majid: He [A] doesn't start communicating with you, that I need this or ... ?

X2: No. He will just take it or go ... for snacks for instance I take raisin and a cracker ... and then try to make him to make a choice ... but for the picture ... he just likes to eat them .. because it's not as realistic ... it just doesn't have any meaning to him ... so a raisin or cracker ... so we have somebody behind him who helps him act like actually ... point to each one ... then I would say cracker or raisin ... and then let his hands go and he picks what he wants ... but picture is not a good thing for him ... so that's difficult to have the picture and say I want to go to the bathroom ... so he is not quite to that point where he even cares to go to the bathroom ... usually he's wet ... he doesn't care even when he is sitting there ... so ... it's not like having a wet diaper, it's not aversive and he doesn't care ... but for food he cares about sometimes ... he wants something ... he never asks for it ... if I am at the table and I got food ... and he is playing, he gets to the table to have some food but I ask him, hey A you need to sit down and by the end of the day he understood that you need to sit down to get it ... but he is not like that, give me it ... so we have to help him choose ... for him something interactive will be good ... something like bells and whistles something that he could ... like the puzzles ... but again he is not like doing the puzzle and give it to me ... but in the future there could be something that he could do and put it together ... but I like the "color", "touch", "the senses" ... with him he is such a oral person but I would not even think that this would be something that he would associate with that what he needs ... and again ...

And then they put the simple shapes together? So that's what I think for him in the future like putting them together like a puzzle ... because a lot of time puzzles are big things

like figuring something out ... but at this point it wouldn't ... but I think it would be really cool esp. for at home because it is really simple ... for parent to do like easily ... I think it could be something that he could do with a peer ... puzzle is something that anyone could do ... so they could do it together ... like that toy that lights up and say things ... it's like childish toy but other kids like it ... and so it's not like novel toy for the kids with ASDs and everybody could play with it ...

Pattern 6: Emotional Expression

X2: oh that's cool. That would be neat ... I think that would be neat to have ... like the felt board pieces that they could make faces on it ... or even stickers ... maybe even like magnets ... and they could use it at school and at home ... I'm just imagining a mad child with autism that ... could put the mad face of the magnet on the door to say that I'm mad don't come in here ... for like felt board, or stickers would be motivating ... but magnet will be really easy to use ... or even a book, that change the face on each one ... maybe it could be sad and they will put it together the sad face on that page ... and you could use any of that school ... esp. when they child is not having good day at school ... maybe giving them one of these sort of things ... to like maybe work it out visually ...so that you know what's up? So this would be something that ... he [A] can't even express if he is mad ... or he is sad or happy or he is hurting ... maybe even like backgrounds like ... maybe using band-aids to say that someone is hurt ... tears or something ... maybe they could band-aids ... so it's not just being sad but I'm sad because I am hurt or I'm sad

because I am sick or ... adding some tears ... because a lot of times I think A doesn't feel well ... he has some stomach issues but I can't say if he is so mad at me or if he is like miserable ... and he can't verbalize it ...

Pattern 7: Play

X2: pretend play is so hard with them. For him it's not realistic at this point ... they like videos lot of kids with autism and I am thinking if you can act out something that they like ... like train ... sing it or do it ... I'm thinking if do this or parent and showing them ... they are not interested in what I am doing but they are super interested in what is cartoon character doing on TV ... somehow learning it through that ... and maybe having the unrealistic things doing it and then having the children model it and giving them props to go with that ... and then like interactive play and pretend ... I have never seen interactive pretend and play ... I know A likes farm animals a lot ... he watches the show but not interested in the farm toys ... because they like to see it on TV and they don't care if I am doing it ... and the next door guy with autism ... he is really into videos ... and he uses costumes that he sees in the videos ... we have cooking toys and he is not interested in them let alone that they understand that they pretend food items and not real ... that's a tough ... props from a show that they could see first ... like a song or dance that props go with that.

Pattern 8: Social Interaction

X2: This is kind of like the picture exchange symbols ... that could be like a cool game at circle time ... you could make it into a game ... I would start it between instructor and the child with autism and then turn it into class-wide game ... so it's becoming more like

a social game rather than just ... so it's not something like I just want this picture ... I think that would be a cool game that you could do ... I don't know how else you could do it ... I don't know like a cooler things than pictures

Majid: Do you have any comment on the whole thing if I am missing anything?

X2: I think it's really cool. I just I wish it was out there. I know there are things out there but ... I don't really use anything in the market for these social skills ...

Majid: Do you have anything like a goal for these social skills for children in the class?

X2: turn-taking is the one we use a lot ... as like what I said it's all about motivation ... if it's your turn you take a piece of candy ... just playing with random things like stickers ...

Appendix D: Discussion Session 3 Transcript, Participant X3 and X4

Participant “X3” Instructor and “X4” Parent/Expert | 06-29-2011

After a brief introduction – let X3 and X4 read and sign the consent form and saying thank you to them for accepting to be part of this research and what sheets of patterns are, we started the discussion.

Pattern 1: Joint Attention

X4: I like the opportunities that you came up with. The only thing that I would say is that for a lot of kids it's not gonna hold their attention that much. So if you could attach, say, something that they are really into it, like, the cars, the newly released movie of the cars and its characters. Use these kinds of things and maybe match the color; it's something that they are interested in. I mean because a lot of times, I mean my little guy, I mean if he is not interested you're not gonna get what you want. But if something that he is interested in, then you're gonna be able to have him follow that. So what I am saying is that you should probably know about the child who is coming. You can go whatever they're interested. Do you remember that child that he was interested in toilets and how they work. Like the weirdest thing and his mom always buys him little toilets.

Majid: One of the things that I've discussed with some parents, they said that it could not be just joint attention or eye contact. How this transition could happen that, what they learn in class could be used in the real life when they interacting with people socially? Do you have any idea for that?

X4: One of the things that we use for my little guy is that we use specific cues that could help him to look this way or make your voice louder ... One of them is that when I am talking to him, I'll just touch my throat like this and he knows that he has to talk louder so that we can hear him. For eye gaze sometime I may use snap sometimes then he will look at me. But to transfer that into the real life I mean now is like, hey look at me, look this way, when I am talking to you and I think that's a natural cue that you would say to the kids brought up in natural environment. So I think it could be something as easy as that. For kids it is more difficult to make them to make eye contact ...

X3: I mean I think it is a building process so what start with like the remote control car, you keep going back to that one but ... I mean you start there because that's what they interest in and they learn even if they just remember the pattern of person-car, person-whatever ... that's at least building a framework for it. And eventually that will become naturally, oh, this do this, so that then you could move on to the place that when someone is smiling and look at you that means s/he is happy ... but I think it's more like the making those patterns of behavior automatic ... so you can eventually move to the "look at me", or whatever is next but ... and it's like what they practice more it becomes natural I guess

X4: And you can say there are 3 steps and then there is a reward at the bottom, you go do this one, and then this one and then there is a reward whatever it is. So the first one is look at the board, get your instructions, look at your teacher make sure you're following this, do your work and look back again and make sure you get your reward down back here. So the thing that is nice about that is you walk to the steps and then eventually it becomes a natural process and this completely fades away ...

