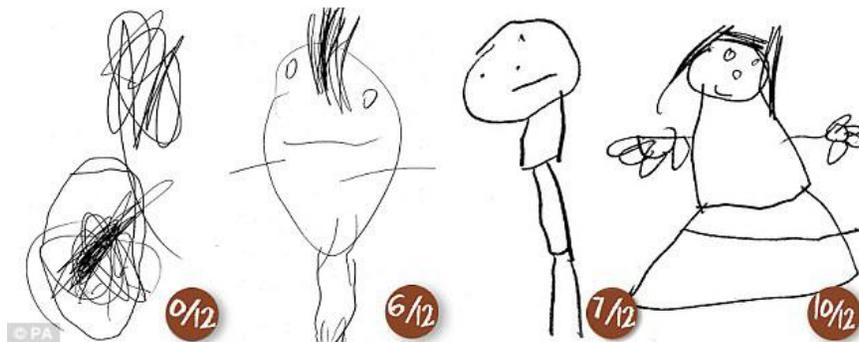


# EQ On Learning & Intelligences



This book is designed to be short.

When it's possible, we say things in a very direct way.

The things we say are based on our own detailed  
research.

This is one of a series of books produced with the support of the Velux Foundations

At the centre where we work with young children we provide interactive resources for parents, educators and childcare professionals that provide a larger understanding of the material in this book.

THE VELUX FOUNDATIONS

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This book has two parts.

The first part provides a set of principles that ensure that the educational approaches taken with children before they enter school are developmentally appropriate.

The second part explores the idea of multiple intelligences.

The second part is inserted into the first part. It breaks the sequence at an important place.

# Principles of Child Development and Learning

The following principles are drawn from a wide body of literature although we are especially indebted to the National Association for the Education of Young Children in the USA.

The list is fairly comprehensive but no linear sequence of stated principles can truly do justice to the complexity of the issue of child development and the ways that children learn.

The principles are closely interconnected because it is impossible to consider the different domains of learning and development in isolation from one other. Each of the principles is drawn from solid research. As this research expands and new revelations emerge, the principles are likely to be modified. Some may be re-phrased. In the future, we may feel it is necessary to add other statements of principle. However, it is unlikely that principles will be dropped.

# 1

**All the domains of development and learning – physical, social, emotional, cognitive (intellectual) and spiritual – are important and they are closely interrelated. Children’s development and learning in one domain influences and is influenced by things that happen in other domains.**

.....

EQ argues that early years’ care and education should not only cater for all domains of development and learning but this process should extend beyond simply planning a sequence of activities and building variety into the timetable.

Children should be provided with rich and varied opportunities to learn *holistically*. This means that by playing and exploring, through dynamic interaction and engagement, children enjoy full, rewarding experiences.

Helen Tovey, a British educationalist, argues that too often “children are given a pre-packaged, ‘out of a catalogue’, plasticized environment which can be bland, static and sterile. Routines can sometimes be so rigid that children are hurried and harried from one event to the next. Learning in such environments becomes responsive and passive rather than creative and active.

A dynamic environment “unites elements of order and chaos, calmness and exuberance, predictability and surprise, flexibility and routines, planning and spontaneity.”

Back in the 1970s, the architect, Simon Nicholson, questioned why community spaces, museums, kindergartens and schools were so sterile and lacking in interactive components. He was reacting to cultural elitism that determines that community environments and artworks can only be shaped by 'suitably qualified' individuals despite the fact that there is no evidence that shows that some people are born creative and others are not.

Nicholson argued that the creative empowerment of children comes from an environment rich in 'variables' – materials that can be constructed, de-constructed, manipulated and transformed through self-directed play and experimentation. The more varied and flexible the materials are, the more scope there is for deep, creative exploration and the more likely it is that children will remain absorbed in creative play all the while helping to shape the space that they occupy.

The environment we have created at our new centre combines materials that we've bought, others that we've found and objects we have gathered from the great outdoors. It's designed to be transformable in response to how the interests and preoccupations of children alter over the course of the day.

Different groups of children engage with the environment in different ways. Members of a single group alter course on the basis of their discoveries.

We use the chorus from a children's rhyme as a metaphor that explains how circumstances unfold –

"We're going on a bear hunt.

We're going to catch a big one.

What a beautiful day!

We're not scared."

(Michael Rosen)

A beautiful day contains endless possibilities and the bear is an object of discovery at the end of each quest.

## 2

**Many aspects of learning and development follow sequences and the earlier parts of those sequences often provide the platforms for developing the abilities, skills and knowledge that comes later.**

.....

A significant body of research shows that children undergo a relatively predictable and stable sequence of development during roughly their first nine years of life. Interpretation of the sequence may vary across different linguistic and cultural settings but knowledge about how children develop and learn within a given age span provides a general framework that allows parents to monitor how their children are progressing and provides teachers with the ability to prepare learning environments that are age-appropriate. This knowledge supports curriculum design and the development of learning experiences. It helps determine the appropriate style of interaction between teacher and child.

