

Developmental Learning Steps

By Veronica Steer BAppScOT, RegOT, AccOT

About Veronica

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Veronica Steer Graduated in Occupational Therapy in Adelaide, South Australia in 1975.

Sensory Integration, to improve the underlying central nervous system foundations for learning, coordination and behavioural organisation, has been her primary focus and drive.

She has worked predominantly with children with multiple disabilities, developmental and learning difficulties, and those within the autism spectrum. Neurodevelopmental therapy training assisted her in her early work with children with cerebral palsy, and she became a Sound Therapist in 2000 as she believed it further supported the sensory integration principles of ensuring the CNS is accurately registering and integrating auditory information for listening, language, literacy and learning.

After 15 years of work, she ventured into private practice in 1989, developing a large sensory integration practice, 'OT for Children.' Since 2005, she has been a sole practitioner working with all ages and using a combination of OT, Sound Therapy and LEAP Brain Integration Kinesiology.

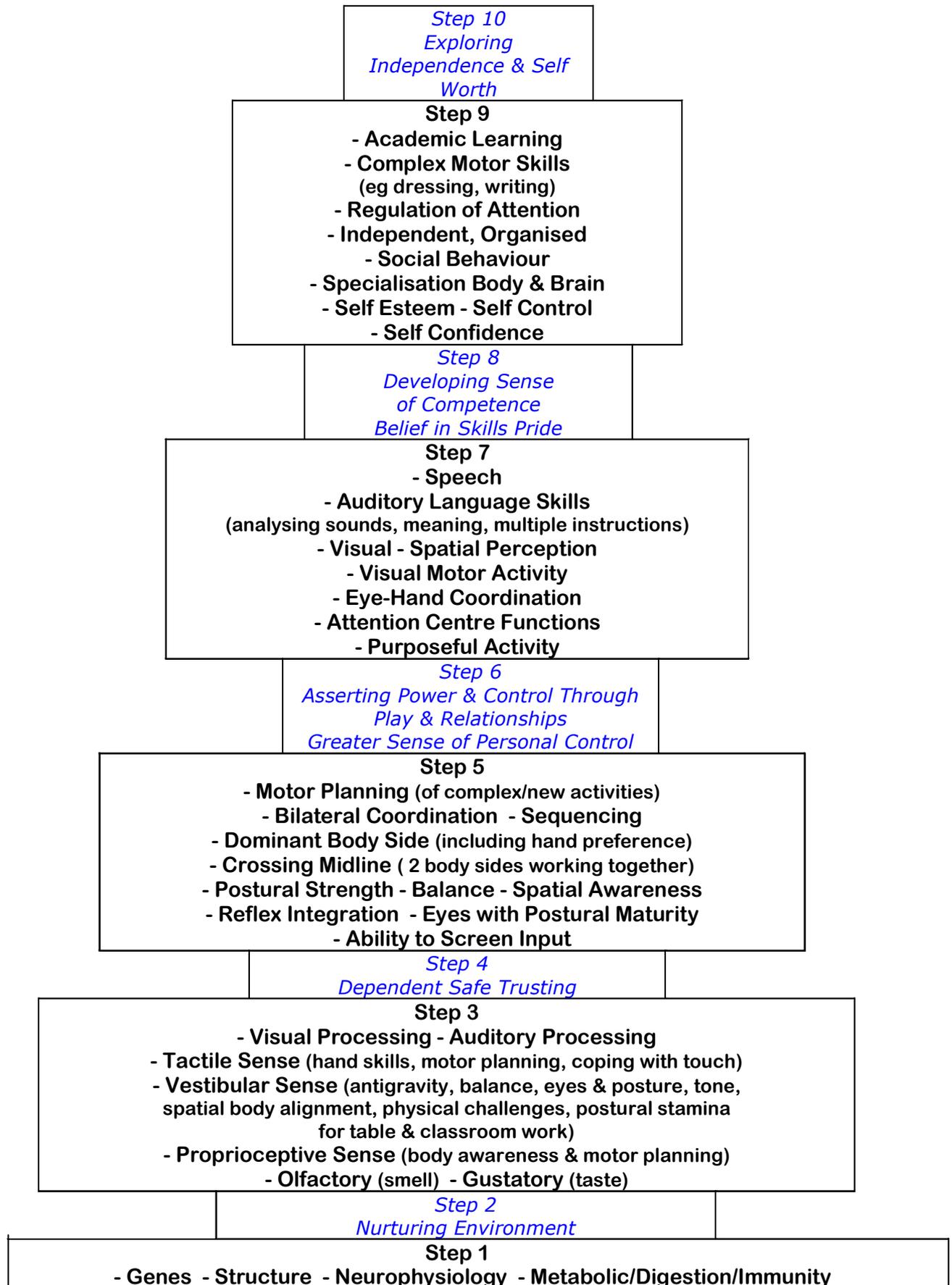
She has been a Faculty Member of Sensory Integration Australia since 1990 and has had great pleasure in training therapists in this field. She has also been member of various OT Association committees, the OT Registration Board, and the Advanced Brain Technologies Training Faculty (The Listening Program).