X3: So they don't have to be like ... ok, first teacher, because it's a natural thing of, like, checking ... So I think it's more like the repetition of whatever you're doing and it builds it ...

Majid: So is there any tool or toy or any kind of thing in the market to be used for that or ...?

X4: In the market, no, I think the lot of things is that a lot of times you can customize it ... for some kids it could be just one step process or two steps processes that they build on it. So I think being able to create your own type of tool. And there are lots of stuff out there and you can buy them in the store ...

X3: My friend's kid has a bear and responds to the kid's voice. So, it's like say ball and It says ball. And then like good job ... it's an interaction with toy but you will really wanna build a social interaction. I think there are a lot of toys out there that they have that but it's more the kid and the toy, or the kid and the computer program. Than like another person in that situation. So if there is probably some good social learning, computer games like that, to do it with other people but you have to do it on your own rather than there is another person there. I'm seeing that for the kid, the iPad app. Or whatever it is,

that person has to facilitate between you and the kid, not just the computer program. But those things will be helpful so ...those automated toys like that

Pattern 2: Maintenance Skills

X3: For example for that any kind of board games, those are probably for older kids but the twister [board game] because it has the fun one the color and spots, or even the card games or “chutes and ladders”, for things like here is your piece and here is my piece and then we spin this; still it is building that pattern. Ok it’s your turn you spin this and then ok it’s my turn, I spin it. So I think board games are really helpful because it’s not just talking and you have the solid thing in front of you.

X4: We use video modeling for this. So video tape just the three of us at home playing bingo. So we video tape just taking turn and we say “it’s your turn now”, “no it’s my turn”. And then we show it to H [her son] the couple of times and went through it, to help him follow, just you know, the pattern. It’s a really tough skill. So he’s so much better now but in the beginning it was really tough. So we video modeled it and I think video modeling for some kids, esp. like H who is so visual, it can really help to learn that skill.

X4: I also think the same for the peer prompting too. Like the swimming slide and go down the slide and to the water ...

X3: Like watch this kid going down and then ...

X4: You know like “it’s not your turn”, “it’s not your turn” and then all of a sudden it’s your turn ... the whole thing stays like that and then it fades back ...

X3: And you have to stay back and let the kid go

X4: Yeah because if it’s not your turn and you go down there is a consequence for that ...

X3: I think a lot of these things like, if you're sitting at a table, playing those board games and the kid is looking to you "is it my turn"; and then you have the eye contact and then you have the joint attention, you could see that he is spinning, oh, ... like they can kind of overlap but trying to break down each one is important too.

Because you can sit down and play board game with every kid, who is a little bit older and higher-functioning, to be able to handle and play the game and sitting down and taking turns ...

X4: Esp. if there is no enjoyment it's stupid to play this game, so ...

Pattern 3: Eye Contact

X3: I really like the idea of these eye cards ...

X4: Have you used these eye cards?

Majid: No. It is just an idea

X4: So they look into tiny little holes to you ... ok.

X3: I guess, I mean, as the way just to draw the attention it makes sense, but I've never thought of it ...

X4: I don't like them because they may focus more on it and it will be like a magnifying glass, ...

X3: like a toy ...

X4: Yeah, and then you don't see the face and so it blocks the interaction. And they will sort of hide behind it. It is like those of dark sunglasses that are protection but again I have interaction with you. I can see that how my son will not pay attention at all.

X3: A lot of basis for eye contact is if you ... like here we use goldfish emblem a lot ... but this is a reward for different things and tasks. So for the younger kids if they do it well ... they see the candy, they like the candy but you're, like, to say: hey look at me, or like ask "please!" and then you'll until they make eye contact with you ... and then they say "please" and then you give it to them. That's another way of building that repetition of when you make eye contact it's a good thing and you get the reward ... or even like tickling ... making eye contact and then they are like more and then ... something like when you get the eye contact you should respond with a positive thing right away. And if they do it again and you give them another reward ...

X4: And then it just becomes a natural process.

We've done making funny faces, because he likes to make funny faces. So he'll make different funny faces. So we make the same ones. One of the things we do now is that he's next to me sitting on the chair ... and then he looks at me really fast and the longer he holds it, there is eye contact and then he slowly moves it back again ... so it's a really great way for him to make intent eye contact ... and he'll hold it really really long and then he'll look away. So it's a totally fun game. Now he does the same with his friends and they are all freaked out. So again it's a great way for him to use things and make a great eye contact.

X3: Making an eye contact and hold it and then stop it is a thing to learn ... you start the eye contact and then at some point there should be an endpoint to your eye contact ...

X4: Eye contact had been always a difficult one ... In the beginning for H it was really difficult. He would be really creepy in a way to look away and then ... Now it's not an

issue with him at all anymore. And I think a lot of this is because we've faced it a lot with him and now it's part of, you know ... it's skill-based ... even at school when the teacher wanted to talk to him, he had to look at her ... he had to look at her and looked away ... and now the appropriateness that how long I should look away ... but it's like a balance like the other day we went to that Shakespear thing [a play at theater], there was a teacher who used to be at school and he sort of knew who she was ... she said hi but he even didn't look at her ... it's kind of a standard response that the kid doesn't know you very well but ... you know I don't know you very well so I am not gonna engages with you that much ... so it was kind of interesting because he said hi J and then he looked away ... and she said that's fine. There is always that balance to keep in mind.

I like it when you use the eye-cards, you let us know how it works? I really wanna see how it works. I would be really interesting. So you can make the holes bigger and bigger and bigger each time they come so ...

X3: Yeah it could be like those cut-outs that you go to the amuse parks and put your faces and take pictures it's like that ...

Pattern 4: Entry/Approach Skill

X4: In theory it sounds it will work. Have you tried it? Ok ... The couple of thoughts on this ... I think it's a good approach and I think it helps the child to have sort of that social skill and it will be ok. You probably get a good response from it. I think for kids who have to sit in a large group, and sitting like a circle, and that's a huge skill right there that you have to learn. I know H did circle time. So whenever he was in the circle time, he

was the kid doing like, oh my gosh, I should get out of this place as fast as possible. So I don't know about, the group part of that.

X3: I think this is another one like a repetition of pattern. So like first you meet someone you say, hi I'm blah, what's your name? And even if you start out prompting that exact thing every time, like what we do when we meet someone? We say hi and then you hold up your hand and then you make eye contact and sat nice to meet you. Like we had kid here yesterday and I was having lunch in the kitchen and X4 came with a younger girl and they walked to the kitchen and she asked, can she have a lunch with you? And I said yes she does. And I said tell me your name and she said, My name is blah blah, what's yours? And it was like they had rehearsed before they walked in the door. And she was told that we are gonna sit by the table and she ask about your name and asking if we could have a lunch with them. I don't know if there is always like an object, a game or a toy but again like ... prompting of words, or whatever is used ...

Majid: So is it more behavioral rather than to be an object or toy ... like any specific method or ...

