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Revolutionary Learning Approaches are Dusted Off

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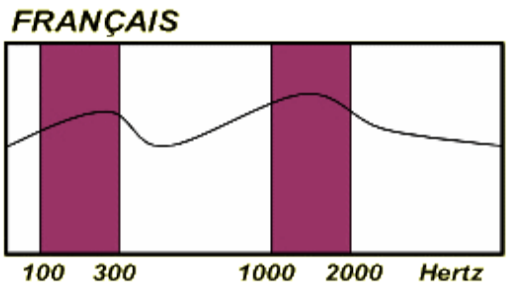
I. Introduction

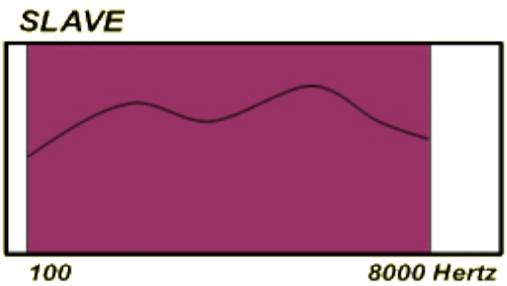
Neuroscience can help us a lot in our formative mission. We need learning approaches that take into account the interdependence between body and mind, the emotional and the cognitive. Revolutionary discoveries are dusted off and resuscitated.

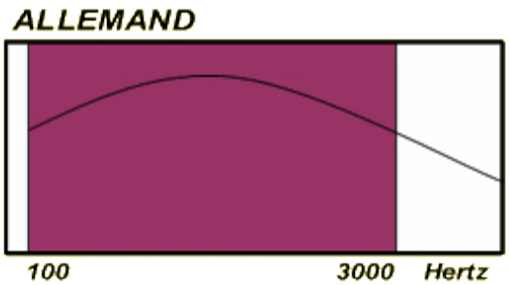
The methodology of teaching foreign languages is based on a wrong postulate, namely that everyone all over the world hears in the same way. But the voice reproduces only what the ear hears. Hearing well means analyzing sounds and recognizing rhythm and linguistic melody.

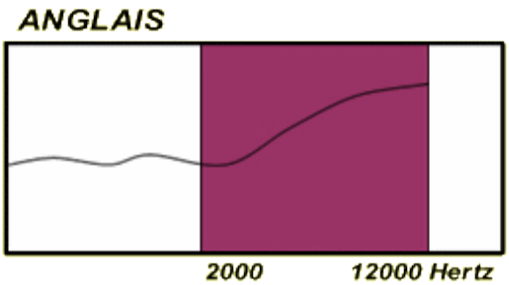
II. The Interdependence of Body and Mind

"Our ability to learn different languages depends on purely physiological factors." These are the words of Dr. Alfred Tomatis, otolaryngologist, recognized worldwide for his work on hearing-phonation and on the role of the ear in the function of learning. According to Dr. Tomatis, language is directly related to neurology and our ability to learn foreign languages is not related to the intellect, but to the physiology of our ear. Dr. Tomatis has unique system for treating dyslexia and teaching foreign languages. [11]









So, the wide open door to language is the ear, which plays a key role in language learning. Hearing includes an 11 octave sound spectrum from 16 Hrtz to 16000 Hrtz. Dr Alfred Tomatis went even further - he discovered that each language has its own particular frequencies. By using sonographers that are able to break down sound like the prism breaks down the light into a rainbow, he was able to establish specific profiles for each language, called 'ethnograms'. Every place in the world has its own acoustic resonances.

The specific listening curve of the French language is profiled in the form of two ranges with high points - one located at 250 Hrtz in the bass and the other between 1000 and 2000 Hrtz. The French find it hard to speak foreign languages because their language is rich in vowels whereas in most languages consonants are largely predominant. The ear of a Frenchman with a permeability of 1000 - 2000 Hrtz has

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difficulty learning English, which is in the diapason from 2000 to 12000 Hrtz. (4 octaves). The Spanish language is in the low waves between 100 and 500 Hrtz, Italian between 2000 and 4000 Hrtz and the range of German is very wide at 3000 Hrtz.

The Slavs have a very wide range of sound frequency (11 octaves) and have a wide open auditory diaphragm, thanks to which they are able to comprehend and reproduce the sound spectra of other languages. That explains the gift for languages possessed by the Slavic populations.

These discoveries are professor Tomatis's contribution to physiological linguistics, recognized by the French Academy of Sciences, and known as the 'Tomatis effect'. In 1957 he founded a new science: audio-psycho-phonology. With his unique method he treated children with difficulties in expression, reading, memorizing, learning foreign languages, suffering from a lack of concentration, stuttering, dyslexia and dysgraphia, even autism.

