

NEUROLOGICAL SCIENCE AND CHILD EDUCATION

Dr. Renu Khamesra

MD (Medicine) DNBE (Neurology)

Consultant Neurophysician, Geetanjali Medical College and Hospital. Udaipur

Educational Neuroscience is a research discipline which explores the interactions between biological processes occurring mainly in the brain and education. Here education implies, but is not limited to, the formal steps of learning the languages and mathematics; it extends to the ability of individuals and their groups to study and extract useful information from the natural and social worlds around, assimilate the information coherently and lead to logical inferences. Neuroscience creates a new challenge for education because it provides new characterizations of the current state of the learner—including brain state, genetic state and hormonal state – that could be relevant to learning and teaching. It provides new measures of the effects of learning and teaching on brain structure and activity, making it possible to discriminate different types of learning method and attainment.



Brains of young people are built over time, starting at some antenatal period. The scaffolding is ready by birth. The architecture is built in bursts of sensitive phases, each

of which is associated with the formation of specific circuits associated with specific abilities. There are periods of intense activity and then there are periods of pruning and consolidation. The basic framework and circuitry thus laid is the basis for further up gradation and refinement. Individual development of increasingly complex skills relies on underlying network architecture. In this step-by-step process, early experiences shape lifelong learning, behaviour, physical, psychological, emotional, social and mental health. If the early years create a strong footing, the child grows into a well-adjusted, successful, happy adult- an asset to the society. Negative outcomes are indicated if the formative years yield a weak and shaky kid who may mature into a burdensome load.

Nature and nurture and the interaction between them design the brain hardware in the nursery. The important constituent is the bilateral involvement of children with parents and other caregivers. Genetics govern when and which brain circuitry is under formation while day-to-day sensory stimuli govern how it forms. The brain develops from a basic structure with simple networks related to basic abilities. With the passage of time, advanced networks related to complex abilities are built on the basic structure. This bottom-up approach leads to distinctive and highly individualized brain wiring schemes which in turn leads to distinctive and highly individualized set of skills, abilities and interests. Stable, responsive relationships and innate human aptitude for excellence then set the stage for moulding rewarding growth patterns.

The brain is an integrated organ. It has a large number of functions which are conducted in a coordinated seamless manner. Good emotional and social healths are essential for budding cognitive abilities of the brain. For instance, the skilful use of a language is learnt by hearing it, differentiating sounds, associating sounds to words onto their meanings, concentrating, paying attention and participating in meaningful mutual interactions. Prolonged disturbance and high levels of sustained negative stress, emotional or otherwise, damages the brain architecture leading to a lifetime of learning abnormalities. A difficult or troubled childhood invariably results in a difficult or troubled learning curve. The capacity of the brain to alter its networks decreases with

time and age. It is imperative that conducive learning conditions be devised so that the network is established right the first time.

“The child is the father of man,” said the wise poet William Wordsworth, summing up the essence of all educational science and psychology. The tomorrow of a society rests on its capacity to promote the holistic health of its today, embodied by the youngest of the young. Neonates, infants, babies, toddlers or kids: children of all ages grow up to become the ‘productive’ population in the years to come. How they are tended to during this period of growth determine how well they will ‘produce’ wealth, ideas and the next generation. Failure to invest in children creates a risk of a lifetime of poor productivity and irresponsible citizenship. The situation enters a vicious cycle when such people perpetuate mediocrity and poverty by further compromising on the care of their own children. Hence a strong foundation is essential in the formative years to enable cumulative upward mobility. Society in general should develop a culture of emphasizing proper care and nurture of its young people for a strong foundation.

Creating, sustaining and strengthening the foundation are the individual responsibility of parents or guardians and shared responsibility of the community. Both are important and a fine balance is set between them. Optimization of this balance provides the framework for development of a skilled workforce and healthy adult citizens ready to take on the challenges of life. Individual level care, protection and cultivation and promotion of welfare typically rest in the hands of women, generally mothers. It is their effort which drives and uplifts the fabric of society. American poet William Ross Wallace aptly summarizes the might of the child caregivers and the philosophy of educational paradigm.

Blessings on the hands of women! Angels guard its strength and grace.

In the palace, cottage, hovel, Oh, no matter where the place...

The hand that rocks the cradle Is the hand that rules the world.

Shared level fostering is provided at each interaction with other members of family, school and community to enhance the child’s personality and communication skill. Early

childhood development is key to progress and prosperity, since well developed children grow to become competent pillars of society.

The need of the hour is to address variations in opportunity and bridge the gap in facilities available to our children. In particular, stakeholders from economically, educationally and socially deprived sections of society are in urgent need of redressal. Remedial mechanisms may be needed for those who missed the bus and are more vulnerable to falling in the trap. Early intervention for such subjects generates the biggest payback. Neuroscience is able to provide conclusive evidence supporting the development of young brain to maximize its learning potential. Neural markers are used to assess milestones of neural activity so that late learners, atypical learners and slow learners can be given adequate support and additional care. The meritorious need attention to scale the heights, the mediocres need attention to fare better and improve their skill set, the mundane need attention to facilitate their return to the mainstream. Neuroscience educates the educators and caregivers so that they can handle each case accordingly.

