A Brief Note on

Foundation of Child Education: From Psychology to thenew ‘Mind, Brain and Education’ Science

This note is inthree parts. The first part describes how psychology as an educational foundationis changing and evolving, by taking a look at developmentsfromthe era of behaviourism upto the 1950’s. The secondpartoutlines how, in the second decade of the 21st century, psychology does not have monopoly as the only foundation of education.Instead,we will get introduced to the more comprehensive science of ‘Mind, Brain, and Education’ has become psychology’s expanded, converted form. The third part deals withthe field experiences and experimentationinthe education of Indian tribal children. I will share some strategies we have implemented, and solutions we have found to specific learning and educational issues, which are consistent with the recent research and advances in the field of neuro-education.

Part I:

Psychology has had a privilege to be the foundation of education for a long time.

Behaviourism in psychologyevolved as a reaction against introspection as a method of investigating mental events and processes, i.e. looking within oneself to assess one’s mental activity. Against this process of internal perception, some psychologists is of the dayclaimed that psychology should not attempt to understand hidden mental events, but rather should focus purely on the immediately observable stimuli, responses, and behaviours, thus they avoided a discussion of mental activity [1].Behaviourism played a great role as a philosophy, methodology and also a goal of education and research . Education was defined as ‘an expected change in behaviour (of student)’ and, as such, emphasized ‘change in behaviour’ as the goal of education.

While defining the term ‘Learning’, most behavioural psychologists agreed that it was a process of change that occured as a result of an individual’s experience. Though the term ‘process’ was considered as a vehicle for behaviour change, the thrust always remained on the ‘product of learning’ viz. the long-term changes in an individual’s behaviour that resulted from a learning experience.

This outword, observable behaviour was considered, and centrally placed even in the next generation sciences born out of psychology.

For example:

- Social Psychology aimed at providing with some perspectives whereby the student may develop better understanding of both the social environment and its relationship to him and his behaviour [2].
- Developmental Psychology attempts to construct a theoretical framework that can account for the observed behaviours as well as for the changes occurring throughout the life cycle [3].

- A science of Biological Psychology came forward to provide understanding of the bodily systems that underlie behaviour and experience. The biological bases of our experience and behaviour are the ways in which bodily states and processes produce and control behaviour and cognition [5].

During the years 1939-45 (of the second world war), continuing for some fifteen years afterwards, psychology became increasingly dissatisfied with behaviouristic approach as an answer to everything [4].