Since 2003, she has been assisting Barbara Pheloung in Move to Learn seminars and contributed to Barbara's book, 'School Floors'.

Veronica shared some of her vast experience at the Fijian Seminar in 2008, and the following is a summary of her seminar explaining the Developmental Learning Steps.

DEVELOPMENTAL LEARNING STEPS

Steer (2008) adapted from, Ayres; Williams-Shellenberger; Dyson; Erikson



Developmental Learning Steps

The concept of this Pyramid has been used over the decades, with Dr A. Jean Ayres's (1972) being the first one I incorporated into my work with parents and children.

Developmental Learning Steps has evolved in my practice based on Williams and Shellenberger's Pyramid in "Help your Engine Run" (1985); Dr Marilyn Dyson, GP, of Pathways to Potential in Sydney, from her work with children with neuro-developmental, learning and biochemical imbalances, and Erikson's "Theory Of Psycho-Social Development."

Developmental Learning Steps provides:

- an understanding of the approach used by those seeking services
- a clear visual structure for asking many preliminary questions of the parents about their child. They usually readily volunteer information that they see relates to their child. Then more specific detail is followed up e.g. checking the developmental, medical, educational, therapy history
- a tool to help understand the pathway for intervention – where to start, or where to 're-start' and progress onto the next step.
- an understanding of what type of difficulties exist and why.
- identification of hindrances that may have held back success in intervention/s already undertaken as issues in the lower steps have not been identified or fully addressed
- a developmental psycho-social (personality/ego development) screening
- a starting point. Discussion can start by focusing on the top of The Learning Steps, as it is at this level that expectations for mastery are not being met by the child. The second step focuses on the pre-and early formal schooling that can, and usually have been, given extra attention, but often has only achieved short term impact. This then leads on to the lower foundations. If there were no present or possible problems here, parents would not likely have sought out help in the first place
- parents with an understanding of the different aspects of the assessment being undertaken and the intervention being recommended
- parents with an initial report with areas highlighted, and notated
- a reference for the review appointments as the pathway of intervention progresses.
- the framework into which can be placed the screening questions from 'Help Your Child Learn' or the Move to Learn website's 'LD Profile Test'.

A Look at Each Section

Step 1

- Genes - Structure - Neurophysiology - Metabolic/Digestion/Immunity

- **Genes** e.g.

- inherited tendencies from parents and their families of learning, immune system issues etc.

- **Structure** e.g.

- cranial and spinal alignment, for example from a prolonged birth, ventouse/forceps suction, falls, significant bumps to the head and spine etc.

- **Neurophysiology** e.g.

- history of anoxia/blueness at birth, sleep apnoea, low apgar score, jaundice, febrile convulsions, neurological conditions etc.

- **Metabolic/Digestion/Immunity** e.g.

- check for history of colic, eczema, ear throat, chest infections, recurrent illnesses, tummy complaints, elimination patterns etc. Food intolerances and metabolic imbalances are very common in later behaviour and learning issues.

Step 2

Nurturing Environment

Nurturing Environment is where the dependent child feels safe in a trusting relationship. It is especially important to infant development.