X3: Maybe I am just thinking what normally we do and I'm not thinking of toys but, esp. for like approach skills, I don't know what you could attach to that as far as an object or a toy but ... I think a hand shake is a really good thing to do ... reach your hand out to meet someone

X4: You have to think about for age, you know what I mean this might be good for pre-school or kindergarten kids ... this not gonna work for somebody who is going to 4th grade ... so like I give you an example ... The school that H is not at he started at the 2nd

grade ... what we did is ... these, we call them typical peers ... we took all the typical kids and we did a training with them ... this is what autism is ... this is how you can be friend with somebody with autism. And you know, what kind of questions do you have? Once they have answers for questions they are completely fine. Because at that age group they are like, why is it blue? It is blue because I said so, ok that's fine. I just needed to know, I mean, they take whatever you say. Oh ok, that make sense. So what we did is that we did a little bit peer training with them which is I think vital in this setting because they sort of understand what autism is. And then what we did we set up like a little social time. So during recess we would call couple of kids to just play with H. so they have to sign up. So I figured 28 kids in the class, all 28 signed up. So we came up an issue with H that why do you wanna play with H because you played with H last week. I wanna play because I sent him fun game. So what I did is that I enticed these little guys as why it is cool to plat with H. so H was playing on a TV show. So he was like a rock star and all of them were seeing him on TV. That was the other one ... so a lot of this comes to the marketing. And it really does how you market your child. I mean in this setting you have to look at what's the age? What's the context? Is it just with school friends or we want it to be at the work environment? You know, what's going on there? Or is it just a little kindergarten you just want them to say hello, make a friend? It's such a broad-based thing in my mind because you've done that at different levels.

Majid: Would they have any sensory defensiveness if you put the hat on their heads?

X4: Yeah, I mean that's something to think about. Some kids will like it ...

X3: And some kids will not take it off.

X4: H won't take it off his head because he likes to dress up. So he would be probably the one who wants to keep that. So that would be another thing. I mean, something maybe more like a stick

X3: or maybe like a soft ball that every time that somebody has that and when they give it to you, they will say the name of the favorite animal. And then everybody should pay attention to this person talking about the favorite animal. Or whatever you're doing but I guess ... I mean it's a circle time again but at least it's like, you're waiting for your turn, your waiting that someone gives you the ball. So it's something exciting you got to do ...I'll get that soon and ...

X4: Or if we go back to the reward system and that emblem stuff. You know these little guys would say, and if the ball comes to you say hello then you will get a reward and them kick the ball back again ... because you participated in the part of the whole game.

Majid: So this reward thing is a base for most of the things being done for the children ...

X3: I think, you're talking about kids on the spectrum or not ... just a learning tool ... if you're talking about an educational system as the behaviorist, you have this process of how you learn. You're motivated to learn because you get something you want or you learn something you want. Like, you have to have the motivation and for typical kids that social relationship is the motivation, because you want to your mom to read you the letters because your mom is excited and you're happy. And then when you go to school you want to make the teacher happy and then ... and you want to do a good job ... but kids on the spectrum don't always care whether if they're happy or whatever ... so you

have to find another way to motivate that learning ... sometimes it works with emblems, sometime it works with stickers, ...

X4: Or take the favorite toy ... this is what we do with H ... because we have some few options ... I give him 2 or 3 favorite toys and he puts them a little plastic box that he could sort of see through ... and what I do is that I pull them and put them right here ... and he has to do this activity and then you did ok, go ahead ... open up the box ... we put the favorite toy away and do this and ... so it's really great to let them have and ... these are toys that he really wanna play with them ...

X3: And these are special because you don't get them all the time and only when you are working on this

X4: So I would say let's go and play with whatever toy that you want and then I will get that down ... so I actually what we do is that, do this this this, get that, and then this this this, get that ... so you will have them for a minute but enough for him to bring him to the table to play with them ...

X3: And then we would say 2 more before we get this and then ok, four more before we get toys ...

X4: And now we sit down and do homework at night at the table for full 30 minutes. And then I'm like you're done go and ...

X3: And that's another reward ... Bubbles are another big one that we use too.

X4: Yeah bubbles are great ...because they are instantaneous and they are right there.

X3: It's not like I'm gonna play with this toy but it's like I'm gonna blow bubbles ... so it's like bringing attention back to person. So they do something good and we say oh bubbles and then ... we do it together ...

X4: ...which could also go back to your joint attention thing ... blow one red bubble and then other clear bubbles ... you can have these two together at one time but ... so those are some options I would do with that ...look at this we could do a lot of good things ...

X3: We can talk a lot ...

Majid: So you've been teaching to the children with ASDs for a while ...

X3: I do the psychological testing here. So if they need support or what kind of school they want to go so they need some psychological evaluation. So that's a lot of times we use quick and easy way like and emblem because we want to have these questions done. I think I've been here for several years ...

Majid: So do you set some goals for them like after a year they should learn this kind of social skill? Or at this level or ...?

X4: Ideally, we set of our goals and this is what we are working on right now. And these will change hopefully in a couple of months and keep going and increasing and increasing ... I think if you have a goal that have been working on for a year and then something goes wrong ...

X3: You change the way that you've been working on it ...

X4: So if it's not working I would say I'm done. It's not working this and let's do it from different angles ... just drop and move on to something else ...

Majid: So it depends how you progress?

X4: Yeah the approach is challenging to understand the best ways they learn ... it's a variety of things ... you know when H was going to school, he was sitting and screaming for three days and when we accomplished that ... like I said now we do homework for the 30 minutes at the table and he's fine ... you know it's more about what you that where you wanna go and what you wanna do ...to get to that point ...

X3: And sometimes they will have some long term goals. Ok, after this year these are the long term goals but to get that, we have to do ... for the next month we're gonna work on ... like eye contact, or identifying pictures, pointing the pictures too, labeling pictures ... putting words to make the phrases and then maybe we have the goal like making the sentences ... but there are a lot of things along the way to break it down ...

Pattern 5: Communication of Needs and Ideas

X4: This we did it is called Picture Exchange Schedule System, the PECS. We actually used PECS when H was little. And it was strange because he used to put them in line rip it off and hand it to you. Then we wanted him to say it here it's easier ... so we would make him to say those. So he would read it to me and then we faded all the pictures all together ... so it was a process and we sorted out with this ...

X3: I mean it is commonly effective for families because it's rewarding for the kids because they get what they want. They tell you what they want even if they can't say it verbally ... like the ball, here's the picture of the ball ... that's what I want so then you say eventually what is that? Ball. So you don't actually get the ball until you say it this time.

X4: We did flash cards but we did like repetition flash cards. So we did like ball, baby and bat. We would have eight or ten of each of these cards. And he makes them and then he flashes them through. So he gets to say them as fast as he could and then he gets this reward ... so he should say it fast so that he could build on recognition and timing on it. And also builds on sort of speech for him. Ball, bat, ball, bat, baby... You know what I'm saying ... come on let's go and everybody is fine here and come on let's get out of here ... and then I say get back here and then we sit down and do it again.

Majid: So how do they say it when they need something or they wanna go to the restroom or ... or they are hungry or ... Is there any way or ...?