However, many commentators warn against the dangers of standardization that arises when the framework becomes too rigid and they are right to do so.

The eminent educationalist, Sir Ken Robinson expresses the essence of the problem in the following statement –

“Educating children by age group assumes that the most important thing they have in common is their date of manufacture.”

He points to the tendency to focus on the things we think all children need to learn while disregarding the issue of personal motivation. Children have personal interests and strengths and educators are legitimately obliged to uncover and nurture individual talents. This is unlikely to happen in educational settings that are heavily standardized and where too narrow a definition of intelligence is applied.

Let's hear what Dr. Peter Gray has to say about the subject. Gray argues that children need freedom to learn – an idea that is antithetical to the prevailing preoccupation with *teaching* -

“Children learn best when they are engaged in activities geared to their developmental levels, prior experiences, and current needs. As they construct their ideas through play and hands-on activities that make sense to them, children's knowledge builds in a gradual progression that is solid and unshakable. They build a foundation of meaning that provides the basis for understanding concepts in language, literacy, math, science and the arts. In active learning, their capacities for language development, social and emotional awareness, problem solving, self-regulation, creativity, and original thinking develop, transforming them into effective learners.”

# 3

**Development and learning take place at varying rates from child to child. Additionally, the rates are uneven across different areas of a child's development.**

.....

We can say that “typically, by age A, a child can perform action B.” However, there is no such thing as the typical child and development varies around the normative course of typical development.

All children have their own strengths, needs and interests. They learn in different ways and are motivated by different things. This means that chronological age is a very crude indicator of developmental abilities and interests.

John Dewey (1859-1952) was one of the first educationalists to identify the importance of the past experience of children in determining their responsiveness to current learning opportunities. However, the fact that you were born on a farm does not necessarily shape your destiny as an agriculturalist or veterinarian. The fact that you are growing up with brothers and sisters does not mean you will share their preferences and interests.

Dewey pointed out that “the belief that all genuine education comes about through experience does not mean that all experiences are genuinely and equally educative.”

What matters is whether or not the child is *genuinely engaged*. The level of engagement depends on two things –

1. The child's capacity to meaningfully engage because the activity is developmentally appropriate and, therefore, potentially enjoyable or intriguing
2. The child's motivation which derives from a combination of readiness (I'm not hungry, sleepy or already engaged with something else) and personal preference

In a joint statement the Universal Education Foundation and Eurochild say that children need to be treated as competent partners. Adults should “nurture the child's individual agency and personal responsibility”.

This statement has an essential sub-text. Respect the child's uniqueness which means that (s)he will, on occasions, inevitably fail to conform with what is “typical” for a child at a particular age. However, remain vigilant for significant levels of variation.

Research done by Karen Rogers at the University of St. Thomas in Minnesota suggests that something like 14% of children in the USA who are identified as being “intellectually gifted” or highly advanced for their age may also have some form of learning disability. Being brilliant at doing certain things in certain ways can also account for emotional volatility in children. They may have a low threshold for the frustration caused when not allowed to do those things in those ways.

# 4

## **Development and learning arise from the balance between biological growth and life experience.**

American psychology professor Walter Mischel uses a wonderful metaphor to explain the interaction between our genetic blueprint – our DNA - and our life experience.

In his book ‘The Marshmallow Test: Understanding Self-Control and How to Master it’, Mischel points out that “what the genes do depends on the environments in which they are functioning.”

Imagine the human body as a library that contains thousands of books. (The body contains about 20,000 genes.)

Each book in this DNA library contains sentences – the genes. The sentences are organized into paragraphs and chapters – groups of genes that work together in a highly coordinated way. Books are arranged in different sections of the library – body tissues, organs etc..

When we visit a library our experience as a book reader is not simply the sum of all the books in the library.

We’ll allow Mischel to finish the story –

“The experience of the reader depends on when he visits the library, who joins him, what sections he visits, what parts of the library are open or closed at that particular time, and which books he pulls off the shelves. In short, what gets read, the genes that will and won’t be expressed, depends on the enormously complex

interactions between biological and environmental influences The possibilities are endless and the role of the environment essential.”

The value of Mischel’s metaphor lies in the way in which it demonstrates the extent to which our ideas of normalcy or appropriateness are somewhat misguided when applied to learning and development.

The metaphor helps us contemplate our uniqueness and that of our children.

**“Are we products of nature or nurture?  
It's the wrong question. It's not one or  
the other. Nor is it a combination of  
both. It's their constant interaction.”**

**(Beau Lotto, neuroscientist)**

**Early experiences have profound effects (both cumulative and delayed) on development and learning.**

A child's brain develops very quickly during the first five years of life and especially during the first three years. It is a time of rapid cognitive, linguistic, social, emotional and motor (physical) development.

