Developing Communication and Access Skills for Children Who Face Severe Physical and Multiple Challenges

Why Use Multi-Modality Communication and Adaptations for individuals with physical and multiple challenges? (Note: Use the term: Complex Communication Needs, which puts the emphasis on needs vs. non, for example: non-verbal, non-speaking)

- Means of expressive language
- Means of improving receptive language skills for those children with auditory processing difficulties
- Provides a means for self-talk and cognitive processing
- Improves self-concept and self-esteem - Gives the child a sense of competence - which in turn, improves a child's ability to learn
- Facilitates speech for children who would be considered pre-verbal (We now have research and clinical evidence that shows multi-modal communication does not hinder speech development and in some cases it enhances speech development)
- Facilitates functional and appropriate use of speech
- Reduce frustration and behavior problems
- Makes language more concrete and less transient
- Provides multi-sensory input, and levels the playing field for children who are developmentally delayed
- Increases participation in daily life
- Means of interacting with Peers and provides a vehicle for developing social skills
- Means of manipulating play materials to learn cognitive concepts
- Provides support for emerging literacy and emerging mathematical concepts

How Do All Children Learn? How Can Adaptations Help?

- Learning is Connecting Intent with Movement: Physical, Emotional and/or Cognitive Movement
- Learning is Enhanced by Attention to Relevant Components
- Learning is: (Anat Baniel)
  - the ability to perceive differences
  - make sense out of the nonsense and
  - create order out of the disorder
- Children are born with billions of neurons and trillions of neurological connections
- Through experience, children learn by creating/building/expanding sets of neurological connections known as a neural network or cognitive schema and they use these cognitive schema as the basis for understanding new experiences.

- "What Fires together, Wires Together"
- Leaning is the process of <u>strengthening</u> connections, <u>adding</u> connections and <u>discarding</u> connections based on experience (The child's cognitive schema for a particular concept is strengthened, expanded and refined)
- Interaction is Critical for Learning Language - Second Language Infant Studies (Patricia Kuhl 2003)
- "Use it or Loose it!"
- Neural Networks or Cognitive Schema represent understanding about a concept that is processed in many areas of the brain to give a rich representation of all the aspects of that concept.   For example, neurological connections related to one concept may extend to areas of the brain that process: visual, auditory, tactile, kinesthetic, olfactory, gustatory, vestibular, proprioception, function, cultural considerations, context and other associated concepts.
- Teaching needs to focus on helping children build more robust neurological connections and cognitive schema
- Once a neural network or cognitive schema is in place it operates unconsciously in the background until there is a reason to pay attention to it
- Attention to any aspect of that cognitive schema immediately gives the person access to everything connected to that concept
- It is critical to teach concepts within natural contexts so that neurological connections for a given concept will be "wired" together for access later
- Learning and memory are contingent on being able to retrieve the information when needed for function
- Children who have normal processing build a complex network that encompasses many parts of the brain
- Children with abnormal processing or less connections to start with, may only build limited connections with fewer associations to a wide range of understandings
- Two much information coming in that doesn't make sense results in over-stimulation and that results in either: 'shutting down' or 'acting out'
- Shutting down can be a compensatory strategy to overload
- Frequently fear response is activated in the amygdala when there is too much unknown - resulting in fight or flight reaction. (acting out) This can prevent much of the information from reaching the frontal cortex for rational processing. Learning cannot occur.
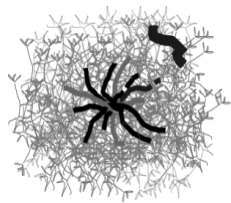
Schematic Drawing of Neurological Cognitive Schema vs. Isolated Connections

How Can You Help Children Develop Rich Neural Networks and Cognitive Schemas?

- The brain is not a video recorder of every detail
- The brain looks for patterns and changes in patterns
  - Memory is stored as patterns, not details
- Routines become patterns
- Patterns can be: Visual, Spatial, Auditory, Tactile, Kinesthetic, Temporal, Procedural, Cognitive, Linguistic, Multi-Modal, etc.
  - Patterns are learned through experience - not isolated drills
- When we "See" a Difference in an Expected Pattern, We are Compelled to Attend to it and Process it!
- Learning Occurs When the Brain Compares an Incoming Pattern with an Expected Pattern and Detects a Difference
- Music, Rhythm, and Rhyme can be used to Emphasize Patterns
  - Rhythmical Intention for teaching voluntary intent to move
  - Technology Can Emphasize Patterns and Comparisons
- Patterns Can be Visual, Spatial, Auditory, Tactile, Kinesthetic, Temporal, Procedural, Cognitive, Linguistic, Multi-Modal, etc.

The brain is pre-wired to look for **patterns** and make **comparisons** to what is known

Representational Hierarchy: Vision vs. Language Development

- When working on developing vision as a priority, the concept of starting with teaching a child to look at a single colored real object and then progress to a single color photo, and on to a realistic drawing and eventually a symbol, and text makes good sense for developing visual skills
- However, this is <u>not appropriate for teaching language</u> - Even for individuals with severe cognitive limitations
- Very Young Children Can Understand Abstract Symbols As Long as they are Presented in a Consistent, Meaningful Pattern- **Speech is Abstrac**t
- The Representational Hierarchy is true for easier recognition of nouns without any prior learning

- However, the Representational Hierarchy has nothing to do with language development – We <u>learn</u> language, <u>not recognize</u> language
- Words are abstract concepts that are learned by how they are used, not by how concrete or abstract they are.
- Many early and important vocabulary words essential for language development cannot be represented by objects or photos. For example: more, done, uh oh, want, up, go, stop, me, no, don't, help, etc. More info at: http://www.lburkhart.com/handouts/representational_hierarchy_draft.pdf
- We need to select appropriate symbols based upon a child's individual requirements - the key feature must be: **<u>Can the individual perceive differences</u> <u>between the symbols</u>?** Labeling, defining or knowing what the symbol is does not help with learning to use symbols to develop language.   Children learning speech do not know the meaning of words before we use them to talk to the child. They do however, need to be able to hear words and perceive differences between different words.
- Then, we need to present the symbols in natural contexts with a **<u>consistent</u>**, **<u>meaningful,</u> <u>pattern</u>** - by talking to the child using these symbols for genuine communication
  - Language is a Pattern - Our Task is to:
    - Use Appropriate Modalities
    - Emphasize and Clarify the Patterns
    - Model Patterns in Context
    - Engineer Ways the Child can Actively Engage and Experiment
    - Provide Strategic, Clear Feedback
    - Respond back with the same language form, to continue the discourse

Shifts in the Filed of AAC
- The field of AAC historically looked at the <u>Representational Hierarchy</u> as a process to teach language to individuals who had severe cognitive challenges. However, this was very limited in terms of long-term outcomes in language development and does not work with the intervention strategy of Aided Language Stimulation for teaching language. As described above, symbols do not need to be "concrete" to represent language
- Now the field is beginning to view AAC Systems as a Language
  - AAC systems need to be robust language systems, not just a collection of vocabulary
  - Teaching AAC is now beginning to be viewed as teaching language in an alternative form
  - There is a large knowledge base to draw from for teaching and learning a language
- We need to choose appropriate symbols based upon a child's individual requirements

- Then, we need to present symbols in natural contexts with a **consistent, meaningful, Pattern**
- Similar to how
- typical kids learn a language through speech
- Not just vocabulary - vocabulary within an organization system that provides patterns for language usage of vocabulary
- Language Disability or Access to Language disability
  - Does the individual actually have a language disability or an <u>access to language disability</u>?
  - Accessible language must be used in the environment to be learned

Best Practices in all areas: Motor, Vision, Communication, & Literacy

- Teach in natural contexts - integrated throughout the day
- Partners need to develop good observational skills to set up and monitor adaptations on the spot
- Active learning and intrinsic motivation
- Challenging individual at just the right level for learning (Zone of Proximal Development)
- Develop goals as a team with the long-term outcomes in mind
- Learning is Dependent upon Active Engagement
  - Moving an individual's body through motor patterns multiple times is not as effective as the child having a reason to move
  - Random visual stimulation done to the individual is not as effective as helping that individual develop visual curiosity
  - Drilling or testing an individual on vocabulary or syntax is not as effective as modeling language with a full range of functions across the day in natural contexts
  - Visual identification of letters and words is only one small part of robust literacy learning

Historical Strategies in AAC: What were we missing?

- Neurologically, the brain needs a <u>large</u> enough set of experiences with <u>meaningful use of language</u> to recognize patterns and create meaning - Patterns are harder to recognize from a limited set
- Historically, we offered children a limited set of choices - According to our agenda of what we thought or wanted the child to say. This is actually harder for the child to learn that communication is about her own message and not just about making a choice from what is offered by others.

- Children begin using language based upon their own agendas, long before they can talk about what we want them to talk about, so others providing options is not how language is learned
- We need to provide enough language for the child to say what she wants to say
- Children are often asked direct questions with a right or wrong answer or given limited choices that don't go anywhere
- There is a need for children to initiate and carry-on a conversation
- Historically, vocabulary flies in out of thin air and then poofs back into oblivion at the end of the activity. Activity specific vocabulary is great, but it needs to become a part of the child's larger system
- We need to be presenting vocabulary that doesn't disappear and can be built upon, instead of replaced.
- The brain builds understanding based upon patterns
- PECs: The Picture Exchange Communication System
    o Designed to teach initiation (functional communication) using picture exchange - beginning with requesting tangible objects (For individuals who are not demonstrating communicative intent - Autism Spectrum)
    o No verbal prompts -Structured procedure for fading prompts
    o Great tool for what it is designed for!
    o Often used beyond original scope and applied to a larger range of children who already have communicative intent
    o Not a whole language system
- Historical strategy: "20 Questions"
- Need a way to systematize vocabulary so the child can begin to recognize a pattern in how vocabulary is presented
- Select and customize communication displays: 'light tech' or 'high tech' that systematically arrange vocabulary, so the child can take advantage of the pattern and focus on the conversation, instead of searching for vocabulary
- Use a language system that can provide a large robust vocabulary that is organized into a systematic pattern for children to learn - For example PODD (Pragmatic Organization Dynamic Display - Gayle Porter, Melbourne, Australia)

What is PODD?
- **P**ragmatic **O**rganization **D**ynamic **D**isplay
- PODD is a language organization system
- One of a number of robust aided-language systems
- PODD begins at early language development with robustness, but not complexity
- PODD continues to build on early language patterns through complex syntax

- PODD is a way of organizing vocabulary for all day long in any context and <u>designed to be used receptively as well as expressively</u>
- Created by: Gayle Porter - Melbourne, Australia over 30 years of working directly with children and adults
- Owning a PODD is not enough, PODD is also how it is used
- Implementation strategies are based upon evidenced-based best practices in the field of AAC for developing autonomous communication
- Features of PODD that reduce load on working memory
    - Systematizes presentation of vocabulary
    - Requires less sophisticated motor skill
    - Reduces random presentation of symbols that have to be consciously processed as new, each time
    - Uses recognition memory – reducing load on recall memory
    - Has many scaffolds that support early language development
    - Pragmatic branches before relying on syntax for intent
    - Tense markers for early word forms
    - Yes/no intonation marker for early questions
    - Plus many others
    - Natural branching - eliminates meta cognitive process of planning what link to follow
    - Patterns that continue and build across increasing levels of language and access methods
- Using a full robust language system (of which PODD is one) systematizes how vocabulary is presented. The child can recognize a pattern and focus on communicating instead of searching for vocabulary
- <u>No individual</u> is too "low" too "young" too "severe" or too anything to be exposed to a <u>robust language input</u> in a form that he/she may be able to learn to use as a means of expressive communication

Patterns are learned through experience, not drills
- Children need to develop cognitive schema and broad understandings that can be generalized and built upon later.
- Problem Solving clarifies patterns. Getting it Wrong is as Important as Getting it Right
    - Allow for cognitive processing time with anticipatory pauses
    - Set up Problem Solving Opportunities
    - Mistakes are an Important Part of Learning
    - Help children recognize a pattern and then change it moderately to maintain attention and encourage curiosity
    - Engineer and scaffold 'failure free' learning experiences with clear feedback

- Using the AAC System to talk to the child teaches patterns
- Relate all activities to the child's experience, knowledge base and relevance
- Make the neurological connections!

Multiple Modalities
- Some children have weaknesses in one or more areas of sensory processing. We need to make use of the child strengths at the same time we help the child make sense of their weaker senses.
- Not being able to move their bodies into position to see, hear or feel what they would like, complicates this problem.
- Processing information is often easier and more effective when presented through a variety of modalities such as sight, sound, smell, taste, touch and movement.
- When auditory processing is difficult, it is especially important to enhance the auditory component of language with other modalities such as visual and tactile/kinesthetic.
- Sometimes this input needs to be presented simultaneously and sometimes sequentially. (See cortical visual impairment considerations below)
- It is important for children to experience language receptively that utilizes multiple modalities.
- Using picture communication symbols, voice-output and sign language as input can provide multi-sensory information for cognitive processing.
- Modeling the use of multiple systems, teaches subtle nuances and differences of using these systems, which become natural components of communicating
- By providing multiple modalities, the teacher/therapist/parent can observe, over time, what strategies are most meaningful to the child

Natural Contexts
- Learning takes place most effectively within the context of a meaningful event and not in an isolated drill and practice session.
- It is critical to teach concepts within natural contexts so that neurological connections for a given concept will be "wired" together for access later
- This helps children relate what they already know to the new information - thus increasing motivation and retention.
- Provides meaningful opportunities for practice with natural variability to maintain interest.
- When learning is presented in an isolated situation, out of the natural context, there is less for the child to associate with and fewer opportunities for practice.
- In the infant/toddler program, parents need models of how to use these strategies in daily routines, because sitting down and "playing" with the child is only one small

part of a very busy daily routine. Often time parents don't have the time to just play

- Aided Language Stimulation (Goossens', Crain and Elder) makes augmentative communication a natural language context
- Augmentative systems need to be seen by the child as a natural means for communication. This is another reason that the systems must be used by others, while communicating to the child.
- A variety of communicative functions need to be modeled in appropriate pragmatic contexts.
- Children's attempts to communicate also need to be responded to and expanded upon using the same systems that the child is using.
- What is the Cue? Because I actually want to do something for a genuine purpose within a natural context or because I recognized an artificial prompt?
- Natural environments teach natural cues.