X4: I think, in this age a lot of time they make a sentence and hand it and it says cookie or snack or bathroom ... or it might be a piece of a picture ... the other day we were at Shakespear thing and it was a 70-minute play and at the 65 minutes mark he was like, that's enough, that's enough ... when we got home I said to my husband that he really made that sentence "that's enough". Because how do you do that out of the picture exchange. So he doesn't use words anymore because he knows those will get immediate response. So what we did is that when he says something we jump right away and then ... because if he said ... is we're in the middle of dinner and he said, cake, he got cake ... he said bike, we jumped and got him a bike ... so it was immediate

X3: It had to be immediate if not, they're not gonna try to do it ...

X4: Now what we're saying is that when he says something we say, hang on a minute or you can pick one and you can't pick all of those. So again it's a slow process and ...

So once I told him if you can say the whole sentence: Mom I don't want to go to school today, then you won't go to school. He's never used it yet so that's ok. But this is a great way to start for those who have the limited communication skills.

X3: And even, let's say it's lunch and you have five different pictures to eat. Even if it's like food a vegetable, hamburger, or whatever ... it was right there so you are hungry and tell me what you want to eat ... and then they can pick one ... so they if they can make the decision and they can tell you what they want and then we go and eat.

X4: The other thing that I've seen those who use this picture exchange they have no language. They loaded on and it was on iPad. So he built sentences now. So it's not like cookie, snack or whatever, it's like, after lunch can I get this or can do this? So he likes technology and he uses them to play the games and he speaks for him. So it opens up this for him to this world. H whispers but he doesn't say it loud ... we're gonna get him to see if he can express more things and then we make this back and forth communication.

Majid: So do you think that this kind of digital environment or virtual environment is a good solution for them?

X4: It depends on the person.

X3: I think sometimes it's not done right. They're not talking because they can just do this part. They can get away with not talking because they can use it and that's when you need to make the transition out of that. And now we will ask ok you should read it to me ... and then if you see that they can't make it to the next step and do the whole process, that's something that you have to watch for it ... a lot of times they do need that or the separation of that to be able to ...

X4: And you know, the way that we are using this right now is like writing out sentences at home, so it says something like, go and make your bed ... and then he reads it as, I need to make my bed. So we write these out to him and he should read and do the action and come back to us when it's complete. And now I have to pick up my toys. Or it's time for me to pick up my toys. So do the action and come back, so reading component of that making it comprehensive and related to an action so that so that making the employment skills. So if sometime he's gonna have a job, so he needs to do a lot communication, he could write the list of things he needs to do step by step and when it's completed, I've got to check it out, oh it's great. So that way it gives him employment ability skills down the line ...

]X3: I just wanted to say that a lot of times, schedule can be challenging, like ok, we're gonna do this and this and ... and a lot of people use pictures to set up like it's time to work and then we're gonna have lunch and then we're gonna have a car ... and this is what's gonna happen with pictures ... so like look at that, around that picture we're gonna work and around that picture we're gonna have a break ... so setting up daily schedule of ... what comes next ... and it's visual like finish this and then do this ... it's like prepping for the rest of the day ...

X4: I think that, they have to tape the schedule on wall which has all the pictures for the kids who are Asperger's ... so if it is to be like 10:02 and it is 10:03 and we're not there, they will gonna ask why we're not there ... so what we do is that we give them a window of minutes ... so between 10:02 and 10:06 ... so if it's a ok time, he's gonna put his thing on the table and entertain himself until ...

X3: And it will switch next time we're gonna say this will be different this time, and let that go and ... then it helps them be more flexible because you make this change and then make another change and ... and then they get used to it and changes are a little bit scary ...

X4: It kind of goes back to the goals. It's like for this one we're gonna work on this goal. But long term goal is employability if I'm gonna use ... so where is s/he gonna be in the long term and so it's a long term goal ... it's the child but how he is gonna be as the adult ... and knowing all these types of things ... builds a comprehensive program which is what you need to look at. Sometimes we have all the skills to make it the most comprehensive ...

Majid: So you think that it should not just be the iPad application but it should be with the human being ... it couldn't be just that application for that eye contact for example ... then it should mix with some other, like entry approach skill. It should be mixed together right?

X3: And I think sometimes you need to break it down to focus on one skill. So it's like starting this application and the kids is learning it ... even if it's like a look ... it prompts that then it starts there ... and then it will eventually make the entry approach ... or can you help me with this ... in the beginning you have to pull out one skill and focus on it ... even if it's, say, ball, so get the ball and play with the ball, then eventually you make the game out of it, so, I think all of that is important because you have to start with the whole interaction ... but will hopefully build to it ...

Majid: Do you think that I'm missing any other social skill that I didn't mention in these 5?

X4: No, I think these are the basic things.

X3: I guess, that kind of entry approach, I don't know how to call it but ... termination ... so like ... at the end of the conversation and when you leave so like ... get up, say good bye and leave ... I'm finished or ...

X4: Esp. some kids could continue on topic and go on and on and on ...

X3: Sometimes you need to closure ...

X4: Like, I'm not interested anymore please stop talking ...so yeah "exit" skill ... "exit strategy" ... no, I think these are the basics ...

Pattern 6: Play

X3: I think we do something like this, give them some objects, like have a baby doll and make the birthday party ... because these are something that kids are familiar with whether they interacted or not ... oh birthday, we say happy birthday, we cut the cake, we eat the cake, there is a pattern that is kinds of familiar, so it's not like, they have to be completely creative and make up their own stories about these characters ... so it's something that is familiar but you put it into pretend play ... or even those small toy people and then we do like, let's cook, let's go to bed ... so it's like these people are in the house ... or like it's Christmas day, and what we do in Christmas? So that could be the starting rather than the things that they don't have any idea of it ...

X4: I think this pretty advanced. I'm thinking it really small like, making airplane and make the sound of airplane when it flies ... or making the car sound ... I mean this is a very difficult skill and H has a difficulty with this ... it's just such a hard concept.

Majid: Or if we say let's do what grandma does ...

X4: Or maybe do what the pig does ... I mean these little simple things ... if you're asking about grandma, he's got two ... I would say with something really really small ... and because it is such a hard skill to develop ... I've been doing this birthday cake party and he was like, why do we do this? I can have the birthday cake later ... he just can't cross that bridge, it's really really tough so ...

X4: That's one of the things that you do testing ...

X3: We try to have like, frog, and what the frog does, like hop hop ... and then we try to substitute that with just a simple block, oh, this is a frog, and make it hop ... so we do it with the plastic frog and then we do it with this block ... it's a weird concept because most kids don't do it ...

Majid: So is it based on some psychological principles?

X3: Well it could be called like, place holder play ... you take this idea of frog, but then, in your mind it's a frog, but then, it's just a block, so you're making it a place holder toy ...

Pattern 7: Emotional Expression

X4: I think you should make it a little bit more simplistic ... happy and sad ... you know just go from there ... because it's like, what's the difference between happy and excited ... so the peek-a-boo thing is great because it's eye contact too. And it's the whole idea of

anticipating it. And maintaining it, engagement and all those great things ... but then you can move it to happy face, sad face ...

X3: I think that's good point, like the contrast of just two ... I mean eventually you can get to the difference between happy and excited ...