Part II :Towards new psychology

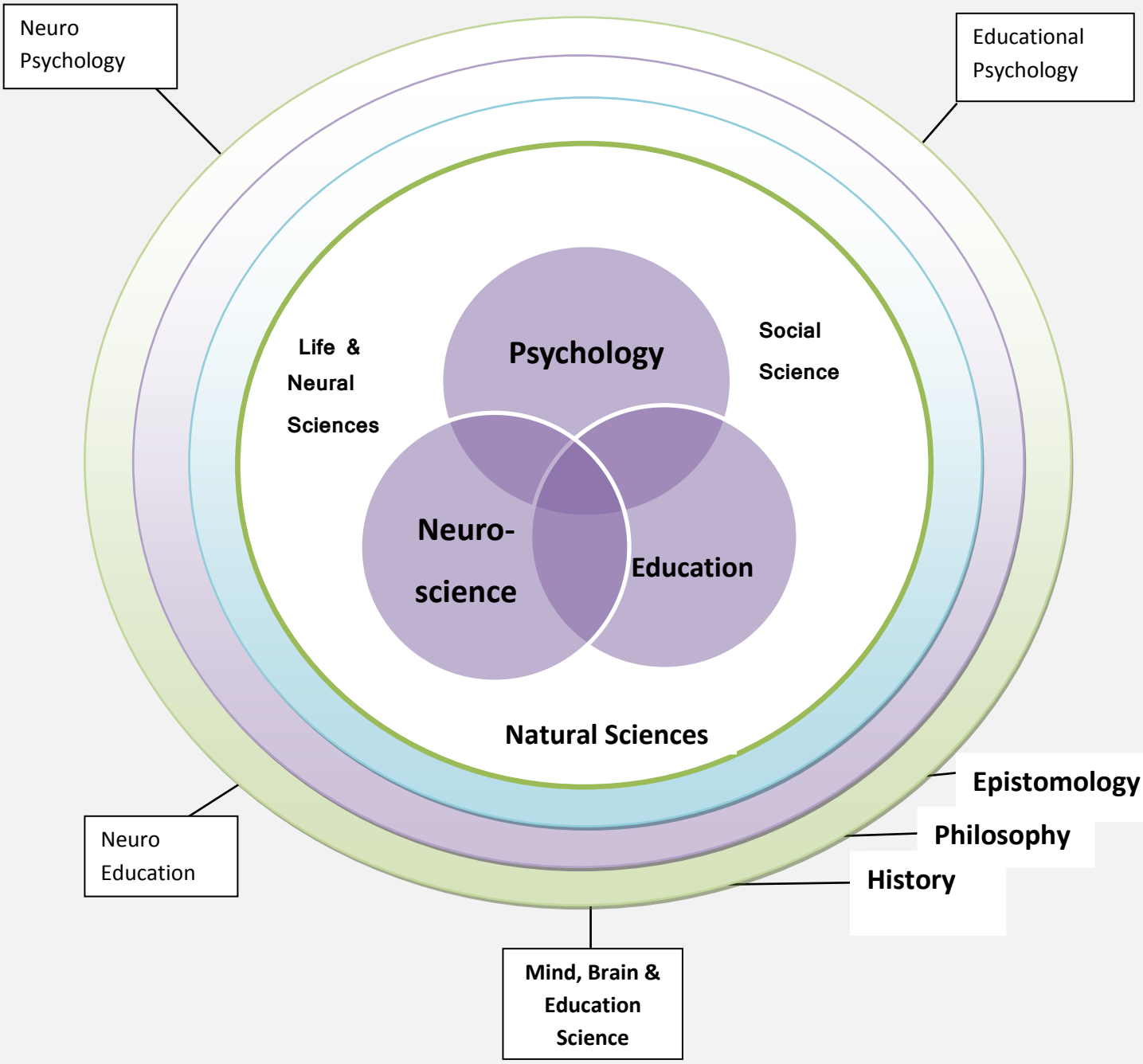
The 1960's saw a turning point in Psychology. It turned back to studying the mind, which led to the era of cognitive perspective in psychology. This perspective focused on how people think, understand and know about the world. The emphasis was now on learning how people comprehend and represent the outside world within themselves, and how our ways of thinking about the world influence our behaviour [6].

Dissatisfied with the rigid and narrow behaviourism, cognitive approach appeared on the scene of psychology, with a contention that mental processes do exist and can be studied scientifically. There is an especially distinguishing feature of the current cognitive science: The multidisciplinary study of cognition, which includes cognitive psychology, artificial intelligence and computer science, as well as the neurosciences [7]. Ample recent evidence is available on the neurological basis of cognition. Ashcraft has even called it 'neurocognition' [8].