Understanding the Learner with Significant Physical and multiple Challenges:

- Motor disabilities disrupt the child's natural ability to explore the world on her own and learn through experimentation
- Access to Learning Patterns may be more limited
- Frequently motor issues can occur with other multiple disabilities: sensory processing challenges, cortical visual impairment, ocular visual impairment, cognitive challenges, learning disabilities, auditory processing difficulties, hearing impairment, etc.
- Increased Passivity, agitation, sensory overload, and frustration are possible - Due to limited experiences of success
    - This may lead to less availability to take in information and learn
- Expectations are often set too low
- Since assessment requires a "motor response to a sensory input" (Gayle Porter), it is very difficult to determine cognitive abilities for children who have severe physical and multiple learning challenges:
    - Testing only tells us something if the child responds correctly
    - When child doesn't respond correctly, we can not know if the problem is is due to motor, sensory, cognitive, or language challenges
    - Cannot assume that the motor response is the same as the cognitive understanding
    - we cannot assume that the motor response is the same as the cognitive understanding - especially at a young age

- •It is usually very difficult to get a good measure of a child's cognitive abilities at young ages, because these children have trouble using typical non-verbal, pre-verbal and verbal communication
- These children often have trouble with typical skills that we classify as early communicative behaviors
    - •Early communicative gestures such as reaching and pointing
    - •Directed or coordinated eye-gaze for joint attention
    - •Non-verbal signals
- Lack of early communicative gestures often cue caretakers to continue treating the child as if a much younger child, than chronological age
- "Catch 22" - We can't assess where the child is functioning due to lack of effective communication skills, but we don't know what communication systems to put in place, since we can't assess functioning.... round and round - often resulting in inappropriate teaching practices
- May take many many years to develop and refine their motor skills to be effective communicators
- Lack of motor success and problems with interpretation of feedback from their environment, can derail the development of the child's self-concept as a learner
- Development of passivity and learned helplessness is common
- Need to develop an active learning self-image instead of passivity (orthofunctional personality - András Pető)
- These children require activities where they can experience control and adaptations that enable them to <u>learn through problem solving</u> with <u>exaggerated and clear feedback for their efforts</u>
- Children need to learn more effective ways to move and manage their physical challenges - to prevent future orthopedic deformities and contractures
- **<u>Critical Learning for Long Term Orthopedic Integrity</u>**
    - •Learning to develop healthy patterns of movement and rest
    - •Positioning for function and self-awareness of body position
    - •Active participation in transitioning between positions
    - •Seeing themselves as having some control over their bodies
- Adults and adaptations need to provide a scaffold for learning - at just the right level of challenge for each child, so they can experience success

<u>Understanding the learner with Rett Syndrome and Apraxia/Dyspraxia:</u>

General Characteristics of Rett Syndrome that Impact Learning
- Rett Syndrome is a neuro-developmental, genetic disorder found mostly in girls -

There is a phase of degeneration, but over-all it is not a degenerative disease. Children do make progress and learn.

- One of their greatest challenges is Apraxia/Dyspraxia.
  - o <u>Apraxia</u> is the inability to reliably connect thought to action
  - o <u>Dyspraxia</u>: the signal gets through some of the time, but may be delayed or misdirected
  - o Neurological connections are formed, but not as strongly
  - o Compare to using the back roads instead of the main highway
  - o Efferent Kinetic Dyspraxia (motor)   They have the cognitive intention, but have challenges with the motor intention
    - ▪ Difficulty with voluntarily initiating, sequencing and/or coordinating movements
    - ▪ Difficulty finding the 'on' ramp to the freeway
    - ▪ Difficulty with motor planning (moving from intention to action, despite a physical ability to produce that movement).
  - o Getting from intent to action takes more time!
- Breathing and Alerting Abnormalities Affect Ability to Move as Intended
  - o Difficulties with autonomic nervous system controlled by the <u>brain stem</u>
  - o <u>Breathing</u> dysrhythmias
  - o Weak parasympathetic (automatic <u>calming</u>) response
  - o May get too much or too little <u>oxygen</u> and/or <u>carbon dioxide</u> due to breathing
- Difficulty Regulating the Autonomic Nervous system
  - o Fatigue
  - o Temperature regulation
  - o Circulation (sometimes to one extremity randomly)
  - o Sleep cycle disruptions
  - o Swallowing
  - o Gastro-intestinal movements
  - o Anxiety, Agitation
- Observe for Sensory Regulation and Readiness for Learning
  - o Identify signals of dysregulation and regulation for each child
  - o Work with OT, family and others to make a list of strategies that help with regulation - Apply as needed (a quick nap, a bite to eat, short music break, change of activity, get up and move, etc.)
  - o Regulate your own state first then lend the individual your state
  - o Take advantage of teachable moments when child is regulated
- Inability to Move Increases with Demand
  - o The harder the child tries, the harder it is for her to perform it on demand.
  - o May need to move away before moving toward what she intends

- Some motor skills remain intact - but only when triggered with an automatic event that doesn't require forethought or cortical intent. This can be confusing and may be interpreted by others as stubbornness, because it seems that the child can perform a task some of the time. However, the harder the child tries, the harder it is for her to perform it on demand.
- Sometimes the child seems to need to move away before moving toward what she intends. If you don't wait for the child to finish the intent, it may appear that she is rejecting or responding incorrectly, when in reality she hasn't finished her movement yet
- Neurological Stereotypies
  - Neurologically caused - child does not intend to make these movements
    - May be movements that are also sometimes intentional (just like eye blinks can be voluntary or involuntary)
      - Hand wringing, washing
      - Hands in mouth or in hair
      - Other hand movements
      - Other body movements, kicking
      - walking in circles
    - Varies with day, stress, anxiety, pain, fatigue and other unexplained reasons
    - Masks intelligence
    - Often confused with sensory integration problems
    - The Child Must Over-Ride the Stereotypies to Perform a Motor Task for Communication
    - Wait for a response beyond the stereotypy with patient anticipation
    - Splinting
    - Music / Rhythm
    - Intention/Interest
  - Neurological stereotypies are different from sensory processing challenges
  - Sensory processing
    - The neurological process of organizing information we get from our bodies and from the world around us for use in daily life.
    - Can only occur if the information we receive is accurate.
    - With optimal processing of all the senses, the child then has the ability to interact successfully with the environment – to plan, organize and carry out a sequence of unfamiliar actions, and to do what he needs and wants to do. This is called PRAXIS or MOTOR PLANNING.
    - Afferent kinesthetic dyspraxia (motor)
    - Sometimes occur along with Rett Syndrome

- - Problem is not as much getting the information into brain as it is for getting it back out
    - o Strategies that work for children who have sensory challenges often don't work well for girls with Rett Syndrome
    - o Strategies that do help are usually related to helping with stability or calming
- Masks intelligence
- May be interpreted by others as severe intellectual challenges
- Dyspraxia/Apraxia also affects movements that control speech
- Dyspraxia/Apraxia Affects Movements that control non-verbal communication
  - o Difficulty moving as intended affects other communication skills - non-verbal social signals and sustained eye contact (She may appear disinterested)
  - o May make it difficult to maintain eye gaze and move eyes efficiently (even though eye-gaze may be a strength)
- Significantly Increased Time to Initiate Movement
- Need attentive wait time from partners
  - o Interact and then wait with attention
  - o Sometimes look away to free gaze
  - o Don't keep "re-booting" the system
- Verbal prompting may be less effective - especially if it is perceived as an instruction, which increases the dyspraxia
- Attentive / Respectful Wait time: Waiting for a response with patient anticipation is critical to success. The child learns which people will likely take the time to wait for her, so she can decide if it is worth her effort

Note: When the child produces spontaneous movement, no one can see the time it took between initiation and movement, which makes it challenging to know how long to wait. When in doubt, wait longer

- Sometimes, you can facilitate faster attention to you or materials: Movement, Proximity and Moving Your Face or Materials into the Child's View
- Sometimes, co-actively talking the girl through the motor movements, while using verbal "self-talk", verbal referencing and/or modeling, may be helpful (Make sure to go slowly enough to enlist co-active participation from the individual)
- Pressure to respond to a direct question or demand only increases the difficulty of being able to perform.
- 5 to 1 Rule of thumb in Natural Contexts:
  - o 5 inputs: teaching, commenting, explaining, demonstrating, modeling (may need to be 5 or 6 to 1 at first)
  - o 1 integrated test question related to that teaching (stated indirectly if possible)

- o Repeat (data collected over time not in one sitting)
- Strategic Feedback and a little Assistance when Stuck
  - o Move a little - at pelvis, trunk or shoulders
  - o Separate hands
  - o Only help once child shows intent
  - o Allow child to complete movement on her own
- Motivated by Connection with Others:
  - o They learn well from watching peers
  - o Work with peer next to them
  - o Be interactive - socially engaging
  - o Take turns, laugh, tease and share pleasure in little things
  - o Makes movement easier
- Model everything! Help child see the big picture
- Use peers for social motivation
- As with other children with motor challenges, these children often have trouble with typical skills that we classify as early communicative behaviors
  - o Early communicative gestures
  - o Directed or coordinated eye-gaze for joint attention
  - o Non-verbal signals
  - o Therefore, they may get incorrectly labeled as "pre-intentional, Reflexive" or "low functioning" and not provided with appropriate Augmentative and Alternative Communication Systems, supports, and strategic learning environments
  - o We cannot see intention, so for children older than the age where typically developing children show intention we cannot use the term "pre"
- It is Easy to Make the Wrong Assumptions about Cognitive and Language Potential for Children with Rett Syndrome
- Children with Rett Syndrome are Often Underestimated
  - o Severe difficulties in letting us know what they know
  - o Behaviors (stereotypies) beyond their control make them appear cognitively younger
  - o Limited expectations can impact their learning opportunities
- Children with Rett Syndrome are Reading and Participating in Academic Learning
  - o Many do best in inclusive environments
  - o Modifications include adjustments for
    - ▪ Quantity
    - ▪ Time allowed
    - ▪ Working with peers in group projects
- Keep your Expectations Open about Cognitive and Language Potential for Children with Rett Syndrome!

Motivation for Learning

- Motivation is **more than enjoyment**. It comes from an inborn drive to explore the world: 3 drives
    - Drive for Curiosity and Intrigue
    - Drive for Autonomy and Sense of Self
    - Drive for Social Connection

Motivational Drive 1: Cognitive curiosity "The Need to Know"

- Babies are Motivated to Learn Through Problem Solving
    - Cause and effect learning - baby scientists - Hanus Papousek (1969)
    - Problem of habituation (Boredom develops with too much repetition that is not child-directed)
    - Repetition is necessary for learning.
    - Too much repetition can cause habituation
    - Balance of Novel and Known
        - Children learn by a process of gradually adding to what is known through comparisons and patterns.
        - Start with Known Information and Build Systematically
        - Help the child build associations and comparisons to known information
- Start with what the child understands. Patterns that make sense, and then provide **repetition with moderate differences**
    - This taps intrinsic motivation and assists learning
    - Helps the child relate new information to familiar information and build associations
- Meaningful repetition within natural meaningful contexts provides active practice for developing skills. The use of natural motivation that includes variation (moderate differences) holds interest and helps child internalize a broader understanding of concepts.
- Personalize materials and use preferred/familiar items
- Use Multiple Modalities for better processing Set up activities for the child to use a combination of previous knowledge and trial and error to achieve success.
- Battery operated toys - give them a mission: deliver snack to a friend across the table, kick a ball, knock down blocks, act out a part of a story, etc.
- Repeated Readings with Moderate Differences:
    - Research shows that repeated readings of a favorite book is an important early literacy skill
    - Typical children naturally add moderate differences with each reading

- Children who don't have a means to interact with the book, may get bored with the book being read the same way over and over
- Read the same story on multiple occasions with moderate changes each time
- Begin with real life experiences that include multi-modal communication and create or select books related to those experiences. The book then becomes a moderate difference to what the child has experienced and will thus facilitate associations
- Read with multiple modalities - emphasizing one over others at a given time: sign language, picture symbols voice-output overlay
- One option is to add more pages to the book each day for sequential stories
- Add the voice-output device for sound effects or repeated lines (time dependent and non-time dependent - Goossens')
- Incorporate a song, or chant into the reading
- Use a robust AAC system to talk about book, pictures, events, characters, feelings, problems, solutions
- Reread versions of the story on computer: PowerPoint, IntelliPics Studio, etc.
- Have students act out the story - use props, signs for costumes and visual, tactile and positional stage settings
- Re-read the same stories with different purposes for listening/reading
- Write about it with alternative pencils (Center for Literacy and Disability Studies UNC) and robust aided-language system
- Write your own books with the student

• Theme based learning, based upon a selected book, provides multiple experiences with a concentrated set of vocabulary and concepts without being monotonous. The theme provides a context

- Consider language themes that can be built upon throughout the year such as shopping or food preparation as opposed to seasonal or holiday themes
- Help students see connections of concepts in a variety of activities within a theme
- Provide multi-modality experiences in natural contexts instead of teaching isolated tasks that are unrelated to what the child already understands
- o Provide opportunities for active engagement within these experiences.
- o Engineer the environment to prevent sensory and information overload, so the child will be more likely to be in a receptive state for learning
- o Provide computer activities that allow the child to read with different voices to encourage repetition with variety
- Teach language in natural contexts throughout the day - not just in isolated activities

- Natural contexts provide opportunities for repetition with variation
- Emphasize communicative functions in a variety of natural contexts

Work towards Mastery Motivation:

Mastery Motivation: "a psychological force that originates without the need for extrinsic reward and leads an infant or young child to attempt to master tasks for the intrinsic feeling of efficacy rather than because of recurrent reward" (Morgan, MacTurk, & Hrncir, 1995, p.6)

- Mastery Motivation is internally driven motivation - Active engagement with the internal desire and external supports to "figure it out"
- Children Need to See a Reason for Doing Something
- Problem solving is critical - Getting wrong is as important as getting it right
- Children will be motivated to only do what they know they can do or assume they can do successfully – This is often interpreted by others to mean: "She only does what she wants to do."
- Withdrawal or passivity may be the child's way of protecting themselves from further failure
- When a child wants to do something, her brain actually acts more efficiently and that task becomes easier for the child

Modeling AAC for Cognitive Motivation

- Linguistically map your modeling based upon the child's behavior, interest and attention
- Make an effort to get to know the individual and use AAC to talk about his interests
- Talk about what they child might be thinking about or attending to
- Describe, explain, and wonder with AAC

Summary of Cognitive Drive: All people have an inborn need to <u>figure things out</u> and to <u>understand what is happening</u>. We foster this in children by:

- Following their interests
- Setting up the world for them to figure things out
- Explaining or showing (at whatever cognitive level possible) why they might want to try something
- Explaining or showing (at whatever cognitive level possible) why things are happening when they feel confused, frustrated or are in "limbic mode" or emotional distress.

