

**ENHANCING THE UNDERLING SKILLS FOR LEARNING
SO IMPROVING MATHS AND LITERACY
IN PRIMARY SCHOOLS**

by Tamara Nathan & Myrom Kahaner



**The Minimum Input Maximum
Output Neurodevelopmental
Programme for Schools**



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Research has confirmed that in just 6 minutes a day following the unique combination of activities of the MiMo® Programme, maths, literacy and many developmental areas can be dramatically enhanced.

In 2007 England had plummeted from third to nineteenth in an international league table of children's literacy levels and 2018 saw a slide to 49th.

In 2017 The Department of Education statistics showed that just 61% of 11-year olds made the grade in reading, writing and maths national curriculum tests. **This means that 39% failed to meet the threshold across all three subjects and could now struggle when they move to secondary school.**

In October 2018 The Daily Mail reported that according to an Ofsted report *'Too many primary schools are failing to teach children how to read, write and spell properly....in tests this year, nearly a third of seven-year-olds failed to reach a good standard in reading and more than four in ten fell short in writing.'*

"Neuroplasticity is at the heart of what makes us human."

*Moheb Costandi, 2016
Molecular and developmental neurobiologist*

Neuroplasticity refers to the ability of the brain to reorganise itself, both physically and functionally, throughout life due to environment, behaviour, thinking, and emotions. While it is true that the brain is much more plastic during the early years and capacity declines with age, we know that our brains and nervous systems change continuously in response to our actions and experiences throughout our lifetime.

In children and adults, just as in the animal world, the nervous systems respond to repeated movement patterns and proper nutrition by altering their neuro-physiological responses, organising mental processing, and changing the very

structure of the brain. We rely on the fact that the nervous system is intended to adapt continually throughout the lifespan. Through the gentle enhancement of weak functions and providing proper nourishment to strengthen the nervous system, weak aspects of the nervous system can be permanently strengthened.

“Exercise is the single most powerful tool you have to optimise your brain function.”

Johan J. Ratey, M.D., 2009

Associate Clinical Professor of Psychiatry at Harvard Medical School

This concept underlies our programmes

Maslow's Hierarchy Of Needs



Maslow's hierarchy of needs is a motivational theory in psychology comprising a five-tier model of human needs with the more basic needs at the bottom. The needs lower down in the hierarchy must be satisfied before individuals can attend to needs higher up.

All aspects of our programmes are targeted to strengthen the physiological foundation (the base of the Hierarchy of Needs pyramid) in addition to full integration, so that the learning process is maximised.

The vestibular and proprioceptive systems, kinaesthetic memory and muscle tone are interlinked and interdependent. It is when all these physiological areas are in place that good cerebral interhemispheric integration occurs and so learning can become efficient.

The vestibular system functions to detect head motion and position relative to gravity and is primarily involved in the fine control of visual gaze, posture, the ability to maintain an upright standing posture, spatial orientation and navigation.

The full list of functions that are supported by the vestibular system is extremely diverse and expansive. It is an important contribution to the ability to 'sit still and concentrate', eye tracking for reading, phonological processing for spelling and cursive writing.

Kinaesthesia is the registration of the experience of the proprioceptive sensors; i.e. the awareness of the position and movement of the parts of the body by means of sensory receptors (proprioceptors) in the muscles, joints and surrounding tissues that signal information to the central nervous system about position and movement of body parts.

Kinaesthetic memory involves learning these positions and the sequence of shifts in these positions for rote, repeated movements. When we can rely on kinaesthetic memory to move through an activity we can focus our attention on other aspects of our environment or on other tasks simultaneously; for example, learning to drive versus driving skillfully.

Proprioception gives us information about our internal state, such as joint angle, muscle length, and muscular tension. It is the brain's unconscious sense of body-in-space; i.e. the ability to sense the position, location, orientation and movement of the body. It is a skill that is specifically necessary for writing and the ability to move around efficiently, and is the physiological foundation of math.

Muscle tone is the mechanical tension in the muscle, which ensures the balance of the body, the relative position of the body parts or the posture, and creates a pretension for muscular work. From birth muscle tone naturally builds up as a result of resistance to gravity. Strength in this area supports academic performance due to sustaining upright posture when writing, as well as sport

“The more active the baby is as he develops, the more developed the brain’s neural connections become. The level and amount of practice determines the strength and viability of these neural connections”.