The brain processes information by forming networks of specialized nerve cells called neurons, which 'communicate' with one another using both electrical and chemical signals.

At birth, the brain already has about all of the neurons (or nerve cells) it will ever have in terms of quantity. It doubles in size in the first year, and by age three it has reached 80 percent of its adult volume.

Even more importantly, synapses are formed at a faster rate during these years than at any time during later life. (In fact, the process starts before birth.) Synapses are the connections that allow electrical or chemical signals to be transferred from one neuron to another of between neurons and glands and muscles.

Actually, the brain is growing and re-shaping throughout life, even if most development is completed by late adolescence / early adulthood.

Different parts of the brain develop at different times meaning that there can be dramatic change happening in certain regions with little or nothing happening in other places.

The durations of the sensitive periods of development are shorter or longer for different parts of the brain but

each period has an initial stage in which the specific region develops more synapses than it needs. That stage is followed by the “pruning” or discarding of synapses. It is widely reported that the neural connections used more often grow more permanent, while those used less often are discarded. However, this explanation is very simplistic. We do not yet fully understand the relationship between losing “grey matter” (nerve cell bodies and synapses), enhancing the integrity of the “white matter” (nerve fibres that form the pathways in the brain) and making the connections more functional or efficient.

At age two or three, the brain has up to twice as many synapses as it will have in adulthood. These surplus connections are gradually eliminated throughout childhood and adolescence.

It is as if the nervous system sets up a large number of connections and then starts to refine the network by selecting and strengthening “appropriate” connections and discarding “inappropriate” ones. This leads to the existence of a streamlined network that provides us with the sensory bases and probably the cognitive (intellectual) bases for what happens in our brain later in life.

The brain does not stop producing synapses. The addition of synapses is a process that operates throughout the whole human life span and it seems especially important that – late in life – people continue with activities that promote this production. The process is driven by experience and it looks as if synapse development is linked to most forms of memory.

(We will look at the relationship between memory and brain processes in a later chapter.)

Although different parts of the brain have different sensitive periods, their development is interdependent.

Neural circuits form in sequence and cumulatively: simpler networks are created first and more complex ones later. The simple structures provide a foundation for the complex structures that follow.

Linguistic development naturally relies on visual and auditory functions that depend on neural circuits that were shaped during the earlier years. Higher cognitive functions (like reasoning) depend on the linguistic development which – in turn – was dependent on more simple circuits built on the basis of serve-and-return interactions during the time of infancy.

The brain is said to have an “executive centre” (the prefrontal cortex) that handles those operations that take effort and control and that we associate with adulthood or maturity. However, improvement in these operations between childhood and adulthood depends on the integration of complex systems that are scattered around the brain. These systems change their structure and function across the entire period of development and they are built upon the simple foundations created during infancy.

This shows that the first three years of life represent a highly significant period for learning and development.

### **Serve and return interaction**

It is broadly accepted that rapid brain development in infants (a million new neural connections every second) is driven primarily by stimulation provided during interaction between babies and their mothers who are calm, attentive and responsive so as to be able to participate in a process of “serve and return”.

Even if you are not a fan of tennis, you are familiar with the term “serve” and “return” as players send the ball back and forth over the net. Here it is being used to refer to how either the baby or mother can provide a cue or signal to which the other responds.

Serve and return interactions are simple to start with (eg responding to a baby’s cooing by smiling and talking gently) and become increasingly complex over time. As children get older, they will engage in more specific “serve” interactions that develop particular areas of the brain. For example, when a child points at an object (serve) and the parent responds with the name of that object (return), the child starts to understand the correlation between the object and the corresponding sound.

When parents are sensitive and responsive to their baby’s needs and the signals “served” by the infant, the “return” contributes to creating a loving and supportive environment that’s rich in emotional and cognitive interactions.

John Bowlby refers to this process as creating a “secure base” for the child who will become securely attached to the parent.

Back in the 1970s, the University of Minnesota started a study into attachment that followed the development of a large group of children through their academic careers.

In his book – ‘Helping Children Succeed’ – Paul Tough describes the success of children who, at the age of 12 months, were seen to be securely attached to their mothers. They were “more attentive and engaged in preschool, more curious and resilient in middle school, and significantly more likely to graduate from high school.”

## **THE IDEA OF MULTIPLE INTELLIGENCES**

There's an idea that is called 'infant determinism'. It's the belief that what happens to a child in the first 3 years of life shapes the adult.

Infant determinism derives largely from the work of the British psychiatrist John Bowlby (mentioned earlier) at the Tavistock Clinic in London in the 1950s and 60s.

Bowlby is the father of "attachment theory". He argued that an important difference between "vulnerable" and "resilient" children is found in the quality of their earliest relationships, particularly attachments to a mother figure. In essence, Bowlby claimed that a secure relationship with their care-giver makes children more secure and able to cope with stressful situations later in life.