- By helping them understand patterns of how the world works to reduce their anxiety and increase their curiosity about the world. <u>Provide repetition with moderate differences</u>

Motivational Drive 2: Drive for Autonomy and Sense of Self

"Have a say" and experience some control

Active Learning:

- Active learning is vastly more effective than passive participation.
- Children with significant challenges, may become passive learners when they have difficulty communicating, interacting and/or understanding what is going on around them.
- Sometimes these children cruise through the day as a passive passenger, never needing to pay attention to the road or even helping with navigation of where they are headed. (Guided Tour vs. Following a Map)
    - They are cared for and entertained regardless of their participation level.
    - The problem is that learning is less likely to take place when the child is in a passive role. This can lead to "Learned Helplessness"
    - Neurological connections are formed through active experience - not isolated drills
    - Teachers and therapists need to think outside the box and create participation opportunities within activities.
    - Children need to be actively engaged in learning - correct level of challenge ad worth the effort
- Another key component of active learning is the child's perception of control - it must feel real to them If the child feels competent, then he will more likely to engage his brain in the task at hand.
- Teachers, therapists and parents can engineer opportunities for children to feel competent, by creating activities in which the child can easily relate his efforts to the success of the task.
- Active participation is increased by providing opportunities for control and having a say that will affect the child's experiences
- provide opportunities to "having a say" throughout the day during all activities
    - o Opportunities for Control
        - Need to matter to the child
        - Need to make sense
        - Need to be understood and discriminated from each other

- Provide opportunities for control, by setting up child-directed activities and following the child's lead
- While children cannot often have control about the sequence of the daily routine, there can be opportunities within routines that affect them. (For example, deciding who will be their peer buddy for an activity, selecting the book for story time, or competing with friends in an adapted game that reinforces concepts just learned in a lesson.)
  - Offer control beyond tangible objects
  - Who?
  - What?
  - When?
  - How?
  - Where?
  - How Many?
- Control needs to be balanced with limits.
  - Cultural and routine limits provide security and reliability that gives the child a known base of structure in which choices can then build the child's sense of self
  - Too many options without that structure can also be detrimental to learning.
  - The balance is what feels safe to the child and communicates respect for them as individuals.
- Prompting too much and being too helpful or rewarding dependency behaviors can reduce mastery motivation and lead to learned helplessness
- External rewards and reinforcers can reduce mastery motivation and shift child's attention away from task toward the reinforcer. It is more effective for the activity to have relevance and intrinsic motivation.
- Empty praise is NOT helpful. Praise a child for specific and active efforts. Constant cheer-leading, when the child hasn't done anything, can be confusing to the child and will make praise less effective. Well targeted praise, with clear feedback, helps the child recognize her own accomplishments.
- Limit telling the child what to do. Instead, provide strategic feedback on what they did (strategic feedback)
- Select and customize technology to enable exploration and then provide strategic feedback
- Getting past learned helplessness and passivity required multiple success with active participation
- Scaffold a discovery learning environment to allow for problem solving
- Role of teachers, therapists and para-professionals is to facilitate independence, active engagement, and support for problem solving

- o Doing one problem with active engagement is better than finishing a whole page of assignments without engagement - just to get it done
- Encouraging expectant wait time, without pressure, can allow the child time to process and respond with her own motivation. (Keep extraneous verbal clutter to a minimum)
- Avoid telling children it is "hard" (Ok to say, I can see you are working hard at this - in a positive encouraging tone)
- Modeling, especially by peers is a very powerful means of motivation
- Vygotsky (1978) "zone of proximal development" (ZPD) Challenge child just above what he can do independently and provide a scaffold of supports
- Reducing the pressure of testing situation and using an engaging, interactive experience instead, can help the child make use of more skills and be more likely to practice them on his own
- Recognize the difference between Testing and Teaching
- Children learn by doing
- Emphasize and focus on instruction and experience - not drills
- Assume that the child is strategic and there is a reason for their behavior - even if it is not immediately apparent
  - o Every behavior has a reason - look for and respond to the reason
  - o Behaviors often demonstrate the strategic competence to avoid, change or achieve something
- Look for and respond to any subtle communicative signals the child uses
- Language is multi-modal - Accept any attempts at communication as valid and respond to themPresume competence
- Work Towards Clearer and More Reliable Signals
  - o Move towards more independence
  - o Support the child's Intent
  - o Provide Strategic Feedback, instead of prompting
- Support the child's Intent
- Only help once child shows intent
- Allow child to complete movement on her own
- Scaffold success by assisting the child meet his goal
- Move towards more independence over time
- Backward chaining
- Limit or eliminate hand-over-hand assistance - try to support movement initiated by the child, instead of moving their hand for them

Adapting Materials to Increase Active Learning:
- A range of assistive Technology from Velcro™ to computers can provide a means for children to accomplish physical tasks

- Two switches two functions for exploratory play
- Adapted handles for grasping: PVC pipe, hot glue sticks, shower curtain rings, dowels, Velcro, stick tac, etc.
- Stabilizing toys: carpet squares, Velcro, shoe strings, clamps, slanted surface for better forearm support and better viewing
- Touch screen, eye-gaze, IntelliKeys overlays or two switches connected to the computer to do different actions on the screen
- Simulating fine motor experiences on the computer for children who face physical challenges - developing the cognitive concepts related to fine motor skills
- Indoor/outdoor Carpet playboards with Velcro
- PVC eye-gaze frame to hold props and direct action
- Magnetic dry-erase boards, colored magnets and magnet strips - math activities

Active Learning is not Just Answering Questions:
- Reduce direct questions, because direct questions:
  - Limit control
  - Encourage passivity
  - Reduce initiation
- Active Learning is not Just Answering Questions
  - Student's robust AAC system must always be available
  - Add "My Work" phrases for quick control during schoolwork
    - Read it again
    - Explain it to me
    - Give me a minute to think
    - Help me brainstorm some ideas
    - Please get my communication book
- Foster and wait for initiation
- Prompt least to most - pause, environmental cue, expectant delay, gesture or point, model, indirect verbal, direct verbal, partial physical, full physical

Modeling AAC for Autonomous Motivation
- Reduce or limit the use of questions
- Pause often
- Model ideas of what the user might want to say in a given situation, instead of modeling what they should say
- Model language without expecting a specific response back from the child at that time (no mand modeling)
- Use patient encouraging wait time

Summary of Drive for Sense of Self (Autonomy): Children gain a sense of self through being able to do things themselves
- o Scaffold learning opportunities that include options and opportunities for the child to try out different possibilities without a right or wrong answer
- o Adapt materials so child feels a sense of independence to do something themselves
- o Value their participation

Motivational Drive 3: Drive for Social Connection

"Valued as a member of the community"
- Social interaction and a sense of belonging are powerful motivators for learning
- Connection with others is a basic human need
- What is the worse punishment for humans? Isolation, Solitary Confinement - people need to interact with other people
- Respect:
  - o Communicate a feeling of value or worth as a human being
  - o Care but don't pity
  - o Communicate pleasure in being with them
- Teach Peers to be Friends
  - o Teachers and other adults often set the tone of the classroom
  - o Discourage "helping"
  - o Encourage "doing things together"
  - o Friendships are formed through common interests, not forced
- Utilize peers to customize activities and play games
- Practice Academic Skills through playing games

Co-Planned Sequenced Social Scripts (Musselwhite, Burkhart)
- Use of sequential message devices for a series of communicative turns
- Provide frequent opportunities for social interaction and connection with other people to increase motivation
- Access challenges for children who face severe physical challenges, often hold them back from participating in effective communication
- Provides practice for access with intent, purpose, motivation
- Co-plan with child's robust communication system if possible
- Touch Point cues (2 and 4 point) - using the child's body (Dale Gardner-Fox)
- Remember that no response is a response
- Do not give the child options to say that don't make sense or follow the flow of the conversation
- If the child doesn't choose one of your suggestions, change your suggestions
- Creating Co-Planned Sequenced Social Scripts (Burkhart and Musselwhite)

- • Action Scripts: Book reading to a peer, songs, everybody do this, putting on lotion, directing actions of others
- • Class/Work Participation Scripts: Studying for a test, engaging in a cooperative learning activity, be a song leader, story leader, or transition leader
- • Conversational Scripts: Guess what happened?, Who's cute, The gym last night, pranks, or an interview
- • Anatomy of a Conversation
    - • Attention Getters - and/or Greetings
    - • Starters / Context Setters (Generic)
    - • Starters / Context Setters (Specific)
    - • Descriptive or Event Statements
    - • Maintainers, Holders and Interjections
    - • Turn Transfer Questions
    - • Closures and Transitions to Other Topics
- • Allow the child to initiate, don't say "press your switch" Approach the child with a look of interest on your face and wait. You can try a natural verbal prompt if necessary such as "So, what's up?" or "How's it going?"
- • Provide frequent opportunities to co-plan and use scripts within natural contexts
- • Co-planning is crucial!

Modeling AAC for Social Motivation
- Research shows that language is learned most effectively through interactive discourse (model conversation)
- Start a conversation using the individual's AAC systems
- Always say something with AAC in response when an individual uses AAC to say something - even when babbling
- Use AAC to talk to others around the child
- <u>Model with the intent to connect to the individual, not teach him something</u>
- Respond to any communicative attempts from the child as intentional and interesting - respond to and expand upon what the individual might have meant
- Use what you model to build a relationship and communicate your interest and enjoyment in interacting with the individual
- Use mutually appreciated humor and teasing

Summary of Drive for Social Connection: Everyone needs to be connected to others and feel a sense of belonging
- Communicate to the child that you enjoy them
- Build a relationship with the child
- Model and use peer models

- Include them as a member of the group

Imagine: You are a teenage girl who is not able to use speech to communicate. Mom is dressing you and talking about what you are going to do this weekend: Going to little brother's soccer game, Going to the park and watch the kids playing, etc.,You would like to go to the mall and buy new shoes - How do you say that?

Activity - Please find a partner

<u>First person</u> - take a secret message
- look at secret message to communicate (don't show your partner)
- sit forward in your chair, legs up (instability)
- close eyes or look down (no facial expressions, visual challenges)
- sit on hands (no gestures - physical disability)
- answer only with yes or no head movements

<u>Second person</u>
- Ask yes/no questions to guess the message

Switch roles and try another message

How did that feel?
- Did your partner get your exact message?
- Did you want to answer yes to questions that were not your message?
- Did your communication get off track, when you responded with yes (because you agreed with what they said) but it wasn't related to what you were thinking?
- Did you want to give up and not bother communicating your message

This is what individuals with complex communication needs feel all day every day, without access to a robust communication system

Learning Access of Partner-Assisted Scanning (listing) as an Alternative to Pointing and Access to AAC
- Within appropriate natural contexts, list at least 3 items and look for a signal from the child
- Always include "none of those" or "something else"
- Adding technology to the listing strategy: "that's the one I want" - be careful to balance new difficulty of using a device with a simpler cognitive task
- Yes and no movements are even better:
    - Child controls the speed of scan and allows for processing time
    - Partners are more confident in child's message
    - Plan to teach 2 movements over time, while accepting what the child can do now

- Use monotone, rhythmical voice for scan and social voice for interaction
- List toys, objects, things written on a series of dry-erase boards, song verses, class jobs, iPad apps with a pipe cleaner pointer, etc.
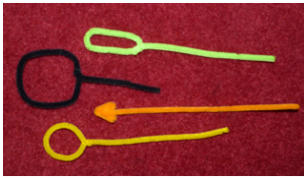
- Use partner-assisted scanning with a robust and organized language system such as PODD (Pragmatic Organization Dynamic Display) Communication books (Gayle Porter, Melbourne, Australia)
- Developing Access Skills for Partner-Assisted Scanning with AAC
- Partner-assisted scanning may be:
    - Visual
    - Auditory
    - Visual plus auditory
- Remember that scanning is giving the child an alternative means to point
- Visual partner-assisted scanning:
    - (this section) this column, this one
    - First choice if child has good vision for seeing the whole display
    - Faster, more efficient, less load on working memory
    - Student learns the symbols and then can progress more quickly to other access methods, increased vocabulary, and high tech eye-gaze
    - PODD navigational side panel: oops, another word on this page, go to categories, back to 1, that's all I have to say about that (puts child in control of length of utterance)
- Visual plus auditory partner-assisted scanning: Name each item in the column and then individually if column is selected
    - For children who have vision challenges that prevent them from looking across the whole display and need auditory support
    - Can start as one-per-page item by item (with matching companion pull-off book for direct modeling) and then move to pull-off columns
    - Eventually, combine visual plus auditory with some items just auditory only scanning as vocabulary increases beyond the potential benefit of visual support.

- o PODD navigational side panel: oops, another word, (if yes: this page/go to categories/ back to 1/back to __a/its not in my book, I'll give you a hint) that's all I have to say about that
- Auditory only
  - o Partner's voice is part of the selection set
  - o Selection set is transient and temporary
  - o Only part of the selection set can be presented at one time
  - o Hardest form of scanning
  - o Start simple and build knowledge of patterns over time
- Scanning is Not a Series of Questions
- How do you model partner-assisted scanning?
  - o Start with Direct Selection Modeling
  - o Use a Direct Model for More Vocabulary and Speed of Conversational Flow
  - o The pattern that you are modeling is the key word on each page that the child will eventually scan to communicate (PODD)
  - o Powerful way to highlight and emphasize the path for each step of the message
  - o Reduces excess verbal clutter of the scan for the child - between targeted items
  - o Different from what the child will use to express herself
  - o The 'Full Model' will need to be introduced, in addition to the 'Direct Model' once the new partners are ready, in order to model how the child will use the system, but this can wait in the beginning
  - o Use the Full Scanning Model - Some of the time
  - o Use the Full Scanning Model
  - o when there is someone else to chat with, so the child can watch
  - o Modeling Auditory Scan - sometimes just what child would say yes to - direct model, and sometimes the full model. Use full model more in the beginning with auditory scan for child who understands speech

visual   Auditory
Side Panels for Scanners
(PODD)
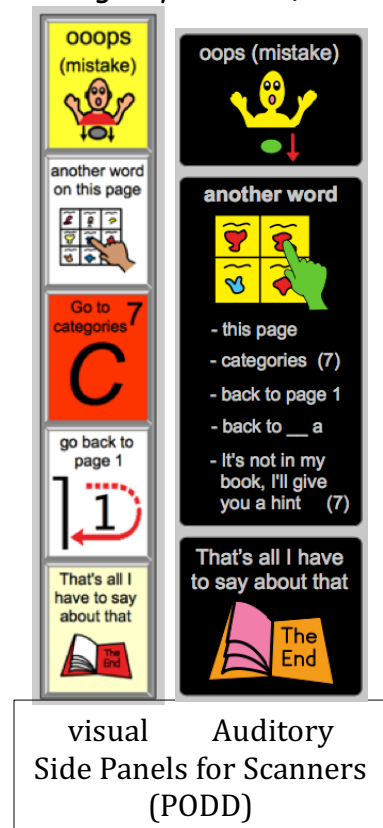
"But he doesn't have a reliable "Yes and No" so how can we use Partner-Assisted Scanning?"

