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Articles for the 90th anniversary of Early Education

Artful Learning Makes Sense

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“The arabesque, properly speaking ... is the first fancy of the artist; he first plays with his material as a child plays with a kaleidoscope; and he is already in a second stage when he begins to use his pretty counters for the end of representation. ... No art, it may be said, was ever perfect, and not many noble, that has not been mirthfully conceived.”

Robert Louis Stevenson (1882). *Across the Plains.*

“My aim is to show, although this is not generally attended to, that the roots of all sciences and arts in every instance arise as early as in the tender age, and that on these foundations it is neither impossible nor difficult for the whole superstructure to be laid; provided always that we act reasonably as with a reasonable creature.”

John Amos Comenius (1631). *The School of Infancy.* Translated by D. Benham. London, 1858. (Quoted by Robert Herbert Quick (1894). *Essays on Educational Reformers.* New York: D. Appleton. Reprinted in paperback from the 1909 edition in 2003 by the University Press of the Pacific, Honolulu.)

“...it is surely the case that schooling is only one small part of how a culture inducts the young into its canonical ways. Indeed, schooling may even be at odds with a culture’s other ways of inducting the young into the requirements of communal living.”

J.S. Bruner (1996). *The Culture of Education.* Cambridge, MA.: Harvard University Press, Preface p. ix

Prologue

I am writing as a biologist interested in the cleverness of animal life. I became interested in studying the natural gifts of infants and young children for inventing and sharing knowledge in joyful movement, especially the baby's eagerness to communicate from birth. I am still trying to understand what it is about human movement that makes it so inventive and cooperative, and how it evolved to be that way in such a short time, just a few hundred thousand years.

I was fortunate to be guided to infancy research by the insights of Jerome Bruner who was changing ideas about cultural learning — how a child's curiosity in daily experience with interesting company leads him or her to pick up the conventional meanings of the particular social world into which they are born. I have never been a practitioner in early education, but since I moved to Edinburgh forty years ago, I have had the privilege of working with and learning from experienced teachers of young children and from researchers on pre-school learning, including my senior colleague Margaret Donaldson, and some very talented students. In that time careful descriptive research on the playful and cooperative learning of



infants and toddlers with their parents and other intimate companions has changed ideas of the source of human learning. It has become clear that, as Alfred North Whitehead said, the success of teaching depends on recognition of the child's 'zest for learning', which changes from within the child as body and mind develop and which seeks responsive company. Teachers of young children know they have to share this power. They do not create it.¹

Even young infants eagerly synchronise with rhythms of human life in other persons, using this intimacy to learn rituals, tasks and tools that assist their care, and they display generous aesthetic and moral emotions that regulate their inventing, knowing and making of friendships before objects are mastered or any words are learned. A newborn is already developed in body and mind for cultural learning, and, if all goes well, the process of development soon attracts collaborative learning with intimate and trusted guides. As soon as he or she can, a baby joins in the conspiracy of stories about what can be done, with what, and how the pleasure of knowing people, places and objects can be shared and remembered.

The innate habit for sociable invention of meaning grows strong in the years before formal schooling can begin. The Norwegian musicologist Jon-Roar Bjørkvold charts the making of 'children's musical culture'. He says:

This little social being dramatically enlarges his or her world during the first year of life. At every step of the way, bodily movement, rhythm,

¹ I have been collaborating recently with the Child's Curriculum group, retired nursery school teachers and experts in early childhood development, education and family care who are concerned about the loss of excellent pre-school provision developed in Scotland over the past century and who want to do something about it. See www.childscurriculum.org.uk

and the intonation of language are of decisive importance.... During the second year of life the child's interest turns increasingly toward other children, especially those of similar age.... Once the process begins, it moves quickly. First there is one playmate, then a large group; first one game, then many. A magical new chapter opens for the child during the third year of life, one of companionship, as well as loneliness, in the company of other children in play

(Bjørkvold, 1991: 16-19).