Erikson's term is "Psychosocial Stage 1 – Trust vs. Mistrust", in which he sees the period of birth to 12 months, as when the infant is totally dependent. It is the most foundational and fundamental.

Development of trust is reliant on the dependability and quality of the child's caregivers and on a feeling of being safe and secure in the world. If this is inconsistent, if caregivers are emotionally unavailable or rejecting, feelings of fear and mistrust will develop. The world will likely appear inconsistent and unpredictable to the child.

Erikson's Theory Of Psycho-Social Development was suggested to me by a child psychiatrist colleague in Adelaide, Dr Stephanie Fryar Williams, as I wanted to screen, or have some benchmark, of the psycho-social development. This would give an indication of associated stress that we were seeing if aspects of The Learning Steps were not being mastered. Erikson does not address the mastery of sensori-motor influences but his work is the highest regarded and most akin to the stages that we clearly see in some of the children with LD.

Erikson's Theory Of Psycho-Social Development

This is one of the best-known theories of personality and development of ego identity in psychology. Some of the basic points are:

- personality develops in stages
- there is an impact of social experience across the whole lifespan
- ego identity or conscious sense of self develops through social interaction
- personality is constantly changing due to new experience and information in our daily interactions with others
- sense of competence also motivates behaviours and actions
- each stage relates to becoming competent in an area of life, which can lead to a sense of mastery, or a sense of inadequacy if not handled well
- at each stage, a conflict is experienced that serves as a turning point in development, and this can lead to developing a quality, or failing to develop a quality, leading to high potential for personal growth, or potential for failure

In respect to this and Step 3, an infant's central nervous system may have difficulty coping with daily routines as they are touched while being hugged, fed, changed and encouraged to sleep. They may be over or under sensitive to movement, sight, sounds, touch, taste and smell.

The parent/s have to apply a great deal of extra management and skill in easing the child into life in the most basic of routines. Finding the cause and the method/s of management is the challenge. Is the CNS overwhelmed, under-registering or variable depending on the stimulation, time of day, proximity to feed and digesting times? and so on.

Step 3

- Visual Processing - Auditory Processing

- **Tactile Sense** (hand skills, motor planning, coping with touch)
- **Vestibular Sense** (antigravity, balance, eyes & posture, tone, spatial body alignment, physical challenges, postural stamina for table & classroom work)
- **Proprioceptive Sense** (body awareness & motor planning)
- **Olfactory** (smell) - **Gustatory** (taste)

- Visual Processing

- vision is our leading sense, and the structure of the eye ball in fact grows out of the forebrain. Visual alertness, attentiveness, tolerance of levels of stimulation, eye following are being used in infant screening of intellectual and social aptitude. Early screening of vision and eye muscle control is essential within a pre-school assessment.

- Auditory Processing

- this and the visual sense are our leading classroom learning senses. The auditory sense has a 'head start' over the visual sense as it is developing while in the womb as the baby hears and listens through bone conduction from 5 months of age, i.e. through sound conducted through their bones, the bones of their skull and into their cochlear.

In our early and later learning, simultaneous intake of visual and auditory input is essential for effective listening, language and literacy. Early screening of hearing and a full audiometric assessment is essential as a preschool assessment. However often the hearing is fine but the rate and accuracy of intake of what is heard is far below the requirement for listening, language and literacy skill development, especially for those with a history of ENT infections, family history of literacy issues, and food intolerances and/allergies. Pronounced noise intolerance is an early indication of auditory processing.

- Tactile Sense (hand skills, motor planning, coping with touch)

- issues in this area can be identified by variable tolerance of hugs, touching, textures in bedding, clothing, oral/food or texture sensitivity, grooming, dressing even skin contact when on the floor.

Fine motor skill difficulties are almost always associated with tactile perception difficulties in the hands as well as oro-motor immaturities. A component of motor planning is having a 'touch-based reference map' of our bodies while we are doing a task, or about to do a task. Comfort with being physically close to someone and interacting with our first caregivers is a basis of social interaction.

- Vestibular Sense (antigravity, balance, eyes & posture, tone, spatial body alignment, physical challenges, postural stamina for table & classroom work)

- like the auditory sense it is processing stimulation by 4 - 5 months of age after conception. Both auditory and vestibular sensory processing difficulties are almost always concurrent areas of under-functioning in the child with learning difficulties.