X4: H was with this girl friend and she was crying and then H walked by saying: don't cry baby ... so he really got the concept and she was a little baby.

X3: Or maybe using the idea of baby doll ... oh baby is crying, oh baby is sad ...

Majid: And the faces shouldn't be abstract like the smiley ...

X4: We use the photo cards that have the real picture of the faces on it ... or we will use our own ... so we have the pictures of the kids in the class and we go to this naming thing ... and he would know the kids ... is Vincenzo happy today or is he sad? So it's sort of put it in with person ...

X3: And I think another thing about attention like, they're gonna pay attention more to the kid in the class rather than grandma's face to be happy or sad, so ... or if it is something like favorite cartoon character ... happy or sad

Pattern 8: Social Interaction

X4: I don't know if this is a social interaction if I have a chocolate to be happy or ...

X3: I think the first part, to respond to the picture, that makes it like ... like Simon says do this, and you have to do this ... so the first part is like doing the action ... that makes sense to me ...

X4: I think doing the scenario like, Joey is walking on the street; Joey falls and hurts his knees ... and then have them choose between Joey is sad or Joey is crying or something like that. You know that might be a way to do it. This is a tough one ...

There is a guy who's called Jed Baker, have you ever heard of Jed Baker? He is the guy who does all the social interaction. And he does like video modeling or just making the picture and he does it like, in the public schools and in the middle schools. So he has all the kids do these scenarios. So like, it says you have been mean to me? And the other one says you shouldn't be mean to me. And all the kids watch it and disgust in the end. So that's a great way to, how do you do social interaction? How do you know if it is positive or negative? I think a lot of visuals need to be in the social interaction. And a lot of trial and error ... So we did the same with H. when we were at McDonald's I asked him to go and get the straw. He had to wait for his turn and ...

X3: So it could be like one-on-one thing like, give me a hi-five ... or high high, down down ... some basic prompts and having them do the action ...

X4: we used to do this chasing. So he liked it when someone is chasing him and we wanted to reverse this and have him to chase someone. So the first few weeks in the playground, he was like no one is chasing me and I'm done. But we were like, no you have to do this ... so it goes back and forth now ... so it's a social interaction but it takes a long time to get to that point. And he does the eye contact like come over here and play with me or do this ... so he kind of uses eye contact to pull in the people to play with him.

X3: Hide and seek is another one. You should go and hide but don't tell us where you hide. So it has this social interaction thing. Ok wait and then come and find me. You're looking for them or they looking for you.

X4: So we had H's friends to play with him on the Halloween and then they kept telling him do this or do that. So it's another way that they can make social interaction with the kids that they know them ... like, he learns a lot by playing with his cousins in the back yard.

Majid: So can we say that children with ASD are so unique and different that they don't have anything in common? Like texture?

X3: I think some of them will like it some of them won't certain food because of the texture. So there are some common things but doesn't mean every kid on spectrum will have an issue with that.

X4: So I think they are so unique.

Appendix E: Discussion Session 4 Transcript, Participant X5

Participant “X5” Parent | 07-05-2011

After a brief introduction – let X5 read and sign the consent form and saying thank you to her for accepting to be part of this research and what sheets of patterns are, we started the discussion.

Note: Her daughter also attended the session and contributed to some of the ideas.

Pattern 1: Communication of Needs and Ideas

X5: The toy I think is a really great idea. I think something that could be if there is any movement on it, if it moved or if it jumped it would say, “The dog jumped” ... Maybe something more than just one word or just the animal. Maybe different phrases or the dog is barking like, bark bark because the idea is a longer communication than one word.

When My son was young he didn’t really speak at all. So we started with one word and we kept building and building and now he can say the whole sentence.

The symbol is good because we use a lot of the pictures. But as far as making the child build a picture of a bathroom, I don’t know how it would work. I think it won’t work with our son. But like, if you had a picture of actual toilet or if you had a picture of door and picture of boy on it and it says, boy’s bathroom; maybe something like that for this.

Pattern 2: Entry/Approach Skills

X5: I like the idea of hat. That's a really good idea because it giving them to do the action and say hello; because it is really hard for them to make the eye contact and even communicate.

Majid: Would they be sensitive to that?

X5: Some kids. He'll do it. If it's silly thing he'll do it. He's got a really good sense of humor actually. I'm assuming that you're targeting more younger ages?

Majid: Yeah at the early ages like maybe 3 ...

X5: Maybe a ball with handles that makes some noise. The hat thing would probably work too as long as it is something silly and colorful. You know these toys that give to infants ... make crackling noises. Something like that that would be more interactive rather than putting the hat on. And, the biggest thing is that to teach them to have initially have eye contact. You know normal things that kids do at that age. I do like that, that's a good idea, in circle thing. Music is a great idea too. If you squeeze the ball it will play the music; any kind of weird music. Z [his son with ASD] likes the Barney. And that also works for the peers too. R [her daughter] was at special needs pre-school where they had special needs kids and they had peers and she was a peer. So they would do circle time every morning. So they ask them, what would you like have for breakfast? So it's an interaction with the child too, so that's good too.

Pattern 3: Eye Contact

X5: I don't know about the eye cards. I think it's a good idea but I don't if it would actually work. A lot of time what they do is that they take stickers. Put them on the

forehead or between their eyes ... like the teacher tries to have them to look at. So I don't know ...

Majid: That's one of the ways to make the eye contact

X5: or they pick an object that they think the child will be really attracted to and every time they look at me, they say hey good job, a lot of positive feedback. But the cards may be kind of fun because they may say, hey looking through the mask ... or even mask for that matter might work. I think a lot of color and visual stimulation.

Majid: So do you think that it will be different when you use it at home or in the class setting?

X5: Everything is different at home. Because they're comfortable at home and kids are always, I think even typical kids are gonna pay more attention at school because they're not as comfortable. So they are expected to pay more attention. At home, you know you're at home with mom and dad and everything is kind of relaxing.

Majid: For example for communication of needs, do they need it differently? For example when they are hungry or if they wanna go to the bathroom?

X5: The best thing for the child is to be consistent throughout ... if they use the picture board at school, you should use it at home. If they use sign language at home, you should use sign language at school. However it is that you can do the communicating. Because it is so frustrating ... we use pictures of different things in the house that we knew he would like. And we would ask what do you want? And he was doing like [making strange sounds] and we didn't know what it was. So he will pull the picture out sometimes. I think he couldn't understand what we were saying to him. So using very short direction,

maybe 2 or 3 words directions, like sit down Z ... where it's not that wordy. Special that young they don't understand. If they can't understand what they're doing they can't certainly do it. So I think short instructions.

Pattern 4: Joint Attention

X5: I think that's really good. For the motor skills this threading thing is good. You can talk about that's the red bead ... or you could say what shape is that? What color? Or square. So you're generating more conversation. Or you can make the necklace, or you're gonna be the mommy or ... but that's good they use that a lot.

Majid: So what they are taught in the class and what they use in the real life. Do you have any idea for this transition? You know this official training which is so structured but it's not a real life, to do the entry/approach or ...