As the Russian poet Kornei Chukovsky discovered, children from two to five are 'linguistic geniuses', playing together with the invention of meaningful stories in spoken sound.

Correcting a deviation in psychology

Over the past 200 years scientific psychology has aimed to be an 'exact' science concerned with measuring what we, as individuals, **perceive**, **learn** and **know** about the physical world, sometimes also recording how we react with emotions of confidence or anxiety, depending on the pleasure or pain that encounters with the world cause our body to feel. We have a capacity to learn how to communicate what we know by imitating symbols, talking with them in speech or writing them out in text according to rules of grammar.

If this 'taking in' of experience and 'linguaging' about it is the essence of our intelligence, young children need instruction in order to act well when

doing practical tasks, solving problems or getting along with other people. They have to learn how to talk in words or write using symbols to represent what they know, and to understand what other persons mean by their talk or writing. The state of consciousness before representational tricks are learned remains a mystery.



But this cognitive-behaviourist account, favoured by a science that imagines it can measure causes of action and effects of experience on an obedient system, is not the whole story. We are not just what we are trained to know. What we perceive and learn depends on what we **do**, on our self-created agency. Two persons in the same 'context' may perceive it very differently depending on what they are 'wanting to do', and they will accordingly remember and believe in it differently. Also we are greatly influenced in what we know and believe by imitations between what we are doing and what other people are doing. These imitations do not have to be transmitted in words. We are also the impulses and feelings we **share** by intuitive artfulness of body movement. Different families, communities and cultures act, perceive, remember, believe and communicate differently, and they may not like each other if these habits or

habitats are different. Acting imaginatively brings knowledge, and sharing makes common sense within a cooperative group of actively aware persons.

A new psychology of infancy has been looking at these human habits of active curiosity and sharing developing in infancy, finding evidence that the psychology of perception and learning has missed. Research on natural intentions and emotions requires a very different conception of the motive source of human nature with its feelings and affections. It also requires recognition of the emotions that infants and young children inspire in adults who care for them and who are enchanted with their playfulness, which companions of all ages can share and delight in. Children and adults, both, are creatures evolved for artfully making sense of life together. That is the defining characteristic of human nature.

The problem of education of the too young to read

Unfortunately pressures of a large society restrict both awareness of early childhood creativity and provision for its natural expression and growth. Adults who have complex work to do that requires special knowledge and skills, as well as artificial ways of communicating with learned symbols, tend to perceive young children as pupils who know nothing of these things and must be taught. The infants and toddlers are growing physically and eliciting care from their parents, but cannot take part in the important cultural tasks and procedures that require great teams of workers, policy makers and managers of wealth. They cannot be expected to grasp principles of moral behaviour in industrial and legally regulated organisations. A young child's talents for acting, perceiving

and communicating are too limited or undeveloped to be cultural. Once they can be taught to read and calculate, then the ideas of past scholars, philosophers and scientists and religious teachers can start to be passed on. As Aristotle taught, their playfulness may be pleasurable for relaxation, but is dangerous for the necessary obedience to rules of knowledge and behaviour, and must be regulated.

A struggle between the free acceptance of the value of the playful spirit of young children for creatively learning from the cooperative company of their elders and that of the imposition of teaching by authority as early as possible must have become more intense in Neolithic times, about 12,000 years ago, as *Homo sapiens*, who for around 200,000 years previously had lived in small hunter-gatherer communities, began to prosper as 'sedentary' farmers, developing a material culture that required control of labour and of beliefs in a hierarchical society, and that developed means of storing information in static visible form.