- Model "Yes" and "No"...as you go...
- Look for Subtle Non-Verbal Communicative Intents, Confirmations, and Negations
- Work Towards Clearer and More Reliable Signals over time

- o   Increase Clarity of Feedback for the child and for the Communication Partner
- o   Reduces guessing
- o   Provides more success for the child
- Stop the YES / No Hunt!
- Why is Yes / No So Hard and Often Seen as Inconsistent?
  - o   Many questions are not easily answered with yes or no... may need to clarify what is being asked
  - o   Depends upon understanding the language used in the question
  - o   Doesn't allow for other options
- **Never Teach Yes / No with Random Questions**
  - o   Understanding the language of the question has to come first
  - o   Developmentally, expressing yes and no appropriately comes after the child has developed some expressive vocabulary
  - o   Yes/No for confirm and reject is an earlier skill than answering questions – this is what is used for Partner-Assisted Scanning
- Learn Yes/No as an **Alternative to Pointing** - **NOT for Responding to Random Questions**
- A list should be at least 3 items
- Present all options including: "none of those or something else"
- Testing and Direct Questions – the last item always: "I don't know" and "please get my communication book/talker" (Encourage the teachable moment and control to ask for more information)
- Ideas to List for options:
  - o   Verses of a song
  - o   Flavors of ice cream
  - o   Books at the library
  - o   Items to click on an iPad
  - o   Dress-up clothes to wear
  - o   Anything and everything <u>as long as it is a natural part of life</u>, all day long
- A smile does not work for all meanings of YES ! (Does your head hurt?)
  - o   Be aware that a smile may mean:
  - o   "I like it", "funny", "silly", "Great", "Yeah", "Something on the other side of the room is funny", "I accept", "I'm nervous", "That reminds me of something funny", etc.
  - o   Spontaneous smiling can cause confusion during scanning
- A smile doesn't work for "yes" long term
  - o   Ok to start as a subtle signal

- When trying to communicate something, What if it isn't something you are happy about - something's wrong / sick
- Need to keep a poker face during the whole conversation or you accidentally say something you didn't mean
- What if you hear or think something that is funny in the middle of your message?
- Problems with "look at me for yes"
  - May work for a quick shared thought, but breaks down with longer autonomous communicative messages
  - Apraxia / Dyspraxia increase with any timing demand
  - How long do you wait for "no response"?
  - Many children show great variability in time required to initiate movement
  - Eye contact and smiles are social connection and may get misinterpreted as "yes" when used to engage
  - Not responding takes effort and child must inhibit looking during a scan or list
  - Some children begin to look more autistic, because they actively inhibit eye-contact to prevent accidentally saying "yes"

Teaching "Yes" and "No" (as an access strategy)
First Goal
Child will intelligibly (nod and shake head or use individually selected movements/word approximations) to indicate YES or NO to select (accept and reject) items during partner-assisted scanning
NOT:
Child will intelligibly answer YES/NO questions by (nod and shake head or use individually selected movements/word approximations)

- Teach yes/no movements, words, or word approximations that will be recognizable to unfamiliar partners in the future
- Cost and time to learn typical gestures and sounds, often pays off down the road in quality of life and people seeing the individual as smarter
- Work with PTs and OTs
- For children with Rett Syndrome and Dyspraxia, try talking switches for a target and clear concrete feedback (Personal Talkers from Attainment Co.)
  - Hold "Yes" under child's chin and "No" next to child's left cheek and move back as a target (Move in after item is scanned - do not mount them)
  - Activate for any head movement to the side or down
  - Fade the use of Switches and move to head movements for Yes/No

- Teach Movements for "yes" and "no"
- Practice Yes/No in Fun Ways
- Work to get good, active positioning and then explain to the child what they could do for yes and no
- Children with significant CVI may not have observed that people use head nods and shakes to indicate yes and no
- Don't Forget Speech as an Option for "Yes" and "No"
- When a child signals yes or no with a movement of some type, let them know what you are responding to. For example, I see you looking up for yes.
- No response may be the response when your only options are YES or NO!

Control is Important But there is More to Learning Language and Communication

- Having a say helps to increase cognitive engagement and reduce passivity
- Choices Help Provide a Means of Active Participation - But
- Just Indicating a Choice that Someone Else Selects - Isn't Enough to Develop Language
- A robust aided-language system is needed to provide a basis for learning language for those children with complex communication needs.

Multi-Modal Communication - Creating an Aided-Language Learning Environment

Adopt and Share Beliefs for the Multi-Modal Language Learning Environment:
- Begin by focusing on interaction and conversation not on teaching the device or AAC system
- Not having speech is not the same as not understanding
- Everyone Communicates
- Communication is multi-modal – depends upon situation and communication partner – Is the message understood?
- Assume the Child has Something to Say - See your role as the person discovering what the child wants to say
- Respond to all communication as intent - build a sense of competence
- AAC is the individual's voice
  - Aided Language needs to be within arms reach at all times
  - Others need to take the responsibility for having the AAC available in the beginning
  - Children will take their cues from others
    - modeling kid talk

- talking to others around the child
- Valuing AAC
- Communication happens all the time it is NOT just an activity
- Communication is about something we don't already know
- Communication is Messy
  - Dynamic and Raw - Not Edited and Polished
  - Not Sterile Like Performing a Script
  - Not a One Way Process - Dependent Upon the Communication Partner's Responses - Not All Thought Out Ahead of Time
  - When the Goal is Communication, We Need to Accept and Expand Upon Whatever the Child Does
- Autonomy of Message is Critical: **Autonomous communication**
  - Refers to where messages originate
  - Able to express self in accordance with own intentions - not just a response to the options provided by others
  - Few restrictions on what they can say
  - Autonomous communication is not the necessarily sophisticated or complex language
  - Autonomous communication is not the necessarily independent
  - Another person may have a role in operating the system to enable an individual to "say what they want to say".
  - Communication can be autonomous but not independent and communication can be independent but not autonomous
  - Autonomy must be the first goal, with independence coming over time
- Communication Begins with Intent
- Getting from Intent to Action is What is Difficult for many children who have multiple disabilities. The result of the effort, must be worth the effort
- Keep your expectations **open**

What Does Successful Communication Look Like?
- Long term destination: (Gayle Porter)
  - Being able to say:
  - What I want to say,
  - to whoever I want to say it to,
  - whenever I want to say it
  - however I choose to say it
- Autonomous communication
- Will she take it to a Party?

What is Language? (Not just speech)

- An <u>agreed upon set up symbols and rules</u> that enables a community of people to interact and communicate with each other
  - <u>Spoken</u> – verbal communication
  - <u>Unaided</u> – using body – including sign
  - <u>Aided language</u> – use a communication aid of some type

What is Communication? (verbal and non-verbal)

- Connection
- Interaction
- Understanding
- A relationship with another person

"Communication is the Engine that Drives Language" Martine Smith

Varied communication functions

greet   manipulate   relate information   agree / disagree
answer   ask questions   instruct others   ask for things   joke
express an opinion   share information
express feelings   protest   describe
discuss interest   "make social contact"   bargain
comment   request / attract attention   complain

Typical Language Development – How many words do children express?

- 1 year old?   - about 1-3 words
- 18 month old?   - about 20 words
- 2 year old?   - about 275 words
- 3 year old?   - about 900 words
- 4 year old?   - about 1,500 words
- 5 year old?   - more than 2,000

Based on Smith (1926) as cited by Dale (1976) & Retherford (1996)

How Do Children Learn Language?

- Typical children learn language by being immersed in a native language learning environment, where they can freely interact with, and try out their developing skills
- Language is not learned by straight imitation, it is learned through broad experiences that provide multiple repetitions of concepts, vocabulary and conventions. This provides a scaffold from which children can construct language

- All Theories of language development imply the existence of an environment of language users necessary to support the child's development of communication and language - Children acquiring spoken language are surrounded by a community of speakers
- Influences are usually not planned
- Input before Output - Receptive language input is necessary for developing language expression
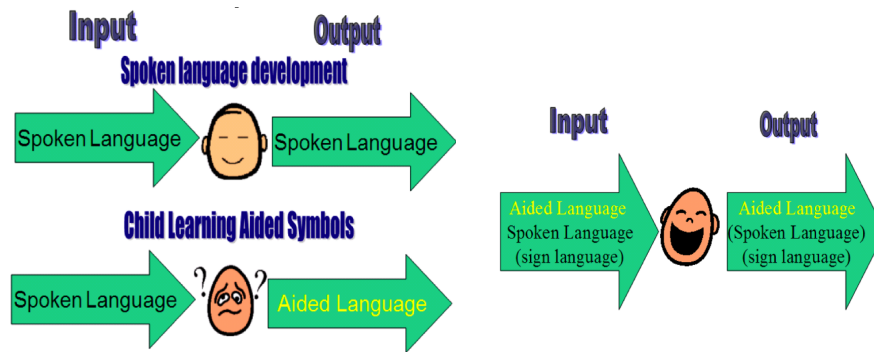
Gayle Porter, 2004

- Analogy to Foreign Language Immersion
- Children who will need to use AAC systems have very limited opportunities to observe others using similar systems to communicate - especially those who use alternative means to access their systems
- Aided Language Stimulation (Goosens', Crain and Elder, 1992) - Multi-Modal Language Stimulation - information needs to go in before it comes back out
- System for Augmenting Language (Romski & Sevcik, 1992) later: Partner Augmented Input
- Natural Aided Language (Cafiero, 1998)
- Modeling general receptive input with no expectation that the child will say anything particular at that time. Model ideas of what to say - kid talk. This is very different from a Mand Model
-

Create an Aided Language Learning Environment
- Children most effectively learn to use augmentative communication through the same methods that they learn to use verbal communication - through modeling in natural and functional contexts
- Aided Language Learning Environment: 3 Components
    o Picture symbol vocabulary must be available at all times
    o System must be used to interact for genuine (real) communicative purposes throughout the day

- o People need to respond to, and respect the child's explorations and expressions of what he says as his voice
- When in doubt of what or how to model - look to what we say to typically developing children and what the research says helps them learn language
- Model in natural, everyday situations as part of typical conversation and interaction
- Children will learn to use their system in the way partners model it
- Early vocabulary must be first introduced receptively in natural contexts
- Children who will need to use scanning systems have very limited opportunities to observe others using similar systems to communicate
- Talking to the Child with his system:
  - Validates the child's means of communication
  - Acknowledges that children learn to communicate in the way they have experienced communication
  - Gives the partner a good perspective on what the child is facing
- Teaching AAC requires the teacher/therapists/families to be more fluent in the child's language system than the child
- Utilize communication books/boards/devices to point to or indicate communication symbols receptively throughout the day.   This is important even when child may need to use a different access strategy - such as scanning or eye-gaze. Model the child's access strategy at least some of the time.
- Drill and practice, rote learning is not very effective for learning language
  Language concepts need an emotional, meaningful connection to be stored in memory
  Learning language in functional situations facilitates generalization
  Anything that has some intrinsic motivation for the child is more likely to be practiced in different settings and used by the child.
- Expand upon any efforts by the child to communicate, using vocabulary, communicative functions, and longer utterances just above what the child is able to express. This helps guide the child and provide a model for higher levels of language usage
- Use a **Robust Language System**
  - A wide variety of communicative functions need to be represented.
  - Core words by themselves are not enough to represent a full language. Core words do not allow the child to set topic or talk out of context.
  - Core must be integrated with content, in any robust language system
  - Robust language systems must contain consistent meaningful patterns for organizing vocabulary to represent a full range of pragmatic functions
  - All children need a robust language system modeled to them in order to learn

Considerations for Children who have Cortical Visual Impairment in Addition to Significant Motor Challenges

Vision Challenges:

- Types of visual issues – Ocular vs. CVI (cortical or cerebral visual impairment)
- Ocular
  - Typically static (unless caused by something degenerative)
  - If the child only has an ocular visual issues, then it is appropriate to figure out the specific accommodations required to enable the child to maximally use-their vision For example:
    - Specific accommodations required
    - Glasses
    - Large text, magnification
    - Special lighting
    - Compensatory strategies to compensate for blind spots
    - A child who has a visual field loss may require materials always presented in a certain field.
    - A child who has an acuity problem will need attention paid to contrast, size, distance of viewing, and corrective glasses
    - Surgery
- Cortical / Cerebral Visual Impairment
  - Visual challenges caused by damage to the brain
  - Vision skills can appear inconsistent, in relation to environmental conditions, but major changes to visual skills occurs gradually
  - Vision often Differs from What is Found in an Eye Exam done by an Eye Doctor (unless that doctor has had additional training in CVI)
  - CVI Frequently Occurs with Other Neurological Damage
  - Specific characteristic use of vision as described in the CVI Range (Roman-Lantzy)
- CVI may or may not occur with ocular visual disabilities
- Ocular vision impairment that occurs with CVI should be addressed immediately, in addition to dealing with CVI.
- Possibly normal eye report
- CVI can be a hidden component of other ocular problems and may not be easily diagnosed - Consult vision specialists for functional visual evaluation
- The key is: if the child's functional vision disabilities cannot be explained by the ocular condition, then CVI should be suspected
- CVI is a Continuum (Range) of Characteristic that Must be Evaluated Individually for Each Child
- CVI Occurs within a Wide Range of Cognitive Abilities and Cognitive Potential

- It is Easy to Make the Wrong Assumptions about Cognitive and Language Potential for Children with Complex Sensory and Motor Challenges
- If CVI is the main problem with a child's vision, then accommodations to the environment and materials will be made to systematically increase the child's use of vision and develop the neurological the connections to help the child make sense of what she sees.