X5: Clinical thing that happens, you know, in educational setting, are completely different than seeing someone at Walmart. But once they learned it in the classroom, they bring it over into different situation. Z used to greet so robotic, hi Mrs. so and so, and now when we go to Walmart, he reads the name of the cashier and says, oh Sara, hey Sara and he want to shake her hand. It does carry over but it does seem very robotic and very clinical when you do it here. But they have to learn it that way first and then bring it into normal conversation. Just walking, before they know it, they don't think about and then ... that's the way that I think about it.

Pattern 5: Maintenance Skills

X5: That's a good idea. Taking turns, sharing and following rules is difficult. So, it is the skill that we use as adult but there is limit to it. I think the face sticker is a good idea but

we find singing structure very helpful, like, pick your shoe up, pick your shoes up ... and it kind of makes it more like a game. They do a lot of clean up song ... clean up clean up everybody everywhere, clean up clean up ... it helps to follow the instructions. There are lots of songs like ... put your right hand in, put your left hand out ... you know that's sort of the instruction also ... [daughter saying: we use a lot of races who can put the shoes first]. Music and art could open up a lot for kids with autism because I don't think necessarily that they see things the same way that we do all the time. And no one really knows why you have autism. So, to try to understand it; I don't know if my son understand it what I'm saying because a lot of time, I don't think he does. And he is 11 and he is moderate. And he can follow some instructions. If you make it fun for them just like any kids, to follow instructing and share, you know just like other kids, we use to say, ah my turn now, ah Z's turn now ... R's turn now ... as long as you let them know ahead of time ... ok five seconds it's gonna be R's turn ... you kind of have to make social stories ... say, they wanna go to the bus ... taking pictures ... we did this in the summer camp time because he was not transitioning well. We went to the summer school; I took a bunch of pictures of me waving bye. Shoes and his bag and a clock, the time that we're picking him up and we made it all in the story. Reading it reading it ... So I think it takes a lot of time for them to really understand what's going on. And if you warn them ahead of time, and if you give them cues to know ... ok the change is coming or ok it's 5 seconds now ... so, I think that helps a lot.

Majid: Is there any tool or toy in the market that you use?

X5: We use a timer. And we use a timer a lot. He has like 10 minutes on computer and it's R's turn. When the timer goes off ...

Majid: Any kind of toy specifically for social skill?

X5: Not that I know of now. But I think a lot of things can be morphed into different things. What's that game that you hit the colors? [Daughter answering: hyper dash]. And it talks about colors, numbers, and we can switch it, it says blue and then you have to hit the cones ... it says hit yellow, and then you hit yellow ... so following instructions and you're learning the colors too. He likes that a lot. He is a high energy kid. So it depends on the kid. Not any of them are the same. That's the tough part. I think some of them have things in common. A lot of kids like deep pressure or are very sensitive to sounds. I don't know of any specific autism toy that's out there. It depends I guess.

Pattern 6: Play

X5: Pretend skill, that's the tough one. Because it takes a lot of imagination ... the cooking thing definitely ... they have to be led a lot of times ... like so, the interaction between the child and the child might be very different from the interaction of the child and adult or instructor ... so I would pretend I am cooking something and Z may come over or not ... he just kind of fall in things ... we have a lot of dress thing because she [R] ... we call her a little general because she likes to direct people and ... but that's good for him, you know. Because he needed that someone telling him

Majid: So how different is it when they are interacting with peers and when they interacting with adults?

X5: It is a big difference. They may be playing around and ... but they don't interact at all. It's like I'm playing here and you're co-playing. I'm playing something separate and you're playing something separate. But when we get adults into it, they do better with adults, I don't know why. But in our situation he always did.

Majid: Do you think that they can play the grandma character?

X5: I think if they are given wig and cane ... they may not use the same things the same way. They may use it to jump over or walk on, you know ... so, their interactions are totally different to me, I think.

Pattern 7: Emotional Expression

X5: Facial expression is really difficult for them. We had a lot of cards they looked like real photos. They would be really pronounced

Majid: Not like smiley. Those abstract faces ...

X5: we would say what does this face look like? You know? And just randomly throughout the day I would be like ... make the mad face. And now he can interpret the mad face. He is 11. He didn't understand at all at younger ages and it was a long way. So, I think maturity and starting to understand more about the world and I think maybe, the peek-a-boo, happy pee-a-boo or sad or some puppet. You know those kind of visuals.

Majid: So what is the big difference child with ASD with others?

X5: I think kids with autism needs things to be more texturized. More colors, things that really attract them to it.

Majid: Does he like any digital game or ...

X5: Oh yeah, he likes them [Daughter saying, he loves angry birds on iPhone]. He loves the computer. When he was 3 or 4 he wasn't really into the computer. But there are lots of kids that they are. I definitely think matching the little smiley face with the word happy, that would be something or finding objects. Because Z a lot of time he doesn't look at you and he just look at you with peripheral vision. So, I do think computers will be good for abstract things. He does type. You know he's eleven and it's been a long time since he's been involved basis social skills.

Pattern 8: Social Interaction

X5: I do think that for the non-verbal kids that the pictures are the best way to start. Having the pictures and having the names in the bottom as far as for reading. And you know they're visual a lot of time and if they see that picture, they're gonna know, oh that means apple or the beginning sound of it.

Majid: Do you think that if I am missing any social skill here?

X5: Safety ... Teaching them to be safe ... Seat belt ... not running in front of the cars ... stuff like that ...

You know interaction could be done in so many different ways you don't even have to ... as a parent you just get used to building in to your daily schedule and it's not like, sit down we're gonna communicate now. It's just what we do. So anything can be a learning thing, when you cross the street, you can say, oh look at that board ... you know anything that could make them verbal.

Appendix F: Discussion Session 4 Transcript, Participant X6

Participant “X6” Instructor and “X7” Instructor/Expert | 07-13-2011

After a brief introduction – let X6 read and sign the consent form and saying thank you to her for accepting to be part of this research and what sheets of patterns are, we started the discussion.

Note: participant X7 attended the session for some minutes and had to leave the session because of the emergency situation for one of the children.

Pattern 1: Communication of Ideas and Needs

X6: So this word [self-absorbed] ... maybe it's because of the connotation that I have from this word ... it's not like that they are self-absorbed but ... it's hard to get motivation from the outside world ... I think my connotation is that they are selfish ... but you have to aware to be selfish ... that's how I look at it ... because they are not just aware of the outside world ... they seem to be ...

X7: So these are the ideas that ...

Majid: Yeah ... you know from industrial design perspective ...

X6: Tell me about industrial design? What does that mean?

Majid: well, it could be any kind of product that you see ... it's a wide range of things ... so anything that you see around yourself industrial design could be kind of involved ... I was so much interested in cognitive issues for people ... there have been some product for children so that they could integrate their senses and learn language ... so what I'm focusing on more is about their social skills ...

X7: Does this exist? ... Animal with changing color? ... because I was thinking what a great idea ... I'd like to see that ...