In the last 400 years of our Western history, this struggle, brilliantly documented in the 19th century by Robert Herbert Quick, has had first to disenchant teachers from belief that the roots of understanding are to be

sought in ancient texts in Latin and Greek, and then to free them from dogmatic instruction by religious texts. Educational reformers, teachers and some philosophers and psychologists — among them John Amos Comenius, Jean Jacques Rousseau, Friedrich Froebel, Lev Vygotsky, John Dewey, Alfred North Whitehead, Jerome Bruner, Barbara Rogoff and Loris Malaguzzi — have all argued that the art of sympathetic and creative two-way communication with bright companions is essential for ‘intent participation learning’ at every stage of teaching, from kindergarten to university.



The prehistory of early childhood and its natural artfulness

Ancient hunter-gatherers, who had light agile bodies, clever hands and large brains like our own, appear to have lived in bands of a hundred individuals or less who would know each other well, and to depend on spontaneous cooperative practice of knowledge and skills in direct contact with a natural world. Before creating articulate language, communicating their feelings and interests by gesture and musical sounds in shared experience of a present world,

and without elaborate technologies, they appreciated beautiful objects and music and evidently celebrated with singing and dancing. Their infants were certainly born like ours, very immature, beginning a long development to maturity, and dependent on maternal nourishment, support and protection for two or three years. Adults made tools and left evidence in decorative paints and ornaments that they shared aesthetic values, making their creations not only useful, but beautiful or ‘special’. They were also recording ideas as symbols, presumably to celebrate fantasies of community awareness that could, in oral prophecies and legends, reach far into the future or back to the remembered past. They were inhabiting an embodied and dextrous thought world of metaphors and narrations that no other species can share. Archaeologists interpret the rich array of art works that sprang into being in France and Spain around 40,000 years ago, to be relics of a greatly expanded ‘religious’ self-awareness. I think that the emotion that animated the great effort put into what seems like ‘useless’ decoration of caves or tools was mainly an enjoyment of discovery and sharing of imagination, a special human form of playfulness evolved for life with a richly mobile body and mind.

Those who try to trace the beginning of language infer from available evidence that early humans used distinctive expressive ‘emotive’ sounds that led to enduring forms as preverbal signs — to express the importance of ‘belonging’ in relationships, as well as to identify experiences. We must assume that their infants’ brains were adapted or ‘environment expectant’ for such novelties. That is how human childhood began, and I believe it is still much the same.

Anthropologists observe that in still-existing hunter-gatherer cultures mothers look after their infants collaboratively, sharing their

care and breast-feeding with other women, receiving loyal support from affectionate fathers, and they accept that children learn in playful ‘intent participation’ with little instruction. These cultures are egalitarian, sharing resources without restraint and punishing selfishness with ridicule rather than imperative force and physical restraint. According to Peter Gray, who has made a comprehensive study of our knowledge of childhood in such communities, the moral basis for their egalitarian fairness arises from the imaginative cooperative play among children who are free to invent their games and tease those who misbehave without adult instruction or censure. Gray ends a presentation of the social and cultural importance of children’s play with this warning:

This article has focused on play in hunter-gatherer cultures, but it is worthwhile to speculate about implications for our culture today. Over the past half-century in the United States as in other modern societies, there has been a continuous decline in children’s freedom to play socially in age-mixed groups, outdoors, away from adults. During the same time there has been a continuous rise – based on standard unchanged measures – in childhood and adolescent anxiety, depression, feelings of helplessness, impulsiveness and narcissism.

(Gray, 2012: 368)

His work leads to the conclusion that the inventive sociability of play is the natural way we, and young people especially, build cooperative moral awareness and mutual affection and respect. I would add that parents, grandparents and experienced teachers of young children know that the development of inventive and retentive

intelligence, practiced freely to test all sorts of activity, greatly benefits from both private and shared play at all ages.