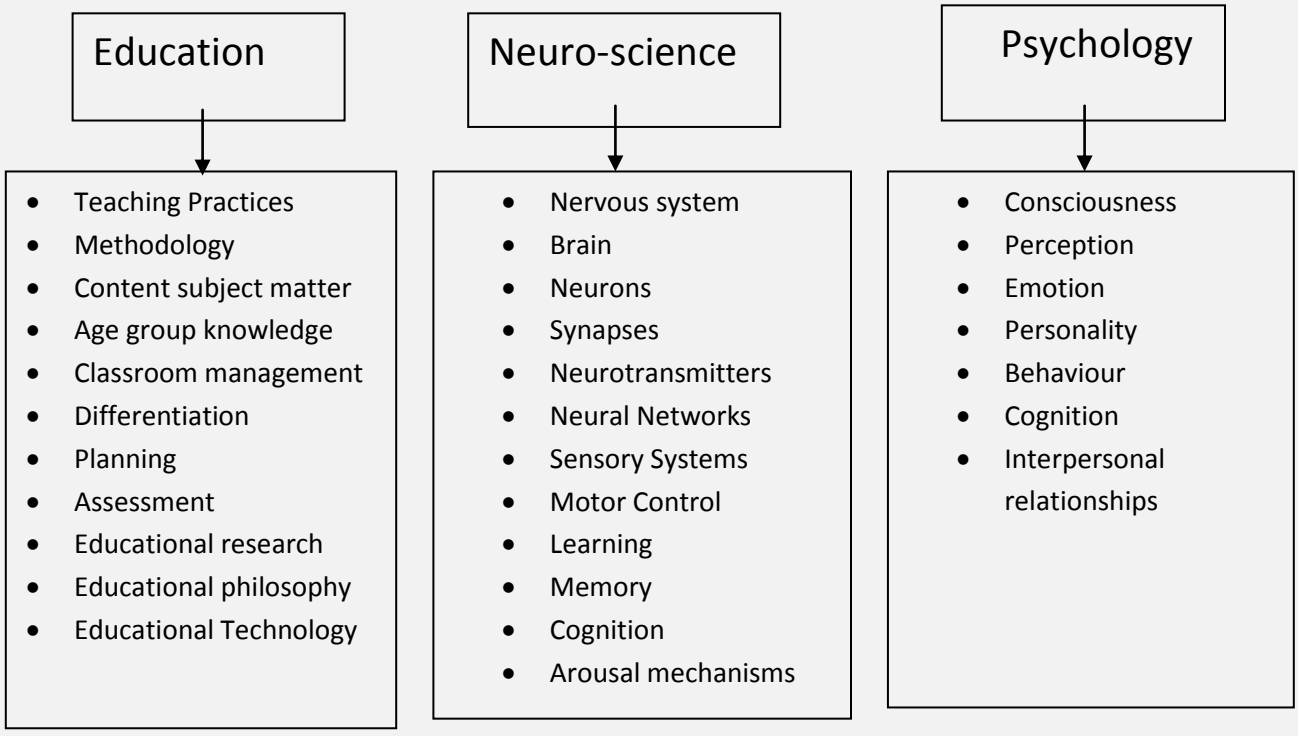
In the last quarter of the twentieth century, cognitive science changed the garb to be recognized as 'cognitive neuroscience'.This science studies learning and memory, as well as cognition and arousal mechanisms, which relate directly to developmental neuroscience, behaviourialneuroscience and, most importantly, cognitive neuroscience [9].

A new approach to education associated with the first decade of the twenty-first century, and nurtured by psychology and neuroscience is the multidisciplinary field known as 'Mind, Brain and Education (MBE) Science'.MBE science began as a cross-disciplinary venture between cognitive neuroscience and developmental psychology, but then it reached beyond these areas to integrate educational psychology and educational neuroscience [10].

In MBE, three disciplines inter-relate as shown in the following figure.



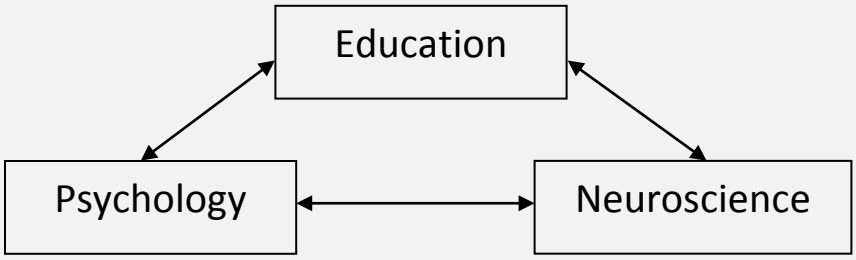
Going into further detail, the following are the subtopics of these three fields that are now studied in MBE science.