In addition to attachment theory, infant determinists place great emphasis on brain development during infancy as if the first three years of life represent the preeminent sensitive period in child development.

Martha Farah, a neuroscientist from the University of Pennsylvania believes she has demonstrated both the crucial importance of stimulation during early childhood and the existence of a critical period.

Farah's results showed that the development of the cortex in late teens was closely correlated with a child's cognitive stimulation at the age of four. All other factors including parental nurturance (warmth and love) throughout the child's life and the level of cognitive stimulation at age eight had no effect. Farah said her results were evidence for the existence of a single

sensitive period that determined the optimal development of the cortex.

The cortex is the thin, outermost layer of nerve cell tissue of the brain, typically measuring a few millimeters in thickness. The cortex contains nerve cell bodies and is critical for cognitive functions such as perception, language, memory and consciousness.

As stated in the prior chapter, as the brain matures, grey matter is pruned or discarded meaning that the cortex gets thinner. Farah found that the more cognitive stimulation a participant had had at the age of four, the thinner, and therefore more “developed”, their cortex.

Farrah’s research team focused on the availability of books and educational toys among families with similar socio-economic status. Did the children go on regular excursions?

It was found that having greater access to these sources of stimulation contributed to healthy thinning of the cortex or, more specifically, the temporal lobe which is located near the surface of the brain right above the ear.

The working of the temporal lobe mainly revolves around hearing and selective listening. It receives sensory information from the ears. It makes sense of the all the different sounds and pitches (different types of sound) being transmitted from the sensory receptors of the ears. It also enables us to comprehend, or understand meaningful speech. In fact, we would not be able to understand someone talking to us, if it wasn't for the temporal lobe.

Here is how Professor Farrah explains the process -

"In the course of brain maturation during childhood and adulthood, the cortex becomes thinner. You would think it would bulk up but it turns out that a lot of the development including the finishing touches put on the brain in late adolescence and early adulthood involves not adding cells and connections but rather eliminating ones that aren't needed, so you are left with a lean, mean machine."

Professor Farrah is telling us that the story of brain development does not end at age three and does not only entail the early accumulation of synapses. When a child is around five or six, her / his brain starts to discard "grey matter" and the level of cognitive stimulation received at age 4 appears to have an impact.

Farrah is not saying that having a super-thin cortex (even in the pre-frontal lobe) makes you a genius. In fact, other research has suggested a relationship between rates of change in the thickness of the cortex and reductions in IQ.

It has also been suggested that those with attention-deficit-hyperactivity-disorder may have a thinner cerebral cortex overall than those who do not have the disorder.

Interesting experiments have been performed on laboratory rats. Some youngsters were deprived of the opportunity to interact freely with other rats of their own age ("rat play") by being kept with a mature adult group. It was discovered that their level of brain maturation (as represented by thinning of the cortex) was significantly lower than that of young rats that were allowed to interact with others of a similar age.

To conclude, we can say that the process of discarding “grey matter” is a significant phase of brain maturation. It leaves the brain in a state in which it will continue to adapt and restructure itself during adulthood but with a larger emphasis on connectivity and functionalism as opposed to volume of brain cells. We do not yet understand how this process is optimized but there are strong indicators suggesting that richness and variety of experience are highly beneficial from the age of four until final expiry. (Farewell, dull world.) Free play provides this richness and variety while formal education tends to take place in a restrictive environment that does not encourage exploration on the basis of curiosity and internal motivation.

**What about a child's intelligence profile? Could this be determined on the basis of what is discarded and what is retained during brain development?**

The answer to the above question is: Probably, yes but we don't really know how.

Howard Gardner who developed the theory of multiple intelligences argues that there is both a biological and cultural basis for a person's intelligence profile.

We need to take care to understand what is meant by the idea of different intelligences.

Ignacio Estrada once said the following:

"If a child can't learn the way we teach, maybe we should teach the way we learn."

This statement aligns with a commonly held belief in 'learning styles'. However, the research that supports the idea of learning styles isn't terribly robust. Gardner makes it clear that multiple intelligences are not learning styles.

There are a number of problems with the learning styles approach. First, there is no coherent framework of preferred learning styles. Often, children are categorized into one of three preferred styles of auditory, visual or kinesthetic learners. However, one study found that there were more than 70 different models of learning styles including among others, 'left versus right brain', 'holistic learners versus serial learners' and 'verbalizers v visualizers'. And on it goes.

The second problem is that categorizing individuals can lead to the assumption of fixed or rigid learning style,

which can impair a child's motivation to adapt or apply himself in challenging settings.

There have been systematic studies of the effectiveness of learning styles that have consistently found either no evidence or very weak evidence to support the idea that educational outcomes for a child will be improved if she is taught according to her learning style as identified.

Gardner is quick to point out that "(a)bsence of evidence does not prove non-existence of a phenomenon; it signals to educational researchers: 'back to the drawing boards'" on the question of learning styles."