Large modern industrial states, with millions of citizens competing in a global economy, plan to instruct young people in scientific concepts and the rules of literacy and numeracy that are deemed important for employment with elaborate machines. They operate hierarchically, with structures of politics, law and management that regulate cooperative behaviours with imperative rules. Evidence from archaeology and evolutionary anthropology indicates that *Homo sapiens* are born with an imaginative and convivial brain ready for the pleasure of shared invention in an egalitarian community, and with a natural sense of beauty in hand-made objects and in music, not only one with a great neocortex evolved to store the facts of experience. In short there are *innate predispositions for culture*, for practicing meaningful habits and artful performances that are playfully inventive and seductive for companionship in traditions, and soon capable of grasping the clever purpose of shared tasks and tools. This knowledge of inventive human nature with aesthetic and moral sensibilities has important implications for educational policy in our schools.

Principles of the natural science of infancy

All who have made accurate studies of the actions of infants, no matter what questions they seek to answer, have had to admit that even a newborn makes *movements to know and learn*. Piaget described the process of cognitive development as one that generated conceptions of objects by accommodating and assimilating consequences of the child’s moving. He was inspired by the work of James Mark

Baldwin who, by research on the creative processes of discovery and imitation arising in movement, also led Vygotsky to define the generation of knowledge and ideas as a process driven by playful curiosity of the child in communication with companions. In the 1970s, among a growing band of researchers who were 'respectful' of the infant's natural talents, four observers with different knowledge and interests contributed to understanding of the infant mind and its conviviality.

The paediatrician Berry Brazelton transformed medical practice and diagnosis of developmental disorders by showing the newborn baby to be a coherent intentional person, both alert to the new world and especially sensitive to a mother's affectionate presence and companionship.

Daniel Stern, a child psychiatrist observed how a young infant could take a leading part in games expressing vitality with all its body in intense attunement with the caresses, gaze and voice of a mother.

The anthropologist and linguist Mary Catherine Bateson described the 'exquisite ritual courtesy' and precise cooperation of a two-month-old baby in 'proto-conversation' with the mother by expressive face and body movements, and by delicately modulated vocal sounds, and concluded that the behaviours of both baby and adult revealed innate foundations of language.

Hanuš Papoušek proved young infants were purposeful agents who could operate a responsive system to repeat enjoyable sights or sounds. With his wife Mechthild he developed the theory of an infant as possessor of a natural 'musicality' that led to language. Musician Stephen Malloch and I have followed this idea with the proposal, based on an acoustic analysis of a Scottish mother's proto-conversation

with her six-week-old daughter, that the parameters of pulse, quality and narrative of 'communicative musicality' in moving is the basis for human companionship of all kinds.



There is now abundant evidence that a newborn infant is selectively attentive to the form and dynamic rhythms of another person's body and movements, especially of head and eyes, hands, face and voice. Imitation of expressions confirms that 'other awareness' may be shared from minutes after an easy birth. This is the start of learning to capture thoughts and feelings from other persons' knowledge and skills, of how they show selective attention to things in the shared environment and move to use them. Cognitive psychologists call this manifestation of sociable consciousness 'joint attention', and they propose that sensitivity for other persons' emotions or states of mind results from a kind of brain-to-brain transfer of emotions called 'empathy'. But the baby is not just 'picking up' either the knowing or the feeling. Both cooperation in tasks and having emotional relationships need imaginative 'sympathy', a sharing of states of mind and feelings that is reciprocal or interpersonal, and that needs complementary actions from an indulgent companion. Knowing anything together, with feeling, must be a two-way

creativity, as in playing a game with the fruitful fun of teasing and joking, which, as Vasudevi Reddy demonstrates, is the source of social skills and the making of the 'second person' understanding of shared minds.



If 'school readiness' means learning by picking up the sense of intentions and conscious awareness with others, we have it from the start. But it has first to be sympathetic and playful. The animated curiosity the baby is born with, for gaining experience from the fruits of moving, from self-aware 'motor intelligence' or 'subjectivity', leads quickly to sharing games of conventional expression with 'primary inter-subjectivity', then teasing and jokes as a self-conscious performer highly tuned to the other person's appreciation, learning in engagement with the rhythms and projects of other person's story-making and discovering companions. Before the end of the first year what companions find curious and their intentional actions with objects become invitations to participate in the use of particular things as tools or toys in tasks which require understanding a shared plan of actions in person-person-object awareness, which we have called 'secondary intersubjectivity'. The infant at the same time investigates what can be done and discovered by handling,

banging and throwing things, creating sights and sounds that become games. All this is before language. Step by step the little person is establishing his or her role in the intimate group of family and close community, showing pride for others' appreciation of clever skills, and protected by withdrawal with shame from unsympathetic neglect or rejection.