X7: So I think in our situation for the peer interaction ... and the students that we have socially they have mild issues ... but some students ... you know you can pick out ... those students are nearly struggling ... so we had fourth-grader he was nine ... so I would say the thing that we do are much ... regarding the objects it has been more incentives or having more ... you know making opportunities for the students to be involved ... that type of thing ... just encouraging them ... do you wanna partner with him ... how could you be sure that he is understanding what you need ... although in general when I think of the older students ... in that certain situation benefitting from active board ... and having things very visual ... and auditory ... and also in terms of objects having things lined up ... we're gonna do this ... this is what it looks like ... here's your notebook that you keep your information in ... that was in the language class and it was helpful about one boy in particular ... maybe it's more of the anxiety issue for him ... if he didn't know what was going on he would get upset very easily ... he was nine years old ...

X6: why would you have them build their own symbol rather than having the symbols that have been already made?

Majid: that was the idea so that they could get creative ... so you think that they may have some issues ...

X6: So yeah ... children with autism have the hard times from “part to whole” so ... so taking parts and making whole ... so that’s why reading tends to be difficult ... they know phonics but then they phonics together and get word like “b a t means bat” ... it’s really hard for them ... that’s what I am asking because if they get that and making with parts ... I mean pictures will be fantastic ... and they work great with children with autism because they are such visual learners ... and maybe I just don’t understand the industrial design part of it ... like I understand that you are trying to get them involved in it ...

Majid: yeah I was told a lot that maybe this is not gonna work ... and putting pieces together ...

X6: So yeah I mean pictures and symbols are fantastic ... and using that exchange because they don’t understand “give and take” and they don’t understand ... you know, I want something and this is how I get it versus ...

Majid: Do you have any ideas for the communication of ideas and needs and how they do it or ... because I’ve asked a lot from others too ... how they say that they are hungry or how they say that they wanna go to the restroom ... do they use pictures?

X6: It depends on the speech therapist ... a lot of times they start out by shapes ... and also it depends on the kid ... some kids have the vocal abilities to speak some, they are

not going to speak ... be it physiologically or cognitively they can't make the sounds ... so then we go to vantages ... the communication system it's a whole ... we use those sometimes ... we use pictures ... we use PECS ... we teach them gestures because sign language is great with them too ... again that piece of teaching of abstract thought concept of ... this together means ideas and it means this thought ... like ... so we start with real pictures and then we go to the simple pictures ... so it depends on the kid ... so we mingle them to make them speak ... absolutely ... but if they can't ... and a lot of times kids with autism have ... they can't find the word in there ... so they know what they wanna say but they can't find them so that cause the jumble ... and that's why you can organize thoughts with pictures ... pictures communication is fantastic esp. for little kids who are learning that back and forth ... because they don't understand "give and take" ... you know like the fifth grader who wanted to know what he wanted to talk about ... and only that and if you wanna talk about something else ... he will walk away ... yeah like I wanna talk about dinosaurs and only dinosaurs and that's what we're gonna talk about ... and I think ... a lot of people forget that ... for the most part you want to teach them but they are not motivated by other people ... like I want to like me ... I want to communicate ... they don't understand ...

X7: I see his speech is not the issue but communicating or not ...

X6: yeah the social skill ...

X7: but on the other hand he gets really upset and says no one wants to be my friend ...

X6: That's the way to understand the pragmatic of social skills ...

X7: and then we would say he doesn't have a friend but he wants to be a friend ... and then we will talk about how you can you be a friend ... she was able to establish some relationships ... the same thing at the end of the year ... his reading was appropriate but he wasn't interested in the books and ... so someone had to talk to him ... so it's a process ... you know he does love to build things that's for sure ... he could sit for hours with plastic pieces if he had free time ... he was good to go with them ...

X6: if you could have parents to use that that will be huge ...

Majid: do they use different things at school and at home?

X6: they try not to ... because they don't generalize well and generality is difficult for them so ... using pictures should be the same ... I don't know if you have heard of Temple Grandin ... that how she sees everything in pictures ... you know you say church and she says a picture of a church ... one church that she knows as a church ...

Pattern 2: Joint Attention

X6: Joint Attention is huge ...

X7: I have to leave in a bit ...

X6: so they start with the balls ...

Majid: It's kind of like a thread so they move the balls ... with the instructor to some colored point and then ...

X6: so are they actively doing this?

Majid: They hold two ends of the thread and together they're holding ... they hold it and then they move the ball to that mark and then they ask about the color and quality of that ball ... so ...

X6: So you're telling me how to move the ball ... ok ... so I have to follow your direction from the child ... this should be a very high functioning child to give the directions ... I mean yeah that's we do that ... we hide the things and they have to show perspective ... or we have to draw pictures and say, put in the right corner or left corner ...

Majid: and that's for joint attention?

X6: and also that following direction piece that ... I'm important and you need to listen to me ... and then perspective ... I think perspective is part of a joint attention, like if I say, if you could see this ... because to them ... oh you see that guy holding the ball ... so you should come over and do that so that then we could have joint attention ... that's good ...

Majid: would they have some problems with the motor skills? Like moving the ball or body ...

X6: if they are big enough so that they can move them ... it's the fine motor piece of it ... but again with the speech part of it ... and even for the typical 3 year old it will be developmentally difficult ... to tell you what to do ... to move back and up ... but as a whole I think it's great ... and parents can also play a game ... who says is good ... because you have that perspective issue and I think any game ... as a whole ... because I have pay attention we play games ... like we have to take turns ... like memory ... if we're looking at the young kids ... It's tough ... joint attention is tough

Pattern 3: Maintenance Skills

X6: That's actually good ... that facial recognition pragmatics ... because they don't understand facial expression ... again they look at the parts ... when I'm looking at you,

I'm looking at your face but they will look at the mouth ... so that will be a good emotion thing too ... to work on emotions with that ... if you have the picture and you're not smiling it will be difficult for them to match the picture ...

Majid: so do you have any other ideas for parents or peers?

X6: they could probably, you know, parents having the picture album of relatives ... it's kind of force but they could have a card ... go to grand ma and they have the grand ma picture and they will go to grand ma ... so they can match that back and forth ... peers ... they can do this kind of thing in calendar ... so who's here or not here ... see it in the calendar and match it to the face ... who's here and who's not ...

Majid: Have you used that before?

X6: yeah I have used that before.

Majid: And do you provide that from market? Is there any commercial product for maintenance skills or joint attention ... or ...

X6: I mean rule makers is how to make the rules for that ... for the sharing and take turns ... we just play games and take turns ... and teach that through ...

Pattern 4: Eye Contact

X6: We do not specifically teach eye contact ... because it is over generalized to them ... they get here and sit like this [staring] ... and that's not normal ... because we don't do that and it feels really uncomfortable ... even when I'm talking I look away ... and there have been adults with autism who have said that it hurts that I can't really look at you and I have to look to the sides ... when I was there we did not teach them eye contact ... what we teach is look at the forehead ... at least look at the person as much as you can ... I

shouldn't be talking to you like this but ... but if I'm looking at you in that area ...
looking at your shoulders ...

Majid: but not looking into the eyes ...

X6: how do you teach what's long enough? So as far as teaching eye contact it is difficult
... and put stickers on forehead ...

Majid: but even they may have some problems even looking at you?