Coping with being moved or positioned, with heights and different directions and speeds of movement, with lifting the head up against gravity or coping with different planes of gravity, can all be challenging from infancy. For some there is a constant need to seek out additional movement and anti-gravity experiences.

The vestibular sense is vitally linked with proprioception, sensing where we are in space, keeping aligned and upright or at least in postural control for the task whether stationary or moving.

Vestibular sense is integral to balance and developing sufficient body muscle tone for daily, mundane or more challenging physical/sporting activity. It is fundamental to

- Proprioceptive Sense (body awareness & motor planning)

- any movement of the body's muscles, bones and joints, sends sensory messages in this proprioceptive or 'body sense pathway.' It gives ongoing information about body position and tension of the muscles, providing for feedback for adjusting and finessing balance, posture and gross and fine motor skills. It is also vitally tied in with developing an ongoing mental picture of ourselves throughout our activities whether we are aware of it or not. It also contributes to motor planning.

All three of the tactile, vestibular and proprioceptive senses develop as infants are in close physical contact with their first carers. As they move and explore with their bodies on the floor they are forming the perceptual framework for what they see and hear, giving spatial information about the safety of the situation, direction, distance in relation to themselves. This is part of the first development of what is from within them and what is separate from them.

- Olfactory (smell)

- the sense of smell is a very early or 'primitive sense' in terms of the human development and survival. 'Is what is being smelt safe for eating? or 'Is there a threat e.g. fire or an animal that might attack us?'

Over sensitivity is often seen in children and adults with immaturity or those in an 'over-alert' state who sense many sensations are a threat. Food or chemical intolerances or digestive issues may be part of this.

- Gustatory (taste)

- the taste sense has a similar role and connections and can be 'over-protective' leading to fussiness. This can also be due to food intolerances or digestive issues.

Step 4 **Dependent Safe Trusting**

Erikson's "Psychosocial Stage 2 – Autonomy vs Shame and Doubt," is an early childhood stage in which children are developing a greater sense of personal control. Toilet training is a vital part of the process, as it involves learning to control one's body functions. It leads to feelings of control and a sense of independence. Gaining control over food preferences, food choices, toy preference and clothing selection lead to feelings of being secure and confident, otherwise a sense of inadequacy and self doubt develops.

Step 5

- **Motor Planning** (of complex/new activities)
- **Bilateral Coordination - Sequencing**
- **Dominant Body Side** (including hand preference)
- **Crossing Midline** (2 body sides working together)
- **Postural Strength - Balance - Spatial Awareness**
- **Reflex Integration - Eyes with Postural Maturity**
- **Ability to Screen Input**

- Motor Planning (of complex/new activities)

- involves organising the body (fine motor, oro-motor and gross motor) to tasks that require adapting and adjusting to a number of steps/levels of challenge; the task usually needs much practice before it becomes automatic. A difficulty here is called Dyspraxia.

If a child has difficulty in this area the parent may say that around three years of age the child's behaviour changed and frustration increased. Later at pre-school, they were watchers of others (doing tasks they found difficult). They may also find it difficult to do what they have learnt if it has not been practiced or is still new. This is often seen as a child being 'lazy', when in fact they are overwhelmed.

Articulation, getting dressed, riding a three wheeler bike, early pre-writing skills, use of scissors, free-play and creative construction are some of the activities that are regularly difficult.

These activities are usually bilateral and involve sequencing as well, and are based on good sensory perception, tactile, vestibular proprioceptive, visual and are constantly changing throughout the task. It also involves making a mental plan or having an idea of how to do the task beforehand. Verbal dyspraxia can be associated with these motor and ideational praxis difficulties.

- **Bilateral Coordination**
- **Dominant Body Side (including hand preference)**
- **Crossing Midline (2 body sides working together)**

- Our bodies, senses and brain are bilateral – two sides of intake, which then need to be processed and integrated for security, confidence, accurate perception and mastery of the environment/task at hand and development of skills.