Gardner defines strict criteria for defining a particular 'type' of intelligence. (As stated above, there are no such rigorous criteria for defining a 'style' of learning.) He has rejected several attempts to add to the list of intelligences that he has created because the additions did not comply with the criteria.

### **Criteria for identification of an intelligence**

- You should be able to distinguish it from other intelligences through experimental psychological tasks
- It should be supported by psychometric tests of intelligence
  - You should be able to interpret it in symbol systems of the sort used in formal and informal education
- It should have a distinct developmental trajectory. (Different intelligences should develop at different rates and along distinctive paths.)

- It should have some basis in evolutionary biology. We should see signs of it in primates (or other species) and you should be able to see how it contributes to human survival
- Neural structures and functioning that support this intelligence should be distinguishable from other major human faculties
  - It should demonstrate a core information-processing system. This need not be totally distinctive from other intelligences (there can be overlaps) but it must be possible to identify a clear set of mental processes that handle information related to each type of intelligence.
- Certain individuals should show particularly high or low levels of a particular capacity in contrast to other capabilities (eg autistic savants, stroke victims or those considered to be 'gifted')

### **Types of Intelligence**

Here are the nine types of intelligence that have been identified defined in brief:

#### **1. *Naturalistic Intelligence***

This designates the human ability to discriminate among living things (plants, animals) as well as having sensitivity to other features of the natural world (clouds, rock configurations).

#### **2. *Musical Intelligence***

Musical intelligence is the capacity to discern pitch, rhythm, timbre, and tone. This intelligence enables us to recognize, create, reproduce, and reflect on music

### **3. *Logical-Mathematical Intelligence***

This entails the ability to calculate, quantify, consider propositions and hypotheses, and carry out complete mathematical operations. It enables us to perceive relationships and connections and to use abstract, symbolic thought, sequential reasoning skills and inductive and deductive thinking patterns.

### **4. *Existential Intelligence***

This involves the sensitivity and capacity to tackle deep questions about human existence, such as the meaning of life, why we die, and how did we get here.

### **5. *Interpersonal Intelligence***

Interpersonal intelligence is the ability to understand and interact effectively with others. It involves effective verbal and nonverbal communication, the ability to note distinctions among others, sensitivity to the moods and temperaments of others, and the ability to entertain multiple perspectives.

### **6. *Bodily-Kinesthetic Intelligence***

This refers to the capacity to manipulate objects and use a variety of physical skills. This intelligence also involves a sense of timing and the perfection of skills through mind–body union.

### **7. *Linguistic Intelligence***

Linguistic intelligence is the ability to think in words and to use language to express and appreciate complex meanings. Linguistic intelligence allows us to understand the order and meaning of words and to apply meta-linguistic skills to reflect on our use of language.

### ***8. Intra-personal Intelligence***

Intra-personal intelligence is the capacity to understand oneself and one's thoughts and feelings, and to use such knowledge in planning and directing your life. Intra-personal intelligence involves not only an appreciation of the self but also of the human condition.

### ***9. Spatial Intelligence***

This is the ability to think in three dimensions. Core capacities include mental imagery, spatial reasoning, manipulation of images, graphic and artistic skills.

Gardner points out that each type of intelligence is completely independent of the others. Identification of the fact that a person possesses one type of intelligence does not enable you to predict the others (s)he may possess.

An individual's possession of musical intelligence does not mean that she will also possess the kinesthetic intelligence to dance skillfully when music is played. Mathematical and spatial intelligence are employed in reading and writing music but many gifted musicians have never used music notation.

Educational psychologist, Frances Rauscher has shown that teaching young children to play musical instruments helps them score significantly higher on tasks measuring

spatial-temporal cognition (the ability to mentally move objects in space and time to solve multi-step problems), hand-eye coordination and arithmetic. However, this need never mean that the children in question become especially gifted in music.

Here is Gardner's advice to teachers:

1. "**Individualize** your teaching as much as possible. Instead of "one size fits all," learn as much as you can about each student, and teach each person in ways that they find comfortable and learn effectively. Of course this is easier to accomplish with smaller classes. But 'apps' make it possible to individualize for everyone.
2. **Pluralize** your teaching. Teach important materials in several ways, not just one (e.g. through stories, works of art, diagrams, role play). In this way you can reach students who learn in different ways. Also, by presenting materials in various ways, you convey what it means to understand something well. If you can only teach in one way, your own understanding is likely to be thin."

### **Biological basis for multiple intelligences**

Here is Gardner's explanation:

" The basic idea is simplicity itself. A belief in a single intelligence assumes that we have one central, all-purpose computer—and it determines how well we perform in every sector of life. In

contrast, a belief in multiple intelligences assumes that we have a number of *relatively autonomous* computers.”

