Earlyarts
nurturing children's creativity

Where is the social, emotional and brain science behind our early education?

A provocation by Earlyarts Director, Ruth Churchill Dower

From an advocacy perspective, I was very disappointed that the early years weren't afforded a higher profile in the government's recently published Cultural Education Summary of Programmes and Opportunities. It signifies a hierarchy in education that considers the youngest children to be the least important.

One of my concerns is around the lack of any focus on that sensitive transition period from early years to primary – possibly the area that needs the most attention in order that assessment based teaching does not end up limiting children's natural dispositions for discovery the moment they step into primary classroom. However, I am even more concerned as to why, despite an excellent foreword about the importance of creativity in learning, none of the initiatives are really designed to position social and emotional intelligence (which is at the heart of mental health, human behaviour and much creative practice) alongside cognitive intelligence.

We know from child psychology and neuroscience research that young children learn in holistic and heuristic ways, i.e. their daily experiences play as much of a role as their genetic predispositions in shaping what and how they learn in the earliest years. It's these experiences that create a myriad of connections across all areas of the brain to help children contextualise and understand who they are and the world around them.

Even with very little knowledge at the start of life, children are very intelligent and can categorise what they learn into many different areas of meaning, all interconnected. Movement can help create the synapses needed for reading and writing as well as physical development, mark making can help create the synapses needed for listening and critical thinking. You can't easily separate early education into academic subject areas as children's brains don't work like that and, thankfully, they will be brutally honest in letting us know when this approach doesn't work for them!

It's important to bear in mind that we only understand a tiny amount about the young brain so far. This is partly because it is not considered ethical or safe to put babies into Functional Magnetic Resonance Imaging (fMRI) scanners unless a serious condition requires immediate analysis of their brains as, a) it's very difficult to keep a baby still unless its asleep, and, b) we still don't know what adverse impacts the strong magnets could have on a baby's brain.

However, the next ten years will enable a plethora of new research to emerge about baby's brains as a new type of scanner becomes available. This will introduce a scanning technique called the Near-Infrared Spectroscopy (NIRS) approach, used in parallel the magnetoenchephalography (MEG) system although the magnetic field strength will be much reduced for use with babies. A handful of expert neuroscience and medical experts have been selected for training in the use of this equipment in Switzerland, so we can look forward to their research results in due course. One such expert is Dr Efthymios Papatzikis, who I'll introduce you to shortly.

In the meantime, I am very interested in researchers who are exploring what conditions seem to enable children's brains to work best, and how strongly their emotional health features in this. A number of existing studies refer to the way different people show a tendency towards a predominant hemisphere, i.e. they are more of a right brain (creative) or a left brain (algorithmic) person. Certainly early creative and emotional intelligence tests by Gardener (Harvard), Salovey (Yale), and Meyer (New Hampshire) confirmed this by measuring responses to standard questions such as 'name ten things you could do with a brick, or a paper clip'.

However, as we know, younger children's imaginary capacities seem to develop much earlier than their algorithmic skills, and I suspect they would be brilliant at this exercise. Their answers would probably only be limited by the requirement to name ten things, rather than 100! So from this we could assume that all young children are predominantly right brain people.

Of course, that's not the case but then these tests weren't necessarily designed to be used with younger children, and I suspect other 'tests' of creativity, such as the Torrence tests, would also result in very skewed results. This is partly because they do not take into account the way young children's brains (both sides) are still developing at an exponential rate until the pruning process begins around the age of three and children's retained

knowledge starts to become more specialised. It is also to do with the fact that many creative processes, such as music making, can be triggered from activity in the amygdala, the emotional centre of the brain. Thankfully, insightful editors such as Christian Jarrett are exposing some of the myths relating to the functionality of the brain.

Psychologist and science journalist Daniel Goleman moved beyond these traditional tests, proposing that emotional intelligence is at the heart of brain development, and therefore, human behaviour. He defined it as 'the capacity for recognising our own feelings and the feelings of others; for motivating ourselves and managing emotions effectively'. His evidence showed that the processes towards, and outcomes of, emotional intelligence can reduce stress, decrease conflict, improve relationships and increase stability – especially in families. Emotional Intelligence sounds to me, therefore, like an excellent core principle for the Early Years Foundation Stage and the National Curriculum – can you imagine how successful these could be if taught with the objective of reducing stress and improving stability and mental health? Perhaps the traditional objectives of academic and economic success would be achieved four-fold if we got our children's emotional, mental and chemical states balanced first.

Being married to a scientist who frequently asks me to explain my assumptions, I am fascinated with both the science and the aesthetics of early brain development. Sometimes I am convinced we can explain everything through science, including what makes us be or feel creative. Maybe that's just the need in me to try and lead a simpler life! At other times I believe in the power of the arts to transcend scientific explanation and provide an experience so beautiful and fulfilling that I don't have (or need) the words to articulate it, the experience is enough.

This experience seems to reside in a completely different part of the body than the brain, such as a sensation in my arms or my diaphragm, possibly due to the number of nerve receptors there. There's a great article in the New York Times on how our emotional response to music can cause the release of the neurotransmitter dopamine deep within the reward centre in our brain.