Indications that these two sides are not communicating and integrating and responding 'as a coordinated unit' raise alarm bells for impediments to ease of learning. The earliest signs being persistent lack or limitation in looking, turning, rolling to both sides, crawling or preferring one hand only.

As the inter-hemisphere communication develops through physical activity, then a coming together at midline of the eyes and hands starts occurring. Hands will be able to cross over the midline with ease and proficiency in bat/ball games will improve. Again if not, it is usually because the child has not rolled well and integrated early primitive reactions to set up for crawling and balancing and eye-muscle control.

As the child gets older, activities such as use of utensils, whether eating or cutting, dressing, fastening clothes, writing from one side of the page to the other, skipping and riding a bike/skate board will increase in competency and/or safety to more age appropriate levels.

Hand dominance can develop early for some and take a while for others, especially those who have mixed handedness in the family. Genetics and environmental stimulation can play quite a role in when and how strongly the handedness is established, however it is a sign that the brain is still sorting itself out.

Working at helping to promote this maturation should always involve sensori-motor stimulation within the developmental stages of postural (which includes eye muscle control) and bilateral integration.

- **SEQUENCING**

- movements referred to here is a check for the degree of coordination, accuracy, timing and smoothness within activities. This is a very 'broad' definition. It is a check of how different parts of the brain or brain circuits are firing within a stage of development for mastery of a specific skill or subskill; how each side of the brain and body is communicating, directing and carrying out an activity .

The baby's kicking, rocking, bouncing, opening and closing of fingers and sucking are important beginnings that start in the womb. Later babbling, rolling, crawling, picking up, dropping and throwing, are part of strengthening and practicing for later skills.

For the pre- and early years school child, increasingly smooth, bilateral sequencing of jumping, hopping, skipping, dancing, rhythm, clapping, speaking, cutting, colouring in, and so on is expected.

Watch for degree of stop-start, jerkiness and lapse in time as one side takes over from the other and back again e.g. in skipping.

- Postural Strength - Balance - Spatial Awareness

- These areas develop as the body integrates the primitive reflexes. They are highly reliant on the child exploring, challenging and mastering his body and his world. Thereby promoting the integration of vestibular, proprioceptive and tactile senses during rolling, sliding, climbing, jumping, swinging, pulling, touching etc

What is checked for here is, can the child hold the body still, in good control against gravity, while on the floor, sitting, standing (not quickly slumping or slouching, 'wriggling') but also being able to maintain good posture while moving from position to position and good alignment during and pertinent to the activity?

Spatial awareness refers to the development of a sense of where the body is in relation to objects, obstacles and people. This being important for safety, efficiently undertaking an activity, organising the body and later for becoming aware of 'social distances'.

- Reflex Integration

- Eye (muscle control) with Postural Maturity

- Much has been written about this area. There is growing understanding and education in observation of how the ongoing presence, or retention, of early primitive reflex postures and movement patterns of infancy can interfere with skill development at the expense of developing more mature postures and patterns of movement. This can interfere with efficient development of fine motor (including hands, eyes and tongue) and gross motor skills.

They also represent an immaturity in development of 'lower brain' neural pathways and integration centres. This is important to serve learning and help develop efficient communication between the both sides of the brain and establishment of a dominant or leading eye, hand and foot. Lateral dominance of the brain for different activities is also assisted by this very body-based development.

- Ability To Screen Input

- is an important neuro-physiological characteristic that develops in the nervous system so that the child does not get overwhelmed with sensory stimuli in the events around them. This will mean that pertinent stimuli can be attended to and used and irrelevant (to the situation) stimuli screened out.

Step 6
Asserting Power & Control Through
Play & Relationships
Greater Sense of Personal Control

Erikson's "Psychosocial Stage 3 – Initiative vs Guilt" relates to development in preschool years as the child asserts power and control over the world through directing play and other social interactions. This leads to a sense of their own capability and being able to lead others. A sense of guilt, self doubt and lack of initiative can develop if their environment does not enable this.