One MBE expert, Ms.TraceyTokuhama-Epsinosa, further explains the development of the MBE science as a trans-disciplinarysubject. In her words, “MBE Science is a cross-cultural entity. The discipline was conceptualized literally around the world at almost the same time in numerous countries. Between 2002 and 2009, countries as varied as Japan, the United States, Canada, Australia, Germany, Holland, the United Kingdom, Italy and France launched initiatives to promote the discipline” [11].

In 2000, the Neuroscience India Group was also founded with the mission to ‘empower through education’ by pursuing cutting-edge research on learning. The International collaboration implies that the developing standards for MBE are based on cross-cultural acceptance of certain norms and shared values.

The flow of information in MBE Science is shown below, which emphasizes the interdependency of the constituent sciences:



The five well-established concepts of MBE Science, as summarized by Tracey Tokuhama-Epsinosa,are as follows [12]

1. Human Brains are as unique as faces.
2. All brains are not equal because context and ability influence learning.
3. The brain is changed by experience.
4. The brain is highly plastic.
5. The brain connects new information to old.

All these concepts have evidence in neuroscience, psychology and educational settings, adding to theircredibility for use in planning, curriculum design, classroom methodology design and basic pedagogy.

Education is changing with changing needs of the students, in the changing world. The new MBE science focuses on understanding the natural processes of learners, and therefore is more relevant today than ever.

In the words of another MBE expert David Sousa, “We have come a longway since 2000, and the future looks promising. More teachers are now paying attention to this area. Teachers are, after all, ultimate ‘brain changers’. They are in a profession of changing the human brain every day. So as neuroscientists continue to discover the inner workings of the brain, as cognitive psychologists continue to look for explanations of learning behaviour, and as educators continue to apply research to improve their teaching, not only will this new field gain independence, but, most important, also greatly improve the quality and effectiveness of educational experiences for our children” [13].

Thisnew science is referred to by many different names, such as ‘brain-based education’, ‘educational neuroscience’, ‘educational psychology’, ‘cognitive neuropsychology’, ‘cognitive neuroscience’, ‘neuro-education’, and even ‘neuro-constructivism’. The decision to call this exciting new field, ‘Mind, Brain and Education Science’, came out of a consensus building activity by a panel of experts from the three parent fields back in 2008, and is now embraced by practitioners around the globe [14].

Principles of learning and that of teaching in the light of MBE Science have been elaborated by Ms. Tracey Tokuhama-Epsinosa in the conclusive part of her book‘Making Classrooms Better’ [15].They are worth considering by those involved in classroom education of any subject and atany level. These principles are as follows:

Principles of Learning:

- Learning is not necessarily an outcome of teaching.
- Student’s existing knowledge base influences their learning.
- Learning usually progresses from the concrete to the abstract.
- People learn most effectively through practice.
- Effective learning requires feedback.
- Expectation affects performance.

Principles of Teaching:

- Teachingshould be consistent with the nature of enquiry.
- Teaching should reflect values.
- All teaching should aim to counteract learning anxieties.
- Teaching should extend beyond the school.
- Teaching should take its own time.

Part III: Educational Experiences with Tribal Children

I have chosen to include here some problem-solving experiments conducted by 'Gram Mangal', a voluntary organization I co-founded more than thirty years ago, to work in thetribal belt of Thane district in Maharashtra. These are only representative examples. They are consistent with the research and advances in neuro-psychology, neuro-anthropology and neuro-linguistics, all now under the umbrella of MBE Science.