In the second year, the world of actions expands as the baby becomes a mobile toddler. An adventure into a great unknown, a chance to have plans for getting about, climbing and even dancing. By three this new 'extravagant mobility' is a great joy. Two- to four-year-olds are full of the fun of their gymnastic cleverness and, as with all stages of play, this is enthusiastically sociable – the child loves company. Everything a human body can do, with the sensations and perceptions that are created, becomes a field for experimentation and discovery. What can be touched, grasped and transformed by the hands makes new touch experiences and new effects or constructions to admire with inquisitive eyes. The ability to make vocal sounds becomes Bjørkvold's 'children's musical culture'. Walking becomes a carnival of dancing, jumping, running, turning, stopping and chasing. The child is practising human vitality dynamics, temporal arts and a proto-technology, learning what the body can do and profiting from enjoying the discovery with others. Pets become playmates too, and are recalled along with human friends in play with dolls.

The child as co-maker of language

This explosion of movement and concepts coincides with the 'vocabulary burst' that so impresses linguists, and that invites all familiar company to talk in more

conventional ways. The child wants to name, explain, show, evaluate and recall impressive events with labels of voice and gesture. New words come at the rate of two or more a day. A three year old is Chukovsky's 'linguistic genius', eager to tell stories, sometimes matching the language of parents and siblings, sometimes inventing words.

Even a one-year-old is getting the idea that other persons' ways of acting with them can be usefully imitated and recalled as conventions for exchange or joint practice. Symbolic behaviour is not just making up new expressions to name particular useful things or actions. It is an entering into a partnership with cultural practitioners, mastering social acts that become social habits or agreed tools for meaning. All of human culture, including language, depends on creative imagination for moving with intelligence and a preference for sharing ideas and projects. Put together, these motives make possible propositional awareness and thinking as well as communication. That is the source not only of forms of art and habits or ritual performances, but of the semantics and syntax of language - doing things with words. Grammar is a product of an innate artfulness of moving with awareness and imitative intention. In developmental linguistics attention is often directed only to the vocabulary and to the rules of grammar, which become topics for a curriculum of instruction. But the appetite for learning or teaching language must be more vital or imaginative - more playful, more emotional and more convivial.

A young child is a knowing human being who learns by artful moving - expecting to enjoy progress with infectious dedication and pride. He or she can decide to work on a project alone, like Piaget's little scientist whose object schemas, as strategies for exercising skill and prediction with things looked at or taken in hand can become of

absorbing interest for other times in other places. But most often others' awareness is part of a project in the moment that can become a game for a team of friends. Human culture uses tools and tasks to extend its purposes, but the main source is the life of convivial play in bodily feelings with encouragement from imitation.

What can a teacher do?

Once we are aware of the young child's gifts for learning by curiosity with or without communication we may wonder where is the place of a teacher when so much can be learned without one? Perhaps this question is behind the neglect of teacher-training for children too young to go to school. But imaginative companionship is part of the world a child is relying on from the start. Psychologists of education have different models to describe the natural collaborative process of cultural learning or making sense, acknowledging that although the motivation of the learner is necessary it is not sufficient. Margaret Donaldson emphasises that it takes dedication, practice and help from an expert to master any difficult skill, such as ballet dancing. She says:

We all walk but we are not all ballet dancers. . . We must apply ourselves. We must become able to guide and direct our own minds. Thus the need for discipline appears. And, though it is self-discipline that is in question, this is not easy to acquire unaided. Few can do it alone. The question is: what help is needed and how can it best be offered? This question, so simple in appearance, is the educational question. The answering of it is peculiarly delicate and difficult. For there is a narrow path between

the pitfalls that lie on either side.