Cortical Visual Impairment and Cerebral Visual Impairment:
- Often used interchangeably as CVI, but these terms aren't exactly the same.
- **Cerebral Visual Impairment** refers to any visual challenges that are caused by damage or differences in brain pathways and brain processing, as opposed to visual challenges that are caused by damage or differences in the eye and optic nerve (Often described by Gordon Dutton and others)
  - Refers to a wide range of visual challenges from mild to severe
  - Includes milder vision challenges that may not be evident until school age when a child is learning to read (problems with visual perception, figure ground, etc.)
- **Cortical Visual Impairment** generally refers to a subset of Cerebral Visual Impairment that is evident from birth or from date of a neurological incident
  - Cortical Visual Impairment (as originally described by Dr. James Jan and refined by Dr. Christine Roman-Lantzy) refers to vision challenges resulting from specific brain damage or differences to visual processing areas in the brain and is defined by the following criteria
    - Eye exam that doesn't explain functional use of vision
    - History of brain condition, trauma, damage
    - Presence of visual and behavioral characteristics as assessed in the CVI Range (Roman-Lantzy)
  - Cortical Visual Impairment almost always refers to individuals who's severity of vision impairment results in the individual being functionally and educationally visually impaired
  - Does not refer to milder visual perceptual problems that don't significantly impact visual functioning in daily life

Issues / Problems with tactile symbols
- Representing vocabulary for a robust communication system with a full range of communicative functions for even early language development would require a large system that would be difficult to carry around and use in natural contexts - unless the individual could use smaller tactile input, such as braille
- Tactile information can be confusing if an individual hasn't had many experiences using their hands to explore the world. Neurological connections to understand

tactile input though hands are formed through active experience exploring the world tactually (not by someone passively rubbing the individual's hand across a tactile symbol)
- o Children who actively explore the environment using their hands, have built connections in their brain to discriminate tactile input
- o Children who have built these connections, might be able to learn to use a direct access communication book that has braille on each symbol
- o Children who are not able to actively explore tactually with their hands due to physical challenges, have not developed or refined neurological connections to process touch - the brain needs to initiate the movement to build the feedback loop to process the sensory input
- o May need to use other alternative access methods that rely more on their auditory strengths - auditory scanning, or auditory plus visual scanning
- Although not explored thoroughly, it might be possible to combine some tactile symbols with auditory scanning to provide sufficient vocabulary
- Historically, Children who were assumed to be "too intellectually challenged" to understand symbols, but often able to see, were sometimes given tactile symbols, however:
  - o With the current understanding of how AAC must represent a range of communicative functions and be taught as a language, the use of tactile symbols to represent concrete concepts - solely based upon an individual's presumed intellectual potential is no longer best practice
  - o We NOW know that symbols used as a language are learned through use via presentation in a consistent meaningful pattern - not just "recognized"
  - o "Concreteness" doesn't help in using symbols as language
- Tactile symbols may still be appropriate for other purposes such as a tactile schedule or calendar box

Strategies and Accommodations for Cortical Visual Impairment and AAC:
- Effective intervention strategies typically focus on customized environmental adaptations to the child's natural routine and modifications to presentation of materials in every day environments to support the best visual functioning - Not isolated visual training exercises or vision therapy
- New connections are formed when the child uses her eyes and meaning can be attached to what she is looking at
- The goal is create/find materials that the child will look at and then present them in a way that is meaningful to the child - Need both:
  - o **Physical environment** will include adaptations to the environment to increase access - physical access - position, adapted equipment, visual and auditory complexity, competing sensory stimuli: noise, vestibular, tactile, and postural security

- o **Cognitive environment** will include speed of presentation, wait time, observation of attention, familiarity of activity / balanced with moderate differences to increase curiosity, affect of partner, relationship to partner, context, internal communicative drive

CVI Range - Roman-Lantzy

Dr. Christine Roman-Lantzy has developed the CVI Range (Roman-Lantzy, C. A. (2007, 2018). Cortical Visual Impairment: An Approach to Assessment and Intervention. New York: AFB Press)

- Designed to be a functional vision assessment specifically for children with CVI
- Quantifies 10 characteristics of CVI
- Scores severity from 1-10
- Describes 3 Phases of visual functioning
  - o Phase I (levels 1-3) Building visual function
  - o Phase II (levels 3+ to 7) Integrating vision with function
  - o Phase III (levels 7+ to 10) Refinement of remaining CVI characteristics
- Range quantifies current severity and indicates appropriate intervention strategies based upon the CVI range score.
- Vision is expected to improve with appropriate intervention, but hardly ever resolves completely

Characteristics adapted from Dr. Christine Roman- Lantzy's CVI Range
Roman-Lantzy, C. A. (2007, 2018). Cortical Visual Impairment: An Approach to Assessment and Intervention. New York: AFB Press) www.afb.org/store
Free Webinars: Cortical Visual Impairment: Special Topics, West Virginia Department of Education
http://wvde.state.wv.us/osp/vi/cvi/cvi-special-topics.html
Webinar sponsored by ISSAC: Cortical Visual Impairment The Everyday Impact on People who use AAC
https://www.youtube.com/watch?v=GE23MGY87PQ
Alberta Regional Consortia - Free webinars
New Research in Cortical Visual Impairment (CVI) & Implications to Teaching & Learning with Dr. Christine Roman (Pt. 1)
CVI Lightbox to Literacy with Dr. Christine Roman Part 2
Cortical Visual Impairment (CVI) and Orientation & Mobility Dr. Roman Pt. 3
https://arpdcresources.ca/consortia/blind-visually-impaired-bvi/?index=12
Purchased Webinars and courses: Perkins School for the Blind - Dr. Christine Roman-Lantzy
http://www.perkinselearning.org

Characteristics of Cortical Vision Impairment with Suggested Communication Strategies:

Light Gazing, Need for Light
- Individuals in the beginning of CVI phases often stare at lights and lit objects
- Individuals progressing through the phases may continue to need light to enhance vision and reduce complexity
- Adjust lighting conditions as needed, attend to child's position in relation to light and glare from a window or other sources
- Use matte lamination instead of glossy for picture symbols to avoid glare
- Individuals may benefit from lighting up materials, such as using a light box or illuminated screen. (Early levels to encourage looking at higher levels to refine looking)
- Highlight environmental objects and communication symbols with a flashlight to help focus attention and reduce complexity
- Light box or background illumination
- Note: Make sure that the use of back-lighting or highlighting does not make the communication system too difficult to use in natural contexts
- Use of light with a communication book may be too cumbersome to implement in all types of environments and positions throughout the day. These strategies may be used part-time when conditions allow, but make sure there is an auditory component, as needed, to allow access to the AAC system in all situations

Reduced Visual Reflexive Responses
- With severe CVI, visual reflexes may be absent
- Blink and visual threat reflexes
- As vision is resolving, reflexes may become present but delayed at first
- These are not specifically addressed in intervention

Color Preference
- Many children with CVI show a color preference
- Often red or yellow
- May be any color, especially a familiar color of something meaningful
- Use preferred color to facilitate looking and then add moderate differences to expand interest
- Highly saturated color assists looking (not just high contrast)
- Use of color may help with discriminating differences

Movement Attracts and Assists Vision

- Vision for movement travels a neurological pathway to the primitive, subconscious part of the brain before going to the cortex. This area is deeper in the brain and may or may not be damaged
- Rapid movement often attracts vision – may trigger a primitive "fight or flight" response
- Infants develop the ability to see an object as separate from the background as it moves in front of a background (Big Bird Infant Study)
- Some children may see better when they are moving, rocking, or in a powered wheelchair
- Shake/move materials, communication symbols, displays peripherally to attract attention (dorsal stream vision - where pathway) and then move them toward midline - usually slightly off center - hold still for inspection and better visual processing (ventral stream vision - what pathway) - according to child's response
- Consider magnification scanning for visual display to simulate movement as items are sequentially scanned (see below - visual/motor)
- A small number of children with CVI have the opposite problem and may lack the ability to see things when they are moving – depending upon the location of brain damage

Latency of Visual Gaze

- Frequently there is a delay in initiation of visual gaze - especially at the beginning levels of CVI
- Latency varies in different situations, with increased practice and use of vision, with fatigue, environment, or other issues such as health and arousal state.
- Cue the child's attention and then wait quietly with anticipation
- Pause with anticipation and without adding distractions
- Allow plenty of wait time for visual processing once the item is seen
- Provide auditory strategic feedback once looking has occurred - name and respond to a selected communication symbol after waiting for visual response
- Be aware that the child may need more time to use vision when physical position changes (sit to stand to lie down, etc.)
- When visual latency or visual processing time is severe, reduce visual complexity in the design of the AAC system, with more reliance on auditory features to keep the speed and flow of communication reasonable
- Use of two switch step scanning as an access method with electronic displays may be preferable to automatic scanning as it allows the individual to control the speed of presentation and length of viewing of each item

Visual Field Differences

- These individuals show a variety of differences in the ability to see in various visual fields
- Watch for cues from the child that items have been seen before asking him/her to interact with them
- Child may need to hold head at an odd angle to see more effectively
- Pay attention to where a child will attend to items at any given time and make appropriate adjustments
- Many individuals have difficult with lower field vision and not see things immediately in front of them placed on a flat surface. Holding/mounting communication system at an angle or higher up may be helpful

Difficulty with Visual Novelty

- Often lack visual curiosity for visual novelty
- Individuals with CVI tend to look at items that have been viewed frequently, the brain is more likely to have built neurological connections for recognition
- Children with CVI do see better at home and in familiar settings
- Build vision by adding small changes to what the child will already look at
- Create familiarity with location, color and meaning within natural contexts
- Repetition of viewing in favorable conditions promotes familiarity - incorporate communication opportunities to use AAC into the child's routine instead of solely in isolated therapy sessions
- Communication displays should make use of familiar vocabulary location, pattern and sequence to reduce novelty

Difficulty with Distance Viewing

- Individual notices things close up, but not things at a distance
- Individual may view items at close distance to reduce complexity - item fills up more of the child's visual field and reduces amount of background clutter
- Child may have difficulty coordinating eyes for depth perception
- As CVI improves, individuals can typically use vision at farther distances
- Bring pictures close and then move back to clear focus distance
- Use pull-off symbols
- Place pull-off symbols on black backgrounds that can be moved to a good viewing location

Issues of Complexity: One of the hardest characteristics to resolve, but one that can be dealt with by type and presentation of materials

Environmental Visual Complexity
- Background environment - clothing, clutter, surface color and pattern can significantly affect the child's ability to see something familiar
- Other competing sensory input - auditory, tactile, visual
- Black fabric can be placed over the surface
- Black screens can be used to reduce environmental clutter
- Individual may not be able to adjust head/eyes for good viewing angle or to reduce complexity

Visual Presentation of Communication Symbols and Communication books
- Spacing of symbols can effect complexity
- Consider presentation of one symbol at a time: One per page PODD
- Limit the number of symbols to be viewed at one time
- Briefly cover some symbols to draw focus to others as you move across all symbols on the page
- Present one column of symbols at a time
- Folding the grid of symbols to show just one at a time
- Pull off symbols that can be moved into the child's visual field
- Consider using one symbol per page - Auditory plus Visual scanning book - with full range of appropriate language functions
- Consider how these adaptations will be managed by the partner and make compromises to ensure that the system will be used (ideal vs practical- but understand the ramifications of your decision)
- Decide if some items will just be presented auditorally in a list format

Visual Complexity of Symbols and selection considerations
- Remember: the individual must be able to perceive differences, but not necessarily identify the symbols
- Children developing speech do not understand the words (auditory symbols) that people are using when they start talking to babies at birth. Babies slowly begin to make sense of the symbols by how they are used in a consistent meaningful pattern. Children exposed to others using communication symbols within an organized system to talk to them and to others around them in consistent meaningful patterns will learn them in a similar way as speech .
    - o It Is Not Necessary for Children to Learn the Label for Each Picture, Before Using then for Communication
    - o Meaning does not have to be in the Symbol. The Meaning is in its use as is for Speech
    - o More important for symbols to be different from each other

- - - o   Symbols are Effectively Learned within the Context of Receptive Language Development - As People Talk to the Child with the Symbols in daily routines and natural contexts
- Take your cues from the child. Different visuals work better for different children. The key is to find what the child will be mostly likely to look at – do some exploring to see what the child will look at
- Note: If use of vision towards the symbols is detracting from the child's ability to focus on the language, then an auditory scan system may be indicated
- Keep in mind that complexity issues decrease as the child's vision improves but never really goes away. Complexity of visual array will need to be re-evaluated as the individual progress through the phases on the CVI Range.
    - The number of colors on a symbol increases the complexity. Use of a single color, or a few colors, on a contrasting background may be needed.
        - Black background
        - White background
    - Amount of detail increases complexity - shape is simpler
    - Size – larger is not always better as these children may have limited visual fields and not be able to take in the whole image if it is too large. Start with 3, 4 or 5 inch symbols.
    - Problems with photographs
        - Complexity
        - Busy backgrounds – cut around object or person
        - Difficult to identify action from person who is performing the action (verbs)
        - Difficult to use photos to represent a wide variety of communicative functions - such as more, done, different, uh oh, help, wait, great!, Don't like, hurt, silly, etc.

Complexity of Visual Plus Motor
- Difficulty coordinating reach and/or grasp with visual gaze - children may look then reach
- Difficult for some children to attend to looking and moving at the same time, because both require conscious effort and attention - neither is automatic – This varies according to the degree of CVI and resolution of vision challenges and complexity of physical challenges with position and movement.
- May be affected by motor reflexes as well
- Reducing complexity can assist with motor targeting – some children who would not be able to directly point to symbol on a typical display, may be able to directly select symbols if the symbols and layout of the display are optimized to reduce complexity.
- Consider visual complexity of switch placement

- Try a black towel or fabric draped over other non-relevant, distracting elements to help the child focus on the target
- Work with occupational and physical therapists to adapt seating systems and adjust the child's position for the best possible use and coordination of vision and motor skills.
- Also need to plan for how the child can communicate /will be able to access the PODD, or other communication system, when they are not in an ideal position that maximizes their use of vision i.e. communication happens all the time – may rely more on visual strategies, such as in some positions and auditory alone in other positions. the bath tub or lying on the floor.
- Following a Visual Scan May be Difficult Unless it is perceived as Movement
- Provide activities where the child uses one switch to move something across the screen and a second switch to activate it once it reaches the other side (See Stepping Stones to Switch Access, step 4 - later in this handout)
- Try scanning magnification when it is an option
- Two Switch Step Scanning Allows Child to Pace his Own Processing Time

Complexity of Visual Plus Auditory -Looking and Listening
- Neurologically, it may be difficult for some children to coordinate attention to listening and attention to vision at the same time Because vision takes a great deal of conscious effort and focus for these children, they may not be able to continue looking when they are focusing on listening.
- Background noise – environmental considerations
- Some children drop their heads, avert gaze, close eyes or roll eyes up to block vision when listening intently
- Separate looking and listening and reward looking with sound e.g. using a PODD
- Sequential presentation: visual then auditory. Present visual items silently or with attention getting sound or movement and then silence to allow the child time to process the visual. Speak the label only after the child has processed the information, visually. (**Note**: Some children do better when visual and auditory input is presented at the same time, so observe each child individually to determine appropriate strategies.)
- Attract attention (sound, light, movement) and then wait quietly with anticipation
- Use switch toys and activities that don't make sounds
- Encourage looking toward faces by movement without sound at first

Complexity of faces may effect use of vision for non-verbal aspects of communication
- Faces are visually complex, with lots of detail. They often, move and make sound all at the same time

- Communication relies a great deal on non-verbal aspects for timing, intent, context, clarification and elaboration of meaning (humor, sarcasm, teasing) It also signals joint attention, conversational discourse and turn taking.
- Child may not pick up subtle facial expressions, eye gaze, orientation and other body gestures from the people that she is interacting with
    - Allow time for the child to focus on symbol and then readjust to focusing on your face
    - You may need to move your face to a position where the child has a better chance of regarding it
    - Once the child is looking toward your face, try using facial expressions – quietly, without talking or making a sound. This may facilitate looking. Exaggerate your facial expressions and move your head
    - Exaggerate you head nod and head shake for yes and no.
    - Consider nodding or shaking your head first and then saying yes or no (so visual and auditory is separate but sequential)
    - If the child won't look toward your face at all, try communicating nonverbal states with an auditory component - verbal referencing. Use sounds, vocal expressions, or words to emphasize what we are communicating non-verbally

Auditory Monitoring of the Environment and Working Memory:
- Children who have significant visual challenges, will need to constantly monitor their environment through the auditory channel instead of the usual visual channel
- This will impact what they can hold in their working memory at any given time
- Sounds may Trigger a Primitive "Fight or Flight" Response - Demanding Attention
- Instead of being able to look over and confirm what caused a sound, they will need more cognitive energy and attention to identify it and decide if it needs attending to or not
- Attending to that Sound - Pushes Something Else Out of Working Memory - especially when working memory is already mostly auditory
- The more the child develops automaticity of skills, the less working memory is used for motor, cognition and communication. Repeated practice in natural contexts develops automaticity

Dealing with distractions – When child is obviously distracted by a noise or movement unrelated to the current interaction:
- First try regaining attention with strategies discussed above
- Help child identify – at least auditorily, what is causing the noise/ movement etc. If needed, use the communication book to explain the distraction.
- Finally, recap what you were discussing prior to the distraction and where you were in the conversation when the distraction happened. Recap what has been

communicated and check with the child for confirmation that she still has a message

Recap and provide auditory feedback to keep the child's focus on the communicative interaction
- Working memory is limited in duration and amount
- Thinking about what to say, how to say, how to move your body to say it, etc, all require conscious working memory
- Working memory may run out before the message is completely communicated
- Balance how much feedback and reminders of the message you give the child
    - Reminders of what she is trying to do, "you said something hurts… now we are on the body part page", etc., can be helpful to extend working memory and help the child stay on task
    - However, reminders or prompts can also interrupt the child's thinking process and then she may forget what she was focusing on, such as how to move her body
    - Dynamic observation of both your part and the child's reaction will help you achieve the right balance.
    - Be very careful not to talk about things unrelated to the current focus. When a child is slow to respond, we often talk to fill in the time, because or our needs, not the child's. It may feel unnatural to wait quietly, but this may be the best strategy for the child.
  - Children will quickly figure out which communication partners are going to take the time to wait for them to respond, and will simply choose not to make the effort with some people. It takes a great deal of effort for these children to coordinate the communication process and the result has to be worth their effort

Sometimes, Communication and Language Needs May Have to Move Ahead of Developing Visual Skills Due to Conversational Flow and Efficiency
- Continue to attend to environmental strategies to encourage visual / social orienting towards communication partner and possibly the display
- Consider focusing on auditory strengths for communication strategies, while continuing to work on visual skills at other times - auditory scanning/listing for communication
- Include visual feedback that may become familiar, and thus paid attention to, at a later time - light tech and high tech when possible - unless it significantly slows down the communication exchange to a point that isn't functional
- Non-Electronic: Partner assisted scanning strategies can allow for a smart partner who pays attention to the child's delayed responses and allows time for thinking and self talk to occur within the process.