Step 7
- Speech
- Auditory Language Skills
(analysing sounds, meaning, multiple instructions)
- Visual - Spatial Perception
- Visual Motor Activity
- Eye-Hand Coordination
- Attention Centre Functions
- Purposeful Activity

- Speech

- check if the child is able to spontaneously, or in response to questions or with peers, express what he knows, use the right words, in the right sequence, with appropriate rules of grammar and with the intended meaning in an age appropriate manner. Clarity of articulation is part of this. This area is known as Expressive Language skills. Speech Pathologists assess and work in this area.

- Auditory Language Skills (analysing sounds, meaning, multiple instructions)

- otherwise known as Receptive Language skills is reliant on present and past 'good hearing' as well as auditory processing of language, which is the accurate interpretation of speech in different listening conditions.

Auditory processing difficulties are identifiable when:

- there is trouble paying attention to and remembering sequences of information presented orally in optimal and particularly noisy, distracting environments
- there are problems carrying out multi-step directions
- there are misinterpretations of words and meanings
- more time is needed to process information
- there is low academic performance in one or many areas e.g. difficulty with reading, comprehension, spelling, vocabulary, maths and creative writing

- there is subtle to overt, receptive and expressive language difficulties
- there are articulation errors
- there is visual observer/learner rather than auditory learning
- there is limited attention, or the child may daydream
- when there is more ease with 1:1 interaction

Auditory processing difficulties can co-exist with a history of ear infections, hearing loss, glue ear, grommets etc. Dyslexia and other Learning Difficulties, ADD, developmental language disorders, a family history of auditory processing problems can also be involved.

- Visual - Spatial Perception

- contributes to being able to master activities such as construction, drawing and bookwork. It also is necessary for reading a street directory, and not being confused in space i.e. getting lost or disorientated. It is the interpretation of what drawings and symbols (2D) and objects (3D) represent in terms of orientation, distance, perceiving similarities and differences.

It is highly reliant on tactile, proprioceptive and vestibular sensory perception from the beginning, as the eyes, hands and mouth watch, explore and move objects, and as the body squeezes between, under, over, across to and around them. Over the months and years the brain starts forming multi-sensory 'spatial reference maps' which are used within in activities that require judging and adapting to spatial elements.

- Visual Motor Activity

- this involves both the below eye-hand coordination skills, but is more motor planning reliant. The student needs to be able to make his hands and body do an activity that involves judgment and adapting in order to successfully build, draw, copy, create and problem solve. Copying pre-writing symbols, block construction and tying knots are used to test this area.

- Eye - Hand Coordination

- is more a motor ability involving the accuracy of the eyes and hands working together for the fine and gross motor activities of drawing, cutting, writing and threading a needle. This is also the term referred to in being able to catch and hit a ball. All fine motor activities are reliant on gross motor development involved in Steps 3 and 5. Often children improve in this and the above two areas when these Steps have been developed.

- Attention Centre Functions

- for pre and early school age children, check if the child has the ability to attend to the activity at hand? For some, there is no problem. For others, it appears they have good attention, but on closer questioning, we find it is only within their special interest area. This is usually because it is their area of strength and doesn't challenge broader developmental skills.

They may love the television or a computer based activity, for example, because they give rewards and are very 'visual' and do not require motor planning skills, or they may love solitary construction activities but not cope with the language on the television or interacting with others to play games. They may spend hours outdoors and have limited attention with indoor play, or they may love story time at bedtime but not be able to attend at group storytelling time.

Taking advantage of a child's area of interest can be the key to broadening a child's abilities and attention, for example, if the child is interested in trains, but limited to solitary play, they can be encouraged into group play with a 'train' theme.

Check if the attention difficulty is due to a delay in developing neurological skill to attend, or if there are sensory, perceptual, motor coordination or other interfering issues involved.

- Purposeful Activity

- does the child choose, plan for and engage in a task to its completion? Does the child engage in activities that have limited completion, goal or end result, is very repetitive or only involves gross or fine motor?

Step 8
Developing Sense
of Competence
Belief in Skills Pride

Erikson's "Psychosocial Stage 4 - Industry vs Inferiority"

During the early school years, from approx 5 – 11 yrs of age, children develop a sense of pride in accomplishments and abilities through feedback in social interactions.

Encouragement and commendation by parents, teachers and peers leads to a feeling of competence and belief in their skills. If this doesn't occur, the student develops doubt in their ability to be successful.