X6: I think that's the joint attention because they have to pay attention to the
conversation ...

Majid: But if they don't wanna do it or if they do it?

X6: My philosophy is that ... we use Applied Behavior Analysis ... just the principles ...
so we reinforce them for the positive and punish them or ignore for negative behavior ...
so if I have a question for you and I am looking like this ... you're not gonna answer me
until I look at you and then we reinforce that to give them what they want ... as far as
products for the eyes contact you can make little gimmick you know ... that you put on
the shoulder and then you move it to the forehead ... or the bird on my head and you
have to look at the bird when I talk ... and you say look at the bird ... yeah you're not
gonna walk around the school with the bird on your head but you would say look at the
bird ... then you can shape it and then diminish it that I have a big bird on my head and
then I'm gonna ... get smaller and then I'm gonna get black and white and then I get this
tiny little sticker on my head until they look at there ... and the same parent will do that
... I'm not sure if you're gonna give that to peers to do that?

Majid: It shouldn't be a big problem for them because they just look and play ...

X6: yeah ... my daughter is 2 and she doesn't look at peers ... they just play and they do ...

Pattern 5: Entry/Approach Skills

X6: so you pick one person who wears the hello hat? And then ... is it sort of a game? So you wear the hat and you have to say hello to each other so many times? ... ok ... my only concern with that is only that it becomes ... because they start to over-generalize the hello, so they start saying hello ... in the middle of ... so I already said hi to you once ... like we say hi when we enter ... maybe instead of this have the hat outside the classroom and asking if anyone comes in to wear the hat ... and I don't know if they're leaving and they wanna say good bye ... because if they don't know and just say hi ... so we will say that only if you come and go you say hi and then we're done ... you know ... when it is appropriate to say hi ... this is great ... do that and say hello ... introduce that and then take it off ... so when someone introduce me I'm gonna wear that and then I will take it off ... and then we're done ... we said that in the morning ... and the parents could have the similar hat or the button ... for the kid ...

Majid: Would they be sensitive to that hat when they wear the hat?

X6: It depends on the kid ...

Majid: they are so different right?

X6: yep ... some may love the hat and get mad when you take it off and some may not even want that ...

Majid: So what do they have in common?

X6: social skills issues ... they tend to have more of integration of senses issue ... all of their delays are pervasive and they all have these social issues ... to be diagnosed with autism and Asperger's is when these come out ... children who are diagnosed with autism have significant speech delays ... whereas the child with Asperger's doesn't have speech delays you know articulation ... and syntax but they have issues with pragmatics so I can't say your shirt looks ugly today ... that's the pragmatic part of it but as far as speech and language goes like articulation and sentence structure and grammar ... just being able to speak ... Asperger's don't have this issue ... if they truly have Asperger's ... so they have that in common ... so they have fine motor issues ... so putting all together ... putting the whole body to do what you want them to do ... and most of them have sensory issues ... they either crave sensory ... they want heavy backpacks or they don't want to touch anything at all ... it's how they're able to process the information ... it's deficit in processing information ...

Majid: so you teach them you use different plans for each of them?

X6: you could use the same base for all of them ... and just change them slightly ... and you also have to look at the reinforcement factor of it ... so we do differentiate the reinforcement of behaviors ... so not that socially appropriate behavior but any time you say help appropriately ... I'm gonna respond to that and give you something but if you say hello to me every time ... to get my attention I'm gonna ignore you ... I'm gonna ignore that behavior ... I'm gonna reward the behavior ... do you know about comic strips by Carol Gray? She uses social stories ... but she uses them more of a comic strip ... she color-code stuff ... so if a child has a really bad time with lunch ... you'll make the

script ... so ok now these are things that stay in my head ... these are things that I can say loud and this makes me feel angry so I'm gonna write this in red ... yes she does those ... I love social stories ... they are fantastic ...

Pattern 6: Emotional Expression

X6: teaching emotional expression will be great to make videos ... something that happened ... like she fell down and now she's crying ... rather than just showing the face ... which we do ... and a lot of time they think it's funny ... because you look funny when you cry ... you look funny when you're mad, because your face changes ... but when you say you're mad because this ... or you're mad because you broke the leg ... because you're funny because your face changes and turns to red ... showing different videos of people falling ... it's great empathy and then ... if any possible way that you can show them falling ... and ask them how did you feel about that ... will be hard with 3-year-old ... maybe having card and when you're crying ... and if you're sad ... tell me you're sad by handing that card to me ... or you're mad ...

Majid: Have you used these things?

X6: We've used the video of like going to the bathroom ... they watch themselves succeed at it ... and you walk them through it and you make sure that they can do it correctly so it's a social story but ... and the like to watch themselves ... you know I had a kid whom rules are hard for him to follow ... so taking his pictures so that he could be following those rules ... because he liked to see it ... and you can do it ... show me how you can do it again ... so maybe they will have their own happy and sad faces with this peek-a-boo

Pattern 7: Play

X6: this is so hard ... pretend and play is so hard ... so the add the grandma character and then maybe you add the social story or the social script to know how you would do with these ... so you teach them how to do with it ... ok so here is the baby doll package and then here it is a doll, chair and a brush ... so we're gonna go through the script so with that package I will include the social script ... so this is the social story for the grandma ... so you wear the glasses and say these things as the grandma ... and then it gets descriptive and hopefully it teaches them how to do it ... yeah including that social skills help them ... and then you can generalize it ... but to be a fantastic product will be the package and the script in it ...

Majid: So is there any product in the market that you buy just for the children with ASDs?

X6: No, because you buy the kitchen set and then you make your social script ... but if you say that here's the box and here's your baby doll and here's how to play ... it has pictures on it so that the kid follow ... I don't have to tell you how to pretend but you can follow ... show you how to read the script ... and then you fade that back and see if they can do it without the script ... that will be a great one ...

Pattern 8: Social Interaction

X6: This one, the food one, will be a little confusing because especially at this age ... because if they don't know how to demand appropriately and if I give you the chocolate picture ... it might confuse them that you make me happy but you don't give me the chocolate ... because they don't understand that if I want something and you give it to me

... then they make get confused with this ... and they should be higher level ... to me that's the first thing that I see ... or maybe using the opposite of that ... or using this the card ... instead of ... I ask for chocolate ... you give me chocolate and then I'll ask how you feel about it and then I show the happy face. So I respond that way ... maybe it's a game ... oh I'm sad ... oh this is chocolate ... I love chocolate and this makes me happy ... I would say to have both actual faces and abstract faces ... symbolic one versus the picture and then ... I would also instead of picture of chocolate use 3D plastic chocolate ... we do a lot of card stuff with them but more 3D things you could do with them ... or encourage the parents use the real piece of chocolate ... so you can use it that way and instruct the parent to use it that way too ...

Majid: So do you think that I'm missing any social skill?

X6: No I think for the 3-year old that's even a lot ... no I think it's great ... great concept ...

Majid: So do you have any idea that you always wanted to have for them and kept in your mind ...

X6: No not really but I think that pretend and play thing that you had is really great ... that it has the doll in it and ... the ability to turn the pages in script ... I think the script is the most important piece ...