(Donaldson, 1992: 252-253)

The apprentice needs to pay attention with his or her imaginative ‘human sense’ and with appreciation of emotions that validate significance. The teacher has to match and complement the learner’s enthusiasm and curiosity.

This relationship has been given different names by psychologists of education. For Vygotsky the teacher must fit the imparting of information or giving of instructions to the child’s ‘zone of proximal development’. Bruner calls the teacher’s assistance for attempts to climb to a new level in the spiral of learning ‘scaffolding’. Rogoff describes learning of practical achievements as ‘intent participation learning’, and she shows its importance in both formal and informal education. For Erickson ‘musicality’ of talk and listening is a key element in classroom education.


All considered, these accounts confirm that the only coherent story is that children are born cultural learners with developing motives to move their body in artful ways, creative learners who look for information and aid from appreciative collaborators. Discovery requires autopoietic, ‘self-creating’ in movement. Mastering meaning or common sense requires sharing experience in ‘consensuality’. Both agency and relating must be regulated by the innate and common sense of vitality in movement with its rhythms and narrations – by its ‘communicative musicality’. What you learn depends on how you move with a purpose and on who notices and reacts. Toddlers at play move in a dance of inquisitive actions, joining and contesting adventures of getting around in space or over and into objects, holding or touching one another’s bodies and gestures in varied intimacy, laughing at novel ideas and coincidences of their appreciation. To observe play from outside one must register the intentions,

emotions and reactions of the players as dynamic in both sight and sound.

I must add as a caution that the recent unprecedented development of brain science, while opening the way to many new ideas about ‘mentalising’ or thought sharing, ‘mirroring’ of intentions and affective foundations of self- and self-other awareness, does not readily give access to the generators of natural vitality in the mind and their important values. The timing of moving, perceiving and sustaining wellbeing in action is often unmeasurable by available tests of the changes in a brain in response to stimuli or that accompany purposeful action. Many parts deep in the human brain are not easily seen, especially when movement is rich and free, as in play. How an innate motive pulse with evaluations of beauty or goodness is felt and obeyed by a single self, and how it might become the synchrony of a moving performance by two or many is hard to measure with functional brain imaging. The richest information can only come from being a ‘participant observer’, and this is especially clear when it comes to any plan to know and appreciate young children’s play, which has more value and importance for human life and learning than objective assessments can appreciate.

Conclusion: the creative child vs politics of training

It is recognised by biologists that play has evolved both to supply energy and experience for development of an intelligent individual, and to promote sharing of wellbeing and skill in relationship to the environment. Young animals learn their place and how to cooperate in the family and the group in play. Children gain in strength, agility, awareness and self-regulation in play, and they acquire



rich experience of sociability and shared invention. These principles also apply to adults who hope their lives will be both strong and appreciated in any field. Einstein said his mathematical invention began playfully, in 'sensations of bodily movement'.

On the other side, the suffering and loss when there is no time or place for play in relationships and in the unmanufactured richness of nature certainly leads to weakness and humiliation, and may provoke self-abuse or aggression toward others. Jaak Panksepp, who is the leading authority on the neurobiology of play, is sure that attention deficit and hyperactivity in young children is a consequence of play

deprivation, and may be corrected by encouraging vigorous collaborative play, which releases hormones that benefit brain development and attachments. There are endless accounts of the benefits for mental health and intelligence of therapies that support play.

We must conclude that restricting opportunities and encouragement for young children to enjoy play that is active, artful and shared is a waste of human nature. The rich benefits for children, for families, for communities and for nations that have been achieved by programmes that have been inspired by belief in the natural vitality of learning in early years confirms this.

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