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| <p style="text-align: center;">Step 9</p> <ul style="list-style-type: none"> - Academic Learning - Complex Motor Skills
(eg dressing, writing) - Regulation of Attention - Independent, Organised - Social Behaviour - Specialisation Body & Brain - Self Esteem - Self Control - Self Confidence |
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This is usually the best step to open the discussion with parents and teachers to determine where are the areas of concern. It is not uncommon for difficulties to exist in all of the above areas. From here, you look back at the lower Steps to see which may be contributing. If all Steps are recognised as possible issues, it is at the beginning, Step 1, that intervention needs to be first addressed.

Many parents, educators, therapists and doctors are not ready to accept this, but the (limited) results of the chosen intervention/s will usually confirm this.

- Academic Learning

- is the child progressing for his age, level of schooling or potential, particularly in the basics of literacy which affects all other areas of learning, and numeracy? Often the parents can say that the child is reading well, but understanding what is read is questionable. Spelling in written work is weaker than in spelling tests.

Numeracy or maths may be mastered early if the child is good spatially but there may be more difficulties later when there are more language concepts and instructions involved in understanding.

Difficulties with the following are usually co-associated with, and signs of, learning/brain immaturity. They have their origins right at the first step.

- Complex Motor Skills (e.g. dressing, writing)

- writing is commonly the most notable issue of concern that identifies the child as needing extra help. When questioned regarding the child's dressing, use of utensils or ball skills etc, parents often then realise it is part of an overall complex motor skill issue and that lower developmental steps need to be assessed. Handwriting is the end product based on visual motor and auditory language skills as well as postural and ocular development. Merely practicing writing is often not the answer.

- Regulation Of Attention

- according to the task, the stimulation present, changing from one task to another, outside to inside, the time of day, sense of mastery. It is easy to identify those with

this issue that are restless and noisy, (eg those with 'ADHD'), but the quiet, inattentive and well behaved ones, (eg those with ADD, auditory processing or language difficulties), may be just as learning disabled. Finding the reason why is the challenge.

- Independent, Organised

- areas to enquire about/check: Are they able to get ready for an event or activity e.g. getting dressed for school, organising books and pencils for the lesson, tidying up, preparing homework books to pack for the night, remembering instructions, getting distracted, needing prompts? Do they have coordination, motor planning, spatial or sequencing type difficulties?

- Social Behaviour

- areas to enquire about: Does the child know the social rules for a given situation, respects personal space, is dogmatic leader, is a follower, has friends, has been invited to parties, has good listening and verbal skills, copes with (or shows inappropriate) physical contact.

- Specialisation Body & Brain

- has one side of the body been determined or consistently used (eye, ear, hand, foot) ? An efficient brain has one consistent side that takes the lead and one that assists. Swapping sides does not give a stable point of perceptual reference – leading to spatial confusion, disorientation, and inefficiency all round (letter reversals/getting lost).
Children and adults with high intelligence, or an inherited strength in an area, are more able to override these difficulties, but their highest potential is not achieved, output requires greater effort.

- Self Esteem & Self Confidence

- as Erikson says, every child needs a sense of competence and self worth, built up by encouragement and commendment by parents, teachers and peers. Parents will often be concerned that their child is lacking in this area. It's difficult for a child to develop confidence when they are unable to master the skills of their peers and sometimes this is the only area that leads into an understanding that these children have difficulties.

- Self Control

- is based on maturation of brain function, being a role of the frontal lobes. It is based on the level of developmental expectation, social training and sense of competency, and how well the lower areas of the brain are processing for the frontal lobes to work well. For example, if a child is still physically restless due to ongoing primitive reflexes or food intolerances, then learning self control will always be undermined.

<p style="text-align: center;">STEP 10 <i>Exploring Independence & Self Worth</i></p>

Erikson's "Stage 5 Industry vs Inferiority"

Leads into the adolescence exploring independence and their sense of self. With good encouragement and reinforcement through personal exploration they can develop a strong sense of self and a feeling of independence and control. If unsure of their beliefs and desires they can become insecure, confused about themselves and the future.