Some commentators object to this apparently ‘modular’ explanation of brain function – the idea that the brain is organized in specific modules responsible for specific tasks. On a very basic level, there are not nine physical regions each identifiable purely in terms of its association with a particular type of intelligence. Also, there are currently problems with suggesting that each type of intelligence depends on a unique pattern of coordinated activity involving parts of the brain that are physically scattered. We simply cannot yet say that, when using intra-personal intelligence or spatial intelligence, activity will be recorded in regions A, D, F, P and Q.

The suggestion of the existence of several intelligences came originally from the study of how mental faculties were affected by damage to the brain and especially to cortical structures. This suggested an association between brain regions and particular types of intelligence. However, there is now a consensus that there is not a one-to-one correspondence between types of intelligence and specific areas of the cortex.

Neuroscientist, Beau Lotto tells the story of a blind boy who learned to navigate the physical world very successfully using a form of echolocation. Bats send out sound waves from their mouth or nose. When the sound

waves hit an object they produce echoes. The echo bounces off the object and returns to the bats ears. Humans can't do this in the same way as bats but the boy in Lotto's story – Ben Underwood – taught himself to navigate by clicking his tongue and listening – an extraordinary act of adaptation.

Gardner and his fellow researchers argue that it still makes sense to ask how activation of the various intelligences as identified can be mapped in terms of brain structures and functions using neuroimaging. Up to now the technique has been applied in attempt to correlate general intelligence (IQ) with brain activity. These studies suggested a correlation between general intelligence and activation of the frontal regions of the brain, a few other regions and the speed at which neurons conduct signals.

Gardner and his colleagues have stated that “the critical test for MI theory will be the ways in which intellectual strengths map onto neural structures and connections.”

There may be a balance between being generally intellectually precocious or a slow learner because of the size of your brain's frontal lobes and the speed of neural conduction and your possessing particular intellectual strengths because of physical development and / or activity in the other parts of your brain. We simply do not know whether those showing similar areas of strength have similar neural profiles while those showing contrasting strengths have different neural profiles.

Perhaps we should give the last word to Beau Lotto a neuroscientist who studies human perception:-

“Development never truly ends as our brains evolved to evolve...we are adapted to adapt, to continually redefine normality, transforming one’s space of possibility with new assumptions according to the continual process of trial and error.”

Lotto asks us to contemplate the genuine uniqueness of our perception of the world. No two individuals have the same experience profile and, therefore, their brains will have adapted differently on the basis of that experience. Inevitably, this will impact on the way they employ their intelligences.

### **Cultural basis for multiple intelligences**

In addition to biology, Gardner argues that *culture* also plays a large role in the development of the intelligences.

All societies value different types of intelligences. The cultural value placed upon the ability to perform certain tasks provides the motivation to become skilled in those areas. Thus, while particular intelligences might be highly evolved in many people of one culture, those same intelligences might not be as developed in the individuals of another.

To the extent to which your immersion in a particular culture (or range of sub-cultures) dictates your experience, you can understand why Lotto wrote a book called ‘Deviate: the Creative Power of Transforming your Perception’.

### **Is there a genetic basis for intelligence?**

We are aware that those with very high IQ and those with very low IQ display distinct combination of genes. However, it is highly unlikely that there is a single gene, or even a small cluster of genes, in your genetic make-up that make you an intellectual. Is there a correlation between gene patterns and the behavioural profiles behind different types of intelligence? We don't know.

### **Conclusion**

**Neither neural nor genetic evidence as discovered to date favour the idea of a single general intelligence. Similarly, we have not discovered biological markers of the existence of a range of intelligences.**

**We do not really understand how individuals come to possess distinct profiles of abilities and areas of weakness.**

**There are optimum periods for certain types of development and learning to occur.**

.....

When predicting the likely fate of young children who fail to form secure attachments with their mothers (or other care providers) and those whose early years are traumatic, we need to be careful not to be guilty of “infant determinism”. This is the tendency to assert that early childhood experience has an *inevitable* lasting impact. On the basis of our current understanding, we can talk about likely outcomes based on the timing, severity or longevity of traumatic experience but – even in the age of neuroscience - it’s tricky to talk about *inevitable* consequences.

We are all familiar with the image of the patient lying on the psychiatrist’s couch relating childhood memories that may yield clues about the roots of adult disorders. However, they are pursuing links between the present and the past that are far less clear and direct than was previously thought.

Infancy is a period of rapid and intense brain development over a sustained period. We do not really understand the relationship between experience and the generation of neurons and synapses. Similarly, we do not understand the relationship between experience and the elimination of those synapses – the process we call “pruning”.

We have all probably read somewhere – online or in a newspaper or magazine – that “the brain is a muscle”. We should, therefore, give it plenty of exercise to keep it

in prime condition. Neural pathways fade and die if we do not use them. The brain is degenerating when this happens. Doing puzzles or jigsaws will slow down the process.

Is it really “degenerating”? It may actually be creating an interface that matches the world you live in and the way you interact with it.