- Electronic: Try Two switch step scanning - to increase cognitive engagement and enable the child to control the time needed to process information visually and/or auditorily before moving on
- With communication, some things are non-negotiable, and communication must be the priority with vision taking a back seat

When priority is communication - use as much vision as possible without distracting from the communicative interaction

- Be aware and address physical position and motor skills to support movements for communication
- For many individuals, vision supports communication. However, if use of vision detracts from communication, do not use vision simultaneously. In those cases, vision should be worked on in parallel
- When an individual focuses on vision, with a long delay in processing, vision may slows down the communication process too much and individual and partners loose their train of thought
- <u>Phase one</u> - just a bright single cover on an auditory book may be used for joint attention - with auditory partner-assisted scanning
- <u>Phase two</u> - mainly auditory with visual supports at the earliest language level - for example a one per page PODD book with companion - higher levels may need to incorporate more auditory scanning components
- <u>Phase three</u> - auditory plus visual scanning - depending upon language level still may need to incorporate auditory scanning components. Some children may be able to handle looking across the page to do visual scanning, but may need auditory support at higher language levels

Motor / Cognitive Learning for Access

What does Research Say About What is Most Effective in Learning a Motor Task? (Adapted by Burkhart and Hanser)

- Initiation of intent from within the child - often generated in response to the environment or social context. (This is not passive participation or hand-over-hand.)
- Problem solving opportunities for trial and error and child-initiated correction or adjustment to errors.
- Practice and repetition with a purpose. (Studies show increased motor accuracy and ease when there is a purpose)
- Thousands of repetitions with variation (moderate differences)

Developing Automaticity

- Developing Automaticity takes practice: Thousands of Repetitions with Intent, Purpose, and Variation
  - Motivation Provides Intent
  - Natural Context Provides Purpose and Variation
- Working memory can only deal with a limited amount of information at a time
- Automaticity is a level of skill where you no longer Have to Consciously Think About Performing that Skill
- If something is not automatic yet, it will occupy the child's working memory instead of operating in the background
- Developing automaticity is getting to a point where cognitive efforts can be redirected from the motor skill to the content of the task
- Always attend to where the child is spending their cognitive currency: motor, cognitive, linguistic, emotional, efforts

The Juggling Act and Working Memory

- Cognitive attention is needed to focus on anything that is not automatic. When someone is first learning a task it requires conscious effort, then with repeated use and practice the brain learns to control the task automatically without much conscious thought. For example: what do you do if someone suddenly throws a ball at you? What would a baby do?

- Children with significant physical challenges, have not yet developed reliable control of movements at an automatic level, and therefore, even simple movements can be unreliable and require a great deal of cognitive energy to perform.
- When child needs to focus on movement, then there is very little working memory left for attention to the play, language or cognitive task.
- Children with Rett Syndrome may not have reached, or may have lost, automaticity with many skills, especially those with a motor response, and thus need to focus attention on each component to be successful. In addition, adding cognitive intent to movement often increases the difficulty - due to apraxia.
- Children on the severe end of the Autism Spectrum may lack initiation of movement and/or motor planning and may not be able to focus on more than one sense at a time
- To be able to communicate effectively, many individual components must be coordinated. For example:
  - **Sensory-motor demands**: motivation, strength, motor planning, endurance, motor automaticity, auditory filtering, reaction time, visual discrimination, visual scanning/memory, visual tracking

- Cognitive demands: motivation, cause/effect, initiating, discriminating
  purpose and function, developing cognitive schemas, making active choices,
  trial and error, problem solving, memory
- **Language components**: motivation, processing of language in activity,
  pragmatics, processing of questions, auditory filtering, processing of symbol
  set, syntax/grammar, attention to task, memory

- Juggling means that the child may only have some of the 'components in the air' at
  any given time, and having all the 'components in the air' will be rare. **<u>This explains
  why performance is so inconsistent and can not always be predictably repeated</u>**
- We need to take successes and move on, as opposed to requiring repetition of the
  task over a given number of trials – Meaningless repetition produces boredom and
  habituation and thus produces inconsistent test results

Parallel Programming

- If we wait for everything to develop in a coordinated fashion, you will be waiting
  forever
- We don't want to hold the child back in one area because of deficits or difficulties
  in other areas
- We need to be careful that we continue to develop rich cognitive schemas and not
  just splinter skills
- The answer to this problem is to work on individual components in parallel. Use
  functional and natural contexts to give the child opportunities to develop skills,
  where only one component is cognitively challenging them at a time. Provide a
  variety of these types of activities that challenge the child in all areas of
  development, but mainly just one at a time. Help the child make associations see the
  relationships between skills that she is developing. Agree as a team on long term
  direction
  - Focus on one component or skill with each activity
  - Reduce motor load for difficult cognitive or language tasks
  - Reduce cognitive load for motor learning tasks
  - Teach access as a separate but parallel skill: Stepping Stones to Switch Access
    (Linda J. Burkhart- see handouts at www.Lindaburkhart.com)
- Team Planning and coordination is necessary for consistency and to allow for
  development of automatic skills
- "Light Tech" Communication Book for Language development with reduced motor
  load
  - Smart partner operating "Light-tech" system
  - Sufficient vocabulary
  - Genuine communication
  - Language development

- • Need a Robust Language Organizational System that Has Clear Patterns of Organization
- Switch Play to Develop Motor Skills for Switch Access
- Fun Play Activities to Develop Pointing Skills
- Play to Develop Eye-Gaze Motor Skills
- Eventually: Combine Motor and Language Skills to Operate a Communication Device

Motor / Cognitive Learning for Switch Access

- We need to stop looking for the perfect switch placement
- We need to begin teaching children to use switch access
- Myth: "We just have to find the perfect switch placement."
- Its Not About Finding the "Perfect Switch Site"
- Its About Finding the Best Switch Site**s** to Learn to Use
- No One Starts with Automaticity of Movement
- Stability and Active Position are important components - Work with physical and occupational therapists to develop skills in observing, recognizing and teaching children to take an active role within appropriate supported seating systems
  - • Weight bearing on pelvis
  - • Upright in an active position, moving forward slightly if possible
  - • Able to rotate and shift weight - even if only slightly
  - • Grasp bar for stability
  - • Control often begins at the head when body is active engaged with gravity

Stepping Stones to Switch Access

Stepping Stones to Switch Access, by Linda Burkhart - Published in Perspectives of the ASHA Special Interest Group – Augmentative and Alternative Communication, Copyright © 2018
http://lindaburkhart.com/wp-content/uploads/2018/06/ASHA_Persepctives_Switches_Burkhart.pdf

- Sequence of skills – fluid not rigid
- Child may use several steps during one activity: starting at one level to warm up and get oriented to location of switch(es) then moving to a higher level for practice at current learning level, but also explore some higher levels when doing well and within the context of some extra modeling, then move back down to a comfort level when fatigue starts to set in, so the child can end on a feeling of success and accomplishment.
- The higher cognitive demands of an activity the lower the stepping stone may need to be for that activity
- The lower cognitive demands in combination with increased motivation of an activity, may allow the child to work on a higher stepping stone.

- **Step 1:   Single Switch - Cause and Effect**
- **Step 2:   Single Switch - Multiple Locations and Multiple Functions**
- **Step 3:   Two Switches - Two Functions**
- **Step 4:   Learning to Two Switch Step Scan** (For children who don't understand Two Switch Step Scanning)
- **Step 5: Two Switch Step Scan Failure Free Learning with Feedback**
- **Step 6:   Two Switch Step Scan to a Target** - Activities for Increasing Accuracy and Cognitive Engagement
- **Step 7:   Practice for Increasing Accuracy with Two Switch Step Scanning**
- **Step 8:   Two Switch Step Scan** - Reducing Time for Success and Demonstrating Knowledge

Anat Baniel -9 Essentials:

http://www.anatbanielmethod.com/ (Kids Beyond Limits by Anat Baniel, 2012)

- Essential 1—Movement with Attention
  - o Learning is determined by where the brain is focused
  - o The brain only attends to a small amount of stimuli at one time
  - o Movements done automatically do not create new connections in the brain
- Essential 2—The Learning Switch
  - o At any given time, the brain is open for learning or not
  - o Anxiety and fear turn off the ability to learn
  - o Motivation organizes the brain
- Essential 3—Subtlety
  - o Less is more
  - o Difficult to discriminate differences when there is too much competing input
- Essential 4—Variation
  - o Variation is required for a brain to recognize patterns
- Essential 5—Slow
  - o We can only do something fast that we already know how to do automatically
- Essential 6—Enthusiasm
- Essential 7—Flexible Goals
- Essential 8—Imagination & Dreams
- Essential 9—Awareness

Developing motor skills:

When you do something fast, you can only use motor skills that you have already developed to automaticity

You cannot improve or refine your motor patterns without slowing down and attending to what you are doing

High levels of activity in prefrontal cortex (Jueptner, Stephan, Frith, et al. 1997)
    During new learning
     But Not when performing something that has become automatic
    Learning requires active involvement of prefrontal cortex

Teaching Switch Access
- Before being able to use switches for learning, individuals need to develop automaticity for switch use
- Learning to use a switch to the point of automaticity for access is a process

<u>Step 1:   Single Switch - Cause and Effect</u>
- Child begins to associate an intentional movement with the ability to cause something to happen
- Children often have difficulty learning cause and effect through prompting.
- Cause and effect is learned through experience, not teaching, so our job is to create adapted meaningful experiences for them to learn cause and effect.
- Begin with accidental switch activation using an existing motor pattern
- Place switch in a location where the child can independently experiment with the concept of cause and effect using existing motor patterns
- Learning a new motor pattern and learning cause and effect at the same time is often too much new
- Once the child understands cause and effect, new motor patterns can be shaped and facilitated - using the cognitive understanding of "why move" as a motivator
- Use momentary/direct activation to get started so the child can easily learn to associate her movements with the effect (<u>Switch Accessible Boombox</u> – Judy Lynn, Rad Sounds – RJ Cooper, Everybody Has Feet – Marblesoft / Simtech) (None currently through a switch on the iPad – but some work that way by holding hand on the surface of the iPad)
- Do not use a delay-timer until it is clear that the child understands the cause and effect of the switch. Then, use a delay timer if needed to make the results worth the effort. (You may want to begin sessions with a few minutes of direct activation and then moved to timed activation)
- Short timed segments for more active engagement (Software that plays for longer than 6- 10 seconds after switch activation is not good for cause and effect learning. That software may be good for recreational and leisure activities instead.)
- Don't stay in this step longer than needed (Children will habituate to the activity and loose interest. This can be misinterpreted as not understanding cause and effect)

- Technology Features: Immediate response to effect, momentary or direct effect (plays and stops concurrently with switch activation and release), or short effect (plays only 1-6 seconds upon switch activation)

Step 2:   Single Switch - Multiple Locations and Multiple Functions

- At this step, child understands simple cause and effect but needs practice intending and executing a movement for different purposes or with different body parts, or when a switch is moved to a new location or used for a new function.
- Practice activating switch using engaging motivating activities, in multiple locations with a variety of body parts
- Develop some motor control and beginning motor automaticity, through repetition with moderate differences - without the stress of timing
- Focus on general social and pragmatic timing - instead of motor timing: reduce pressure for timed control - allowing problem solving to occur in the motor learning of switch activation
- Use a switch for multiple clear intents
- Give battery operated toys a mission - Help the child see a meaningful purpose in activating a switch
    - Battery powered doll pushing a push toy to deliver snack
    - Battery powered pig knocking over blocks
    - Battery powered penguin kicking a ball to a friend
- Operate a battery powered spinner to play a game
- Spinners high tech / iPad
- Practice with variation, control and intent in natural contexts
- Create and use co-planned sequenced social scripts with the child, for switch
- Focus on general social and pragmatic timing - instead of motor timing: reduce pressure for timed control - allowing problem solving to occur in the motor learning of switch activation

Note: Strive to achieve a balance between leaving a switch in one place long enough for the child to accommodate to it, and experimenting with moving the switch to alternate places for the child to learn to use.