*Dr Moshe Elbaum, 2009
Founder of Intelligence Integration*

The **body schema** refers to the acquisition of an internal awareness of the body and the relationship of body parts to one another. It involves aspects of both central and peripheral systems. Thus, a body schema can be considered the collection of processes that registers the posture of one's body parts in space. It is updated during body movement and is typically a non-conscious process that is used primarily for spatial organisation of action.

The brain’s **neural network** is an interconnected system of neurons in the brain in which many interconnected elements process information simultaneously, adapting and learning. It is the physical and biochemical connectivity between the various brain cells.

The development of new neurons and the growth of a more complex dendrite net that occurs in response to repeated stimuli is the reason why repeated practice increases the efficiency of such communication and so improves overall brain function.

As a consequence of the brain’s plasticity and the way the networks evolve, regular practise in the form of daily exercises is key to success.

The Programme MiMo®

MINIMUM INPUT - MAXIMUM OUTPUT

The programme consists of: 6 minutes of movement activities, drinking water using our sports bottle, and listening to classical music; all of which takes place in the classroom.

The activities, which the children copy from a video, are designed to address the skills loop (vestibular system, proprioception, muscle tone and kinaesthesia), interhemispheric integration and full body integration. It also calms down the mind and body after its exertion so that the children are ready for learning. The activities change each term as it builds up the complexity of input. The programme targets the various group muscles that have the highest level of concentrated nerve ends; i.e. hands, fingers, eyes and feet. This leads to neurological maturity as it develops the network in the brain and increases capacity to process.

Sports bottles filled with water are included for two reasons:

Hydration - Being dehydrated by just 2% impairs performance in tasks that require attention, concentration, psychomotor and immediate memory, working memory and recall.

Sucking - The sports bottle is designed to require a sucking motion in order to drink. The importance of sucking in human development is truly profound. Not only do we suck for nourishment, but also in sucking we do many other amazing things that build strength in our bodies! Judith Bluestone, founder of The HANDLE® Institute suggests that sucking can help improve many functions; interhemispheric integration, binocular functions, light and sound sensitivity, articulation and bowel and bladder control.

Music - There are many areas in the brain that are stimulated by music; e.g. the corpus callosum (which connects the two side of the brain), nucleus accumbens and amygdala (which is involved in the emotional reaction to music), prefrontal cortex (which controls behaviour, expression and decision making), auditory cortex (which listens to sounds perceives and analyses tones), and the hippocampus (which is involved in music memories, experiences and context).

Music stimulates the brain to produce certain neurotransmitters like serotonin, the 'feel good' chemical messenger that helps to reduce pain and increases the feelings of pleasure, and catecholamines, which are important for memory and learning.

Research and Results

MiMo® Programme

The purpose of the programme is to raise literacy and numeracy levels and with this a maturation of organisation, efficiency and physical confidence.

After 20 years of clinical experience and 10 years of research we have produced our first programme, MiMo® Programme Level 2, which targets forms 1,2 and 3 in Primary schools. It is designed to improve learning and behaviour in just 6 minutes of simple exercises a day by enhancing the underlying skills necessary for learning.

Academic Year 2016-2017

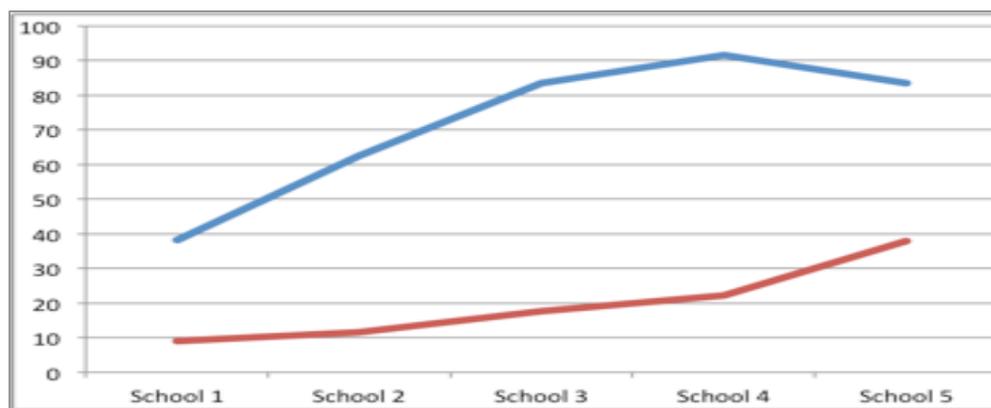
This year saw the first trial of our MiMo® Level 2 Programme. We worked with a mixture of schools, private and local authority, in and around London and one school in Slovenia.