Some theorists suggest that the over-production of synapses in the first 7 years of life reflect a brain in a particular mode – it is *expectant* of stimulus and experience. If that stimulus and experience is not forthcoming when the system is in experience-expectant mode during specific periods of development, this may lead to impairment when processing certain types of information (those types the brain was preparing itself to process but did not receive in the requisite manner at the requisite time).

There are numerous sensitive periods during life – phases of rapid development during which the biological system is especially sensitive to specific environmental factors or aspects of experience because they are particularly relevant to the development of the particular physiological system that is changing.

Sensitive periods occur frequently during early childhood but they continue throughout the lifespan. The effect of stress at any particular time in life depends on the brain areas that are developing or declining at that the time of exposure.

As explained above, the brain can behave as if it *expects* stimulus or experience. However, it also behaves in an

experience-dependent way in which one skill is dependent on the development of another – first A, and then B. This seems deterministic, doesn't it? A child's ability to identify emotions from facial expressions depends on experience accumulated through serve and return interactions, does it not?

However, experience-dependency also explains the plasticity of the brain which is a phenomenon that appears to last from the moment we are born to the moment we finally expire.

We can now return to Mischel's wonderful library metaphor. By distinguishing between the "experience-expectant" and "experience-dependent" modes, we seem to be saying something about the disposition of the person visiting the library. That person may be looking for particular titles or subject-matter. "At this particular stage in my life, I need this information. I have a project to finish." Alternatively, that person may be browsing. "Oh, this looks interesting. I can work out what this information means and use it based on what I already know."

As you read this, you are wide awake. Reasonably alert. Nevertheless, parts of your brain are inactive – dormant. While you are asleep, parts of your brain are very active.

This leads us to think about optimum periods for development and learning from a different perspective. As well as thinking of developmental phases in the life of a child, it pays to think from the perspective of a day in the life of a child. Disregard age.

Neuroscientist, Daniel Levitin tells us that the brain tries to avoid effort when it can. In fact, its default setting during the time we are awake, is day-dreaming mode.

Here is why (explained in Levitin's own words) –

“It's as though our brains are configured to make a certain number of decisions per day and once we reach that limit, we can't make any more, regardless of how important they are.”

Levitin is telling us that – in a learning context – we should not continue to fire tennis balls at a child (serving) when that child is not prepared to return the service because they are engaged with something else, they're sleepy or they're day-dreaming.

Levitin also draws our attention to the relationship between day-dreaming and heightened potential for creativity and problem-solving.

The 19<sup>th</sup> century philosopher and psychologist William James noticed the way that children can become deeply engrossed with an object or within a big experience that can somehow wrap itself around the child.

Psychologist, Mihály Csíkszentmihályi has explored the adult capacity to enter a state he calls “flow”. A person can become fully immersed in an activity and so fully energized and focused that they lose track of time.

Educationalist, Sir Ken Robinson talks about being “in the zone” meaning that you use your particular kind of intelligence in an optimal way.

Given the chance, young children will often enter the zone but the pressures of modern living can deprive them of the opportunity. Even those children who are

lucky enough to be provided with abundant resources for learning are being raised in an increasingly hurried and pressurized style because their parents feel under pressure, harassed or constantly distracted.

Some commentators believe that it is good for children to experience the sensation of boredom once in a while. Learning to cope with the feeling constructively is part of becoming a resilient and resourceful individual. Indeed, some research suggests a relationship between boredom and creative inspiration.

# 7

**Children develop best when they have consistent relationships with responsive adults and the opportunity to form positive relationships with peers.**

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Clinical psychologist Catherine Steiner-Adair has written a very powerful book called 'The Big Disconnect'. Drawing from her long experience as an advisor to parents and educators, the author explores the impact of digital technology on childhood and family relationships.

Back in the 1950s, when John Bowlby contemplated threats to secure attachment between mother and child, he focused on big phenomena – separation, neglect, emotional volatility or detachment, parental feuding. Big stuff. Using a smartphone, tablet or laptop – these things can hardly compare, can they?

Can they?

Not all snakes are poisonous but in the words of Steven Wright –

“Even snakes are afraid of snakes.”

When interviewed by journalist Nick Bilton, the late Steve Jobs said he limited the amount of access his children had to new technology. Family meal-times in the Jobs' house were for chatting and i-phones were banned.

Snake charmers are especially afraid of snakes.

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**“In addition to the issue of distracted supervision putting children at risk for injury, at some point distracted, tech-centered parenting can look and feel to a child like having a narcissistic parent or an emotionally absent, psychologically neglectful one. In nonclinical settings, most notably in focus groups in schools around the country, the take-home message I am hearing from children of all ages is this: They feel the disconnect. They can tell when their parents’ attention is on screens or calls and increasingly they are feeling that all the time. It feels ‘bad and sad’ to be ignored. And they are tired of being the ‘call waiting’ in their parents’ lives.”**

**(Catherine Steiner-Adair)**

# 8

## **Development and learning occur in multiple social and cultural contexts and are influenced by these contexts**

We referred to the impact of culture when talking about the theory of multiple intelligences. A child's development and learning is influenced by family, educational setting, community and broader society and also the interplay among the sub-cultures than the child moves among.