Technology Features: Immediate response for short effect upon switch activation

Proximity Switches

- Mechanical vs. Proximity switches (Karen Kangas)
    - Mechanical
        - Move toward
        - Push to activate
        - (Sometimes hold on)
        - Release

- ▪ Move away
  - o Proximity
    - ▪ locating is activation
    - ▪ Only need to move toward - no extra effort to push and release
- Less overflow of whole body movement patterns when not having to exert effort to push
- More ability to isolate the movement needed and disassociate one movement, such as head movement from the rest of the body
- **Adapted Switch Labs** - proximity sensors with USB power and two switch jacks
  - o Designed to use for powered mobility
  - o Durable
  - o Some are adjustable
  - o May be embedded in head rest or under tray

Spashtop App for iPad
- Designed to show computer screen on an iPad - app for iPad and software loaded on computer
- On same wifi network - no cost.
- Over distance - small subscription fee
- Classroom teachers can mirror what is projected on Smart Board onto iPad that they can move closer to the child for better view and interaction

Step 3: Two Switches - Two Functions
- At this level the child is learning to understand that two switches do two different things. (developing cognitive skills of discrimination and memory)
- Increase motivation by increasing cognitive engagement and control
- Two switches introduces the element of meaningful choices instead of 'do it or don't'
- Two switches positionally related to function - Object Permanence (Left Right Switch Activities on Two Switches to Success CD)
- Encourage attention to both switches, with emphasizing feedback from side that may be ignored more than the other (light, sound, use of motivational drives)
- Two switches trial and error (One works, one doesn't) (Inclusive TLC Software and Apps) also used for two switches social turn talking
- Two switches / two functions (See Stepping Stone 3: Early Songs and Play CD)
- Two switches for related objects or two functions on one object (Switch Skills for Two - Inclusive TLC, and Learning to Two switch step scan - Judy Lynn)
- Two voice-output messages: appropriate pragmatic use of each function
- One switch activating toy, computer story, or song and one making social comments

- One switch toy and one voice-output device (single message or step by step) (pig knocks down blocks - voice output: "build it up!")
- Game spinner switch and voice output comments
- Two voice-output devices with different functions
- One switch computer, one switch related toy or voice-output device
- Classroom Suite - two switches two functions from IntelliKeys or IntelliSwitch
- Newer version of Mind Express will have this function with any switch interface
- iPad Apps, Classroom Suite, PowerPoint, or other digital story with one switch, and the other switch can be a voice-output device for repeated line, sound effect, or to comment about the story.
- Two separate but related activities on the screen in a computer activity (Switch Skills for Two - Inclusive TLC; Learning to Two switch step scan - Judy Lynn; Two Switches to Success & Early Songs and Play - Burkhart)
- Two switches - powered mobility - one turns right and one left to explore and look around the room
- **Technology Features:** Immediate effect for switch activation. <u>Second switch interrupts first effect.</u>

Types of Scanning - to increase choices and control
- Automatic Scanning
- Inverse Scanning
- Step Scanning with a Delay
- 2 Switch Step Scanning
- Morse Code

Why Two Switch Step Scanning?
- Eliminate need for Timing
- Requires less Concentration / Allows for more Distraction
- Allows Time for Cognitive Processing
- Allows for more appropriate social skills and pragmatics
- Active vs. Passive Control
- Separate Function for Each Switch: Simple Cognitive Map
- One switch advances scan with each activation, the second switch selects the item.
- Very few options are available for a single switch user beyond cause and effect that don't require some type of timing

Different Cognitive Levels:
- Some children have difficulty moving to two switch step scanning because they do not yet understand the cognitive task. The goal for these students is to provide

them with graduated experiences so they can experience success in learning the task of two switch step scanning. These students will go on to Stepping Stone 4.

- Some Children will understand the concept of 2 Switch Step Scanning, as soon as they are shown how it works. They may require additional practice to develop the automaticity of motor skills. These students will go on to Stepping Stone 5.
- Some children have difficulty moving to two switch step scanning because of the motor component, even though they cognitively understand the task. The goal for these students is developing and refining the motor skills while maintaining motivation for continued success, so they can use two switch step scanning to learn a variety of curricular content. Go to Step 5 or 6.
- Some children have difficulty moving to two switch step scanning because of passivity and learned helplessness. For these students it is especially important to provide purposeful activities with which they can experience control and success. Refer to motivational factors discussed earlier in this handout.
- Some children have a combination of motor and cognitive challenges and it may be difficult to know if they understand the task or if the motor component is too difficult. The goal is to find motivating activities, tied to what they do understand and relate to, and then add moderate challenges to gradually increase their skills. These children may benefit from working on Stepping Stone 4 activities.

Step 4: Learning to Two Switch Step Scan (For children who don't understand Two Switch Step Scanning)

- Move, move, move, get: The focus here is understanding that one switch moves something along a path (by repetitive activations) and the other switch selects or "gets it" based on the moved item arriving at a given destination. (Note: children who do cognitively understand this process, but simply need more practice to develop motor automaticity, should skip this step and move on to step 5.)
- Children who don't understand the concept of two switch step scanning, may need this intermediate step to experience one switch as the mover and one switch as the selector.
- These children may appear to activate the two switches randomly and without discrimination of function.
- One switch is the "mover" or "lister" and one switch is the "get it" or "selector" switch
- Requires Complex Integration of Cognitive, Motor and Language Skills
- This cannot be taught like a set of facts - It needs to be learned through scaffolded experience
- Learn to use a mover switch to reach a goal
- Use battery powered toys to move to a location for a play purpose. Use a delay timer that moves the toy a short distance for each activation. (rotating plate)

- Rotating plate toys with a delay timer to move a pointer to selection - then second voice-output switch for "that's the one I want"
- Provide experiences where one switch moves something on the computer screen and the second switch activates something in relation to where the item has moved. Allow only one switch to work at a time, so that if the child tries the other switch, the natural lack of feedback will direct her back to the first switch. This is in contrast to typical two switch step scanning where the movement on the screen or display is simulated by a light or highlight showing one item after the next. Some children may have trouble seeing this as movement.
- 'Move - Get' activities on the computer (Switch Skills for Two - Inclusive TLC; Learning to Two switch step scan - Judy Lynn; Two Switches to Success & Early Songs and Play - Burkhart, (working on newer activities for Mind Express)
- Learning to Follow a Visual Scan
    - Use above activities to teach that one switch moves something visually across the screen
    - Use magnification of scanned items to call attention to each item
- **Technology Features:**   Two switches but only one switch is active at a time. Switch 1 moves an item along a path. Switch 2 is not active. Each switch activation moves the item closer to the end of the path. Once the item arrives at destination, the first switch ignores the input while the second switch becomes active and selects the item at the end of the path.

Step 5: Two Switch Step Scan Failure Free Learning with Feedback - any option works – and provides clear logical feedback for that choice.
Note: In the past, I have used the term: Errorless Learning for this stage. However, the term "Errorless Learning" has started to be used for a totally different meaning. Some vendors and developers are using the term to describe a teaching method that eliminates any problem solving or mistakes and only allows the child to indicate a correct answer. This is not what I am talking about here! Karen Erickson, used a better term for describing what I am trying to convey. She uses: "Failure Free with Feedback"
- At this level the child may be learning to understand how two switch step scanning works and/or if they may already know how it works, but they are continuing to work on automaticity for switch activation as well as develop automaticity for the motor coordination of the process of step scanning
- This type of activity offers the child a variety of choices through two switch step scanning, but any response is accepted as the child plays, selects a song or video, creates a story, rhyme or errorless letter. (IntelliTools Classroom Suite - a wide range of possible activities on the Activity Exchange; Two Switches to Success, Early Songs and Play - Burkhart; Inclusive TLC - Choose and Tell Nursery Rhymes, Legends, simple iPad apps: Clicker - Errorless writing with a closed set of whole words (sentence starters, etc.) - Clicker; Boardmaker Plus and Boardmaker Studio;

Learning to Two Switch Step Scan, Pick and Choose, and Story Builder - Judy Lynn. Many augmentative communication devices set up in step scan access mode for two switches - Grid, Compass, Communicator, Mind Express, etc.) (Many of the simple switch accessible iPad Apps that are currently available are at this level – if they are beyond cause and effect.)

- Rotating plate (with short delay timer) activities and voice-output device (single message or step by step) (that's the one I want)
- One step by step to list choices, one voice-output to say "That's it"
- Choose a song, story, rhyme, video, or any other activity
- Choose verses of a song to be sung in any order.
- Have the child use a series of communication displays to direct the action of another person in a play activity script
- The child can "scribble" with a talking word processor with a limited set of letters and the whole alphabet
- The child can use different computer voices to listen to a selected tongue twister or silly saying.
- The child can use a communication device to direct action in a game such as follow the leader or draw a face, with options that all make sense
- Try adapting two switch step scanning access to commercially available mouse activated software games that respond to a child's choices. These are great for practice and motivation. For example iTunes. (some websites use tab and enter)
- Provide emerging literacy activities for creating stories, playing with sounds and letters, or constructing a rhyme or sentence. (Classroom Suite, Clicker, Clicker, Mind Express, Story Builder)
- Use popular, un-adapted software, Apps and websites: Give the child one switch connected to a voice-output device that says "next", and a second switch connected to a mouse click on the screen. A partner moves the mouse to the next item on the screen when directed by the child or moves a pipe cleaner wand over each item on the iPad screen. The child can use the second switch to select that item or direct the partner to move to the next item. Note: it may be helpful to use a large or fancy cursor, and name each item as an auditory cue as the mouse is placed on it.
- On the iPad, (or computer screen) The child can use a head shake or turn for "no" and a head nod for "yes" as the partner moves the pipe cleaner wand from item to item.
- iPad Switch Access: Still evolving and getting better, but currently requries specially designed apps or for full access of the iPad - good cognitive and good visual skills
  o Not all switch interfaces are created equal - some use keyboard equivalents and only work with specifically designed apps, others use built in ios switch access and do not work with specifically designed apps

- - Applicator (Inclusive TLC)
    - RJ Cooper - several versions
    - New Blue2 (Ablenet)
    - Tapio
    - Tecla
  - **Note**: If the child appears very unintentional after many, many experiences in step 5, move on to step 6.
  - **Note**: If the child appears very intentional in step 5, move on to step 6.
  - **Technology Features:** Scanning does not begin until the individual activates switch 1. Activation of the first switch immediately interrupts any sound, animation or auditory cue and highlights the next item in the array. Switch must be released and reactivated to move to the next item. The second switch selects the highlighted item. Launcher features highly desired

Step 6: Two Switch Step Scan to a Target - Activities for Increasing Accuracy and Cognitive Engagement

- This step is often used when the child appears to continue selecting items randomly and doesn't appear to be trying to select a specific item based upon their intent. (Note this is something that you have to observe by the child's attention, responses, interests, social reactions, and patterns of switch activation)
- Some children need practice with an array that has only one target to scan to and blanks that do nothing to learn this concept. Do not do this until the child has had a large range of opportunities to experience Stepping Stone 5: Failure Free with Feedback Step Scanning
- This step is often used when the child appears to continue selecting items randomly and doesn't appear to be trying to select a specific item based upon their intent. (Note this is something that you have to observe by the child's attention, responses, interests, social reactions, and patterns of switch activation)
- Child is now given one exciting or interesting target to aim for. All other items are neutral
- Insert some blanks in the array of choices with a communication display or software activity.
- Use a word like "click" or "nope" repeatedly and have the child listen/look for a target word such as: "read", "sing", or "show me!"
- Have at least 3 or 4 items in every list, and limit the target item from being the first in the list (two items is not a list, and may be confusing to the child)
- When the child selects one of these blank or neutral items, the feedback shows that it is somehow not logical or not reinforcing. Hopefully, the child will select those items less often over time, and pay more attention to selecting a fun or appropriate option.

- Try social interaction, sensory play or movement activities as motivating items to scan to in a list of blanks or nonsense sounds
- The number of blanks or clicks before a target item, should be varied to prevent the child from just learning a motor pattern, instead of staying cognitively engaged to make a clear selection.
- MODEL self-talk as you take your turn: "hmm, no, no, yes- that's it"
- Move-Get" activities on the computer (Switch Skills for Two – Set 2 ('move and get' - difficult level. For example, moving spotlight across stage to reveal musician or passing basket ball to the player who shoots the ball) Inclusive TLC, Learning to Two Switch Step Scan Judy Lynn (level where you move to a target, but can also move past target and come around again) New features being added to Mind Express

Step 7: Practice for Increasing Accuracy with Two Switch Step Scanning
- At this step, the child is developing the ability to integrate the motor component of step scanning with the cognitive component of selecting an item for a particular reason or purpose. With more than one target in the array, the cognitive load to select desired targets requires more engagement of cognition as the child refines automaticity of the motor skill
- Use failure free with feedback activities, like step 5, however, now create them with options that allow the student to select options that are more logical, or show more personal opinion than others. At this step, the child will be putting more conscious effort into creating and generating his or her own ideas with these activities. Include the child in determining which items to include in these activities, such as errorless letters.
- Some activities have correct and incorrect options, but also have good feedback for incorrect items
- Keep motivation high and customized for the child.
- Simple Powerful PODD Page Set: A high tech page set that is organized in a similar way to the child's PODD communication book, with the same patterns, but contains less vocabulary - selected for the most powerful things to say out loud. Make sure there is an item to ask for the communication book to say more, and make sure in the book, there is a way to ask for the talker. (Simpler, because child is still developing access skills)
- With successful and motivating practice, the child will be developing more motor automaticity, and integration of cognitive and motor tasks.

Step 8: Two Switch Step Scanning: Automaticity - Reducing Time for Success and Demonstrating Knowledge

Note: This step is for children who Student has developed motor automaticity of switch activation and the step scanning process. Children can now use step scanning with more ease, can focus on cognitive content of the activity to both learn and demonstrate knowledge.