So, when I think about what conditions enable children to be their most creative, I am constantly trying to weigh up what we can prove through evidence based knowledge, and what we cannot prove but can feel, sense, see or somehow intuit through our experiences coupled with historical and contextual knowledge that help us make sense of the experience. It's a bit like trying to find whether there's any common ground between Christianity and Atheism, one based on faith and the other on a lack of faith, both having equally strong believers and very few middle-grounders.

Recently I was invited to speak about the impacts of the arts in early childhood to teachers at the Botin Foundation Summer School in Santander. Here I had the privilege of meeting cognitive neuroscientist of music from Harvard University and the University of London, Dr Efthymios Papatzikis, who is conducting research into the specific impacts of certain musical interventions on babies' cognitive and social development. He told me a little known fact that the brain holds four memory systems (the long and short working memories, the episodic and semantic memories) which create memories based on positive or negative experiences, each of which can trigger certain reactions in young children depending on how well connected and reinforced these memories become.

It is thought that the storage of memories depends on whether they are formed from a basis of love or fear, from which pretty much every other emotion we experience stems. It is also thought that there is a direct relationship between the development of physical memory, emotional memory, auditory memory, kinaesthetic memory and musical memory, and the strength of that relationship determines how easily we can then access those memories when we need them.

Dr Papatzikis confirmed that the two hemispheres are closely connected in every brain due to the fact that memories we recall every second of our lives in order that our bodies and minds can function, come from complex connections across both hemispheres. This happens in conjunction with the triggering of different chemical sets, which have a direct bearing on our physical and emotional state of being. He suggests that everything can be taught, i.e. we can learn to over-ride previous dominant tendencies, to provide a better access to knowledge across the hemispheres and, whereas he agrees that we may have a disposition to learn from one particular teaching style over another, we nevertheless store the information we learn right across both parts of our brains.

An illustration of how this works: Anyone who knows me will know how terrible my memory is for people's names. Nothing else, just names. It's so extreme, I often find myself asking very old friends to remind me of their name when I'm telling a story involving them. I thought that names were simply stored in the memory bank that resides in the left frontal lobe and I couldn't help but wonder whether the accidental drop on my head at the tender age of two had something to do

with this. We will probably never know, but it is a constant source of embarrassment for me and opportunities for humiliation by my friends! It turns out that names, as with much information, are stored in several different places.

Storing and recalling a name requires a process of attention, followed by the placing of the name in the short term memory, which leads to an experiential or sensory attachment to the name, which then encodes the name in the long term memory. This requires a series of linkages and connections to be set in the frontal lobe, rehearsed in a sequence of events in the left Hippocampus and finally recalled by working in conjunction with the visual memory in the right neocortex and verbal memory in the language centre if we want to articulate the name. This, of course, doesn't take into account the other factors affecting name recall such as genes, hormones, sleep, stress, diet, and age, for example.

However, I have found I can overcome this shortcoming by writing names down (mainly in meetings) and so, by seeing a name in visual form, I store the memory of the shape of the word in a different part of my brain that I can recall in my minds' eye in an instant. I suppose you could say that I am a very visual person, because I can store and recall visual memories easily, which then trigger other memories. I am also a very aural person with strong recollections triggered by sounds.

For instance, I can pretty much remember all the songs from Joseph and His Technicolour Dreamcoat, my first primary school musical at the tender age of 5, having learnt to sing them by rote before I could write. I would say I also have a strong emotional and moral compass – I am sensitive to what I feel about people or things, how other people feel, I try to build trust, to focus on the positive and to mediate any potential conflict. I would say those are the three strongest faculties or 'intelligences' in my brain that I use to trigger and recall memories. For others, smell or colour are also key triggers for memory. Just like our cultural identities, our memories are complex and multi-faceted and, as such, are made up of many different elements within the brain.

So you can see where I'm going with this. We now have a decade of research gathered from fMRI scans that show the undeniable connectivity between many different parts of the brain in order for both simple and complex functions to take place. We also know a small but important amount about how the brain changes and grows even later on in life, during sensitive periods of 'plasticity'. From this we can surmise that learning is not a linear process, facts are not stored in isolation

from our other intelligences, whether they are visual-spatial, kinaesthetic, musical, interpersonal, intrapersonal, linguistic, mathematical or emotional.

Therefore, knowledge and skills surely cannot be successfully taught without an understanding of the social and emotional connectivity behind remembering, contextualising, understanding and recalling knowledge. As a learning framework, the National Curriculum does not seem to cater for this either in the way it is measured and assessed, or in the way teachers are expected to build the knowledge and skills required in their students. The Early Years Foundation Stage recognises it to a degree, but is limited by the training of early educators and child carers in this country.

In the Cultural Education Summary of Programmes and Opportunities, there are a veritable number of organisations, initiatives and outputs, identifying what a child should have access to in terms of a cultural education. But what is so disappointing, and yet again misses the fundamental reason for the whole argument, are the outcomes – why cultural education is so important, and the benefits it brings to children as learners, individuals and members of society on social, emotional, physical, spiritual, artistic and cognitive levels. Surely, that's the most important headline?

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