When an educational programme is undertaken on a small scale or in a particular location the implementation team is unlikely to encounter all the cultural and social permutations that can occur across an administrative area or across the country as a whole. This means that, depending on the extent to which a programme is scaled up, those implementing the larger programme may encounter social or cultural glitches that impact on success and they may not even know what they are. In a sociocultural context, *principles* are more easily transferable than operational specifics.

Sociocultural complexity can also contribute to an "attribution problem" when we try to measure the impact of changes in early years' care and development. Finland is applauded for its education system and Sweden for its child protection and family support systems. However, apart from the obvious rural-urban divide, both countries have, until relatively recently, enjoyed the benefits of strong social and cultural homogeneity within small populations.

As a child grows up, (s)he has to learn to function in the larger social context (outside of the home and the family) and to move comfortably among groups of people whose backgrounds are either similar or dissimilar to her / his own. We talk about the 'global village' a term first used by Marshall McLuhan. Back in 1964, he made the following statement –

“Today, after more than a century of electric technology, we have extended our central nervous system itself in a global embrace, abolishing both space and time as far as our planet is concerned.”

McLuhan was primarily concerned with communication capability. However, the issues of internationalism and multiculturalism have both impacted on educational policy in different ways in different locations as has the issue of gender equality.

Indeed, it is widely accepted that, when we talk about instilling multiculturalist values, we tend to be talking about things that extend beyond the boundaries of ethnic or racial issues.

### **Multiculturalism in operation**

- Embracing cultural diversity – its strength and value
- Respecting human rights and accepting those who are different from you
  - Acceptance of alternative life choices
  - Promotion of social justice and equality
- Emphasis on equitable distribution of power and resources

It has now widely believed that – by age 5 – children have developed a pretty solid understanding of their own cultural identity. Children learn new cultural patterns more easily than adults who are more deeply entrenched and tend to have developed value systems that align with cultural norms. It, therefore, seems to make sense to allow young children to experience diversity and to encourage tolerance of differences.

But, how far should we go?

Egalia Preschool in Stockholm was established in 2011. At the school, teachers refer to the children by their given names, collectively as “friends” or by using a genderless pronoun, “hen”. The use of the pronouns “him” and “her” is avoided.

The books in the school are also carefully selected to avoid depiction of traditional gender and parenting roles and toys are not designated as male-oriented or female-oriented.

While admiring attempts to promote gender equality, some think the approach is over-zealous and misguided. Between the ages of three and seven (approximately), children are concerned with discovering their identity and some argue that a big part of that identity is gender.

What do YOU think?

I’m sure you understand that good practice in early childhood care and education takes account of the diverse cultural backgrounds and systems of belief represented among the children and their families. This practice will help develop the positive self-esteem of individual children as well as fostering an appreciation of

the diversity that the children currently experience or are likely to experience in later life.

However, concern for equality and an understanding of diversity can lead us into difficult territory in the educational and cultural context. It can create philosophical, religious and ethical conundrums.

# 9

## **Development leads towards self-regulation**

The early years of life involve the transition from being totally dependent on others to possession of a variety of complex capabilities that include impulse and emotion control, self-guidance of thought and behavior, planning, self-reliance and responsible behavior that shows consideration for others.

Mums, dads and other adults play an important role in helping children learn to self-regulate. Mothers who soothe their babies when they are unhappy or sleepy also help them to learn how to soothe themselves.

Kindergarten teachers can also design activities to help children learn self-control (eg encouraging them to wait until it is their turn to do something).

However, children need to learn to SELF-regulate. This is something they need to practice when not being supervised or prompted by adults.

Does play have a role in the development of self-regulation? Several studies show that early childhood practice that elevates academic training at the expense of play dampen a child's motivation to learn and reduce regulation of attention and behavior especially among children with low socioeconomic backgrounds.

The Russian psychologist Lev Vygotsky saw a link between make-believe play and self-regulation. When a child uses a wooden block to represent a car that child is

relying on thought rather than impulse to guide his action. Also, an inherent property of pretend scenarios - like hosting a tea-party for dolls - is that children follow social rules and established routines.

***“Children learn as they play. Most importantly, in play children learn how to learn.”***

**(O. Fred Donaldson)**

### **Learning how to learn**

To learn, children must first be motivated and then engaged. As pointed out by Peter Gray “(t)he biggest, most enduring lesson of school is that learning is work, to be avoided when possible.”

We must never forget that children are designed by Nature to learn through self-directed play and exploration. In too many instances, schools attempt to teach while depriving children of the freedom to learn naturally.