- Present a limited array at appropriate times to increase efficiency (combining letters with word endings) (full alphabet should be available as well)
- Provide practice for rehearsing or studying for a test in a child-controlled flash card format.
- Consider using word prediction or picture/word prediction.
- Any of the commercial software or Apps that have only correct and incorrect responses related to a variety of content are typically at this level

Tips for Literacy Learning: Switch Access and Vision Challenges

High Cognitive and Motor Load
- Severe physical challenges plus vision challenges
- Everything is more difficult
- Typically not yet automatic in switch access or vision

Don't Overload the Visual Channel
- CVI range - determine how materials should be presented
- Reduce complexity (visual and auditory)
- Use auditory channel if vision requires too much effort or if it is not at a sufficient level on the range to introduce text

Auditory Channel May be the Best Possible Option Left for Input
- May or may not be an inate strength of the child
- May or may not have additional auditory processing challenges
- May be able to get some input visually, but not as reliable as auditory
- Vision may actually add complexity for some children

When the main gateway to the brain will be Auditory, there will be a bottleneck of input to the brain
- monitoring safety in the environment (fight or flight)
- Input needs to be auditory
- Communication system: auditory scan
- Access needs to be auditory
- Thought is probably auditory
- Holding a thought is challenging when needing to attend to everything through the same channel

Some Children will be Learning via a Dual Literacy Program
- For children who have some visual abilities:
  - Visual reading and listening comprehension skills may be at very different levels
  - Can work on both at appropriate levels
- One should not hold back the other - some children can progress in both

Literacy Four Blocks (Patricia Cunningham)
- Working with Words (phonics, letter names and sounds)
- Guided Reading (comprehension) (shared reading: enjoyment)
- Self-Selected Reading
- Writing

Working with Words - emphasize auditory components
- Phonemic Awareness
- Rhyming
- Alliterations and tongue twisters
- Onsets and Rimes
- Making words
- Syllables
- 2 Switch Step Scanning Activities to Play with Sounds
- Letter names and Letter sounds - Challenge: to see and visually discriminate a letter to connect a letter sound to
- Provide: a personalized set of hook words for each letter of the alphabet*
- "Light Tech" Working with Words
- • Black dry-erase with fluorescent markers
- • Velcro/magnet cards on black Velcro or magnet boards

*Hook Words (Select one personally meaningful hook word for each letter)
Apple, ask
Bye, boy, bus, bed, bad, back, ball, bug, bat, bath, bell,
Cold, Cut, Cat, Cup, Calm, Come, car, cart, cover, carry,
Dance, Dog, Dad, day, dance, dark, done, doctor, door, do
End, elevator, empty,
Fun, Fish, fast, feet, fix, fan, feel, fist, finger, family, full, farm
Good, gas, get, give, go, girl, game, gone, goofy,
Hug, hat, hand, hi, happy, hard, head, hello, help, hot, hair, hit, head, house, hungry, hurt
Itch, in, ill, instruments, it
Joke, Jump, job, jar, jelly, jacket, jeans, jewelry, jingle, joy, juice

Kiss, kick, kid, key, kitchen,

Love, laugh, leg, lip, lick, lift, like, list, look, last, lazy, lap, loud

Mad, mom, mat, math, me, mess, miss, more, move, music, mud, mouth, money, milk

No, not, name, nap, need, new, nice, night, nose, nut, nurse, noisy, neck, nag

Off, on

Pants, Pain, pop, paw, part, pee, poop, pig, PODD, pet, pool

Quiet, quick, quarter, quit, queen

Read, race, rain, ramp, read, rest, ride, room, run, rap, rag, rip, ring, rub, ready, right, rope, rack, race, roll, rug, rock

Silly, sock, sad, song, sun, Santa, see, sit, sick, sing, secret, soup, sand, seat, safe, super, side, sink

Teeth, Tongue, toe, toy, talk, tummy, tickle, time, turn, tub, top, teeth, teacher, today, tired, table, towel, touch

Up, underwear, under, uncomfortable

Van, video, visit, vest, vote

Wet, watch, wait, walk, want, water, wiggle, woman, worry, work, what, why, where, word, wrong, wow, wild, wipe, wind, winter, watch, wash, wall, warm

Xray

Yes, yawn, yum, yell, yes, yuck, young, yogurt

Zipper, zoo, zero, zip

Note: When selecting Hook Words for an individual child, use words with the short vowel sound in the beginning of the word. For example itch rather than Ice.

Stay away from food items for kids who don't eat much by mouth

Stay away from things that are mostly visual for kids who have vision challenges

Stay away from objects that don't have meaning for children who are not able to manipulate objects themselves

Stay away from blends and double consonants at the beginning of words.

Writing:
- Write for a purpose and for an audience
    - Sample purposes: email, text, cards, invitations, shopping list, sign, letters, story, journal, Facebook post, etc.
    - Remnant books for setting purposes
    - Robust AAC system to talk about writing
    - Share writing with others
- Forms of Writing
    - Scribbling / Writing with the Alphabet
    - Co-planning Errorless Writing
    - Predictable Charts and Sentence Starters for group writing

- o Writing with AAC - Robust Language System
- o Combination of AAC and alphabet at child's discretion
- Modeling Writing
    - o Model writing for multiple purposes throughout the day
    - o Use child's alternative pencil
    - o Use child's AAC system
    - o Don't worry about using full sentences for a child who is at a younger expressive language. Model slightly above the level they produce
    - o Use Self-Talk and Verbal Referencing
- Scribing for the Writer
    - o Self-Talk while writing / typing
    - o sounding out words
    - o naming letters
    - o calling attention to hook words
    - o calling attention to word walls
- Spelling with rhythm - ear print for the spelling of words
- Scribe - Don't suggest edits during initial writing
- Revising, Editing, Publishing
    - o Writing may span days or weeks instead of all in one session
    - o Have others read and comment for revisions
    - o Edit with assistance of a scribe at first
    - o Publish/send and share with intended audience

Guided and Shared Reading/Listening means there is active participation
- Learning to enjoy books
- Depending upon Phase of the CVI Range:
- May be visual reading
- May be listening
- May be a combination
- Reduce visual complexity of books
- Object books for Phase I
- Focus on just text or just picture at one time
- Reduce complexity of books
    - o Text Without Picture Symbols is Less Complex than symbolated text
    - o Leave more space between words and lines of text
    - o Black window frame (occluder) to focus on one part of page
    - o Draw attention to the shape of words - While describing salient features - beginning in word study (Christine Roman-Lantzy)
    - o Take Pictures on iPad and Highlight Salient Features
    - o Create videos to show salient features that can be reviewed multiple times

- Guided and Shared Reading/Listening means there is active participation
- Not just reading/listening to a story
- Set purpose for reading/listening (change with multiple readings on different days)
- Involve the child in discussion, opinions, comments
- Provide options for re-reading/listening to parts as needed
- Review purpose and discuss afterwards
- Auditory clutter from the environment and the auditory scan may mean that parts are missed with one reading
- Challenge to go back and "re-read" to find an answer
- Amount to hold in head with no visual hook
- Ways to remember the purpose of reading / listening
- Systematic Method for Multiple Choice answers, including "I don't know"
- High Tech templates for guided reading including feedback with options to go back and read/listen again

Self-Selected Reading
- Kid picks the book!
- List of 3 plus something else
- Electronic Launchers / Book Shelves
- Real books - Partner reading
- Recordings of real people reading
- Record teacher or peer reading the book
- Use Launchers and Book Shelves - allow child to select books

Creating Books
- Related to the child's experiences
- Emphasis on literacy level, for example: rhythm and rhyme
- Sound effects for turning pages forward and back
- Video clips
- Reduced complexity of visuals
- Large text, additional space between words and lines
- Digital Voice for fluency vs. Text to speech
- Control to do more than turn the page (read with different voices, "show me" animation or video, etc.
- Apps and software: Classroom Suite, Mind Express, Clicker, Boardmaker Studio, Go Talk Now, Pictello, Tar Heel Reader (challenge to create/find books that have good auditory story)
- Study Guides for Older Students
  - Need launcher or light tech way to choose
  - Can be just text with limited or no pictures
  - May include video or sound effects

Motor / Cognitive Learning for High Tech Eye-Gaze Access
Eye-gaze is a motor skill to learn
- Looking to locate and looking to select are different
- Need to develop motor skill for selecting with increasing accuracy
- Follow a similar process as described above for switches when teaching eye-gaze access
  - Start simple
  - Start with play
  - Build access skills
  - Avoid high cognitive load when learning access
  - Focus learning based on child's intent, not following directions
  - Cannot use for testing until access is automatic
- Strategies for teaching eye-gaze - select or create software:
  - to enable children to Manipulate the Environment and use Pretend Play
  - personally relevant (topics, photos, videos)
  - Large Targets
  - Limited Number of Targets
  - Control to Choose, Change and Stop
  - Simple Powerful Pageset
    - Including the most powerful vocabulary and phrases to say out loud, but organized in similar patterns to communication book
    - Add a pause button to Model
    - Add a speak message window button
    - Self-Talk Operational Commands
      - Speak message
      - Pause
      - Delete Word
      - Clear
      - Go back to Main
    - A way to ask for her "talker" in her book and a way to ask for book from her talker

Tips, Hints and Tricks for Getting Started

Establish the **Habit** that the communication system is always with the child
- If you carry the communication system with you and have it within arm's reach, you are much more likely to model with it and the child will begin to see it as his voice
- How will you carry the AAC?

- Can you use it with one hand?
- Do you need straps and stands
- Clear front cover?
- Develop Habits for Modeling Anytime, Anywhere

Modeling and expanding for autonomous communication Keep the long term goal in mind
- Our role is to provide ideas of possibilities (NO fixed agenda)
- Child's role is to select what they want according to their own agenda (intentions)
- It is not about work!

Use the system to "talk" to the child in typical every day contexts all day long, whenever possible
- Model the Whole Process
  - Model Initiating
  - Model Self-Talk:
  - Verbally Reference what you see and do - acknowledging what you see the child doing that may be used as intentional communication
  - Model a Range of Communicative Functions
  - Make sure to model messages children might like to say, not just adult instructions and questions
  - Encourage Others to Model
  - Model how the child will use the system some of the time (alternative access method)
- How to Spend your Modeling Currency
  - Immersion is our goal, but reality is that AAC takes more time than speech
  - Look at what types of language input research shows impacts typically developing kids' language development and use that as a guide for what to model most
  - Model what matters to the kid
  - Model kid talk
  - It's not about work!
- Limit Asking Questions
  - Only pragmatic function the child can use after a question is "answer"
  - Turn questions into statements: Instead of "Do you want more?" say "Looks like you want more"
  - Describe
  - Explain
  - Comment
  - Pause
- Relate Everything to the Child's Experiences
  - Help make the neurological connections by scaffolding experiences for child to discover associations
  - Share enjoyment of discovered associations with the child

- o Limit "teacher voice" and telling the child what to do
- Focus your modeling around what child is interested in and attending to
  - o "Linguistically Map" aided language onto the child's behavior
  - o Talk about what is going on around the child - make connections
- Build your fluency
  - o Set manageable goals for yourself to build your fluency with AAC and help others build fluency, too!
  - o Practice, Practice, Practice!
  - o Teach everyone to model
- Set the stage for expressive use with no demands
  - o Pause periodically and provide an opportunity for the child to communicate, without requiring her to do so
  - o Recognize when a child may have something to say
  - o Offer "Do you have something to say?" only at times when a message from the child is more likely in the situation / conversation
  - o Focus on Interaction
  - o Have Fun!
  - o Build a relationship
- Have a Conversation
  - o Whatever the Child Says is Correct! Respond with a comment that relates to the child's experience - Using their AAC System
  - o Expand upon what the child says using his AAC system
  - o Use AAC to say something first, if the child doesn't have anything to say, and also say something after - keep the discourse going!
- It is Good to Make Mistakes - Shows Kids that it is OK to take a Risk
  - o Communication Partners May Also Get "Stuck" - Use this as a "Teachable Moment" - with Self-Talk and Repair Strategies - often the flap or side panel of a PODD has "Oops" that can be used when you get to a page and realize that you didn't want to go there.
- Modeling Communication Books
  - o Always follow the operational procedures that the child will need to use
  - o Self-talk your thinking process
  - o Speak out loud what you point to
  - o Recap the message as you go
  - o Speak the complete message at the end
- Modeling High Tech
  - o Model on the child's device, or use a separate device, or a book
  - o Model operational process - "Speak Message", "Clear", etc.
  - o Self-talk your thinking process
  - o Turn off 'Speak on Entry'

- Communication and interaction should be the primary goal
  - Communication provides the purpose and context for the development of language skills
  - Enjoy communicating with the child!!!

Give Children Something to <u>Do</u>, Something to <u>Think About</u>, Something to <u>Learn</u>, and something to <u>talk</u> about!

Acknowledge that Communication is a priority for any child with Complex Communication needs!
"Communication is the essence of human life" ASHA, 1991, p.9

Communication allows us to: (Porter and Kirkland)
- Establish relationships
- Express our personality
- Demonstrate and share our knowledge
- Ensure that our needs are met and our wishes are considered

*

| chat words | →no | something's wrong | →no | I like | →no | I don't like | →no |

yes ↓

I don't know

More

Done (finished)

Help

Uh oh (Oh no)

Hurry up

Stop / wait

Me (I do, my, mine)

You (your turn, yours)

Listen

Look

Just kidding

Leave me alone

I love you

Good bye

Please

Thank you

Sorry

do something else

Something else

yes ↓

Tired
Hurt
    Stomach
    Ear
    Head
    Neck / throat
    Leg / foot / toes
    Arm / fingers / hand
    Eyes
    Mouth / teeth
    Nose
    Back
    Bottom
    Somewhere else
Itchy (list body parts)
Uncomfortable
    wiggle (jiggle, move)
    change position
    too tight
    too loose
Hot
Cold
Wet
Sick
    runny nose
    cold / cough
Grumpy/upset
    (frustrated)
I can't see it
I don't know what's
    happening
Hungry
Thirsty
Want someone (go to
    people list)
Broken
Lost
Don't know what is
    wrong

Something else

yes ↓

Great

Good (good job)

Funny

Fun

Clever (smart)

Silly / crazy

Awesome

Yummy

Favorite

Beautiful

Nice

Lucky

Cool

love it

something else

yes ↓

Yucky (Gross!)

Boring

Too noisy

Scary

Makes me mad

Don't want to

Can't do it

Too hard

Too easy

Wrong

Bad

Something else

Read labels one at a time, across the top, and wait for the individual to respond yes or no. If No, continue reading across. If Yes, read down the column.   Once the individual makes a selection, recap your understanding of the message and then respond to the message. Use a monotone voice for the scan, but use a social voice for responding to the message.

I want	→no	let's go	→no	do (something)	→no	I'm asking a question	→no →

yes ↓

Eat

Drink

Bathroom / Change

Break / rest

Hug

Someone (people list)

Play / Toys / game
   (list?)

Book (story) (list?)

Music (list?)

iPad / Computer

DVD / TV

Make something (list?)

Outside activity
   walk
   ride
   bike
   ball
   pool

someone to sit and
   talk with me
      (people list)

Something else

yes ↓

Home

Somewhere in the
   house
      bedroom
      kitchen
      living room
      upstairs
      downstairs
      another room

School

Somewhere in school
   classroom
   therapy room
   cafeteria
   health room
   another room

Outside

Inside

Visit (go to people list)

Store (shopping)

In the car

for a walk

Park (playground)

Pool

Restaurant

Doctor

Library

Somewhere else

yes ↓

Change position
   sit up
   recline
   turn around
   get out

Movements
   dance
   sit
   stand
   walk
   roll
   lie down
   bend
   stretch
   push
   pull
   catch
   throw
   kick
   hold
   let go
   grasp

Give (gave)

Take (take off)

Put (put on)

Tell (say, talk, said)
   (go to people list)

Ask (go to people list)

Come

Turn (on/off)

Tickle /massage

Buy (bought)

Something else

yes ↓

Tell me yes or no
   (go back to start)

What's happening?

What?

Where is person?
   (go to people list)

Where?

Why?

Why not?

When?

Who?

What's next?

something else

I want to show you something	→no	I'm telling you about something special	→no	school activity

yes ↓   **yes** ↓   **yes** ↓

people list:

In my bag

something new

Something I made

Something I can do
(watch me)

I'll look at it
(watch my eyes)

I'll tell you where
my room
another room (list)

Ask someone
(go to people list)

I have a note

Surprise

Present

Card

Birthday

Party

Holiday
Christmas
Hanukah
Halloween
Thanksgiving
Easter
Vacation

Sticker (prize)

trophy (metal)

Circle (group)

Work

Play

Book (Read story)

Work with someone
(go to people list)

Therapy

Centers

Eat (snack, lunch)

Drink

Bathroom

Rest

me

Mom

Dad

someone here
(list who is near)

Something else

Something else

Something else

Someone else
(use back of page
for more people)