In the beginning of our work, we faced the perennial problem of children from these tribal homes not at all wanting to attend school. Attracting them to the school was the main challenge. In the past, schools and teachers had tried different strategies, but for the most part, success was elusive. At this juncture, neuro-psychology came to our help. Tribal children were happy wandering around and not sitting tight in closed-walledclassrooms. But when they were out and about, these children always seemed engaged in activities of their liking. Neuropsychology informs us thatachild always likes doing things, as it is the need of herdeveloping brain. Secondly, whenever a child is doing something, she is simultaneously learning, as the brain learns from every experience. Thirdly, wilful learning is joyful learning. Based on these principles, wemade our schools joyful activity centres! (This is a commonly heard and used term now, but we implemented it successfully more than two decades ago.) At all times, our students were involved in one or the other, specially designed and age-appropriate activity.This, thus, made the school a joyful place, where children started coming, because it satisfied their innate hunger to 'learn by doing'. This did not only attract them, but also helped retain them. Gradually, we developed a large set of activities, along with the necessary educational aids, for the initial subject learning. Eventually, we developed complete sets of activities and educational aids that cover all aspects of the pre-school and primary school curriculum. Grammangal was one of the first organizations to do this, and to use these techniques and material for underprivileged children in India.

The second example is more academic in nature. The tribal children found it very difficult to grasp and learn the Marathi alphabets, and therefore found it increasingly difficult to learn to read and write. Once again, the knowledge of brain sciencecame to help. It is now well-understood that the human brain always searches for 'meaning', and therefore understands and learns meaningful things faster and more easily. The conventional method for teaching language begins with teaching individual letters of the alphabet. However, these individualletters have no meaning. They have only two characteristics. First is the form, a sort of design; and

second, a sound, a phoneme imposed on that design. One can write the letter, one can read the letter, but onecannot derive any meaning out of that. Therefore, we have realized after years of experience in the field, that learning letters of the alphabet is one of the most boring pieces of learning a language in the conventional manner. Many times, the brain of a child simply refuses to cooperate this meaningless exercise. As a consequence, it takes a child much longer to learn and retain in memory, thereby delaying their language development substantially.

We quickly realized that word (and not a letter) is the smallest meaningful unit in any language. Why not start language learning with meaningful words, and not with the meaningless letters? Now the approach changed.

There is a great advantage in beginning language learning with words. Before entering the school, children typically already know a lot of words in their mother tongue (first language). They have already used these words many times in different contexts, such as in home, in the community,etc., and therefore have also acquired the meaning of those words. We learned tocommencetheir formal language learning by using those words that were already familiar in one way or another. Children understood their meanings right away. And through the process, they also effortlessly began to recognize, and then write, letters that composed those words. By using a laddering process, they were then introduced to more difficult and unfamiliar words, then sentences. In this way, the critical problem of introducing the first steps of reading and writing was successfully solved.

There was another, relatedchallenge waiting for us to deal with. Children coming to school from tribal homes, tribal villages and the tribal culture were found to have very limited vocabulary in Marathi language. There were two reasons for this 'language poverty'. One, they had their own dialect for daily communications, while the language in school had to be Marathi.Two, their surroundings and hence their life was much culturally diverse. In other words, they lacked the variety of exposure that other, more privileged children enjoy. In effect, they had very limited exposure to the Marathi language. Neuro-anthropologytells us that such limited exposures keep the vocabulary of words insufficient to acquire the information given through the school curriculum. It is said that, a child from a cultured progressive family in an urban area comes to school with a vocabulary of many thousands of words, while a childfromless privileged background such as the area we were working in, might only havea few hundreds of words to rely on. Considering its strong implication to learning all subjects, we had to plan special activities and design language experiences to improve the vocabulary of our students. Language-teaching essentially becameexperiential language-learning.(Many world-known institutions seem to have adopted similar approaches.)

In summary, MBE Science is a comprehensive, interdisciplinary and in some cases, a trans-disciplinary science. More importantly, it has many direct implications to classroom learning. The present need is that of combining the findings and translating them intosuch innovative teaching and learning practices. Also, while more schools and systems seem to be slowly but surely adopting these principles and practices, these are still very much in the minority. We need a concerted effort to derive all the benefits of from this new foundation of educational practice.This is where eminent psychology professionals such as youallcan help us practitioners.

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