The teachers were given pre and post forms, which asked for their subjective opinion of each child's level of concentration and focus, sequencing, multi-tasking, task completion, confidence independence, organisation, reading comprehension, social ability, interest in learning and class participation. The choice for each element was 1, 2, 3, 4, or 5. Five schools completed the information we required. The classes were from 2 local authority and 3 private schools, which gave us a total of 116 children.

The graph below shows an indication that, not only is there improvement above normal growth, but that improvement is related to the amount of input.

BLUE - Percentage Input

RED - Percentage improvement above normal growth

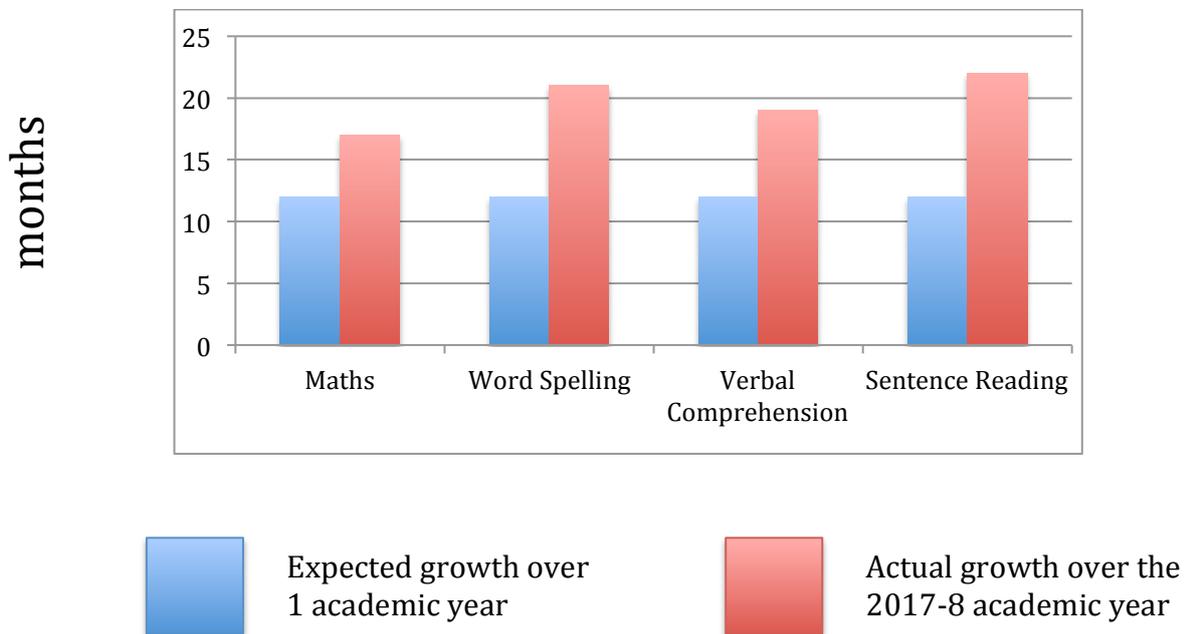


Academic Year 2017-2018

The focus of this research year was academic levels. Thus we had a mixture of 8 schools, both private and local authority, and classes ranging from year 1 to year 6.

All children were pre- and post-tested in class for maths and word spelling, and 10 children were taken from each class and tested for sentence reading and sentence verbal comprehension. At the end of the academic year we had the years 1,2 and 3 pre-tests and post-tests for 357 children for maths, 228 children for word spelling, 98 children for sentence reading and 77 children for verbal sentence comprehension.

The results show marked improvement for years 1,2 and 3; those school years that the programme specifically targets.



We have received many comments, examples of which are:

- We are big believers in the benefits of movement to enable access to learning and to enhance learning. Our view is that fine and gross motor skills should be worked on at an early stage. Time spent doing so will save a great deal of time and resources at a later stage and of course leads to pupils with greater self-esteem and academic confidence. We have been very excited to use the MiMo programme and we are continuing with the programme.*

Pascal Evans Headmaster, Hereward House School

- I am also glad that the programme has proven to be so successful - I have no doubts because we can see the effect on students "with naked eye" - the tests are only proving it.*
- Katja Kojnik - Senco IV. Osnovna sola, Slovenia.

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