The second stage after listening is reading aloud, which is required by the *resonance* phenomenon of the word that sounds, penetrates the body and awakens the memory. The main mechanisms of mastering a language are acquired by giving the voice a certain intensity, which makes it possible to awaken the processes of its integration into the body. For Dr. Tomatis himself, Parisian French was like a foreign language, and he managed to overcome his southern accent by repeating sentences and words aloud in his bathroom or kitchen, and the acoustics of these tiled rooms managed to 'model' his ear.

'To hear' supposes a passive attitude towards the sound world which surrounds us. We receive sounds and record them without any interpretation by our psyche of the transmitted message. 'Listening' requires the subject's participation, the acceptance or refusal of messages reaching the ear, then the nervous system. After passing through the ear canal, information travels to the brain and passes through the thalamus which reflects the emotional state. It may block the passage of information. [11]

Our entire psychological past is important for the perception and acquisition of a language. If a young child is often exposed to loud noises, screams of parents arguing, high volume TV, the only way for him to save himself is to close his ears to this hostile world. According to Dr. Tomatis, he may remain closed to language, communication and social relations. At school, he may have problems learning languages and develop dyslexia. Professor Tomatis stresses the importance of family relaxed atmosphere. Dyslexia and dysgraphia are also explained by this different audibility of people. [3]

It is of great importance in school to work to overcome the blocks caused during childhood, to have classes in personal development, as working with psychologists will overcome the traumatic events of childhood and help the student to express his or her potential.

Especially important for educational purposes is the analysis of fear and stress, which shows how they, for instance, reduce analytical capacity, and vice versa how positive emotions open doors within the brain. [1]

III. The Immense Role of the Rapport Teacher - Student

"Two interlocutors face to face are like two pianos, installed in the same room; if you press the pedals of the first, the second immediately starts to vibrate." According to Helmholtz's law (the law of resonance), if we lift the piano lid and sing the tone *la* against the strings, for example, although the air strings of the tone touch all the piano strings, only the piano strings of tone *la* will vibrate. [10] This resonance illustrates the discovery in 1996 by Giacomo Rizzolati, a neurologist at the University of Parma, of mirror neurons. The theory of mirror neurons could be the origin of a major scientific revolution. The different brain areas activated by these mirror neurons enable us to grasp the intention by contextualizing the action. Beyond gestural intention, mirror neurons enable us to discern thought from action. [1]. When we see others performing an action, our mirror neurons are activated and we feel as if we were performing the action or having this feeling. This means that empathy also has its correlates in the brain. [12]

The mirror neurons prove the great importance of what the teacher feels and radiates. If the teacher loves the subject he teaches, it is passed on to the students. If the teacher believes in the abilities of his students and respects them, they are calm and trust him, which creates an atmosphere for easy assimilation of the information. Learners unconsciously imitate everything they see, hear and feel.

'Social contagion' is based on the system of mirror neurons in the brain, in which people accept the emotional state of others. [9] The teachers need to show confidence in students' abilities. Their confidence and enthusiasm in teaching their subject will be 'contagious'.

The empathy of the teacher is expressed in the ease and naturalness of communication, very close to normal communication. There is no dominant edifying error correction which would lead to blocks and stress for the learner. The teacher only repeats correctly, most often in another context, the wrongly pronounced word or grammatically incorrect sentence, and in a natural tone.

If the teacher's smile is fake, it will be felt because serenity and goodwill cannot be imitated. The zygomatic muscles ('zigomaticus') which act in the smile are under a double control: conscious and unconscious. The orbicularis muscles ("orbicularis") –

the muscles by the eyes, are only under unconscious control and cannot be activated by force of will to imitate a sincere smile. [6] We can smile with our lips but the eyes betray us.

These are the suggestive signals, called 'weak signals' by Professor Georgui Lozanov, a Bulgarian physiologist and neuropsychologist. These signals betray the real feelings that the interlocutor is not able to hide.

When there is a contradiction between what we hear and what the body says, the neural circuit that is formed is the same as in case of a threat. On a deeper level, we have felt insincerity.

"People can't think creatively, they can't work with others when neural pathways are activated in their brains, processing the "threat signal". ... A neural response of the 'threat' type is caused by any lack of emotional spontaneity, by any attempt of the interlocutor to cover up what he feels." [7]

The atmosphere of security and confidence creates a receptive mental disposition in the student which will call upon the untapped reserves of the brain. The didactic approach must take into account the very close links between the emotional and cognitive aspect of the student. Good memorization depends on our emotions. As a neurologist and psychologist, Professor Gueorgui Lozanov has carried out very extensive research on how the brain works during the learning. In the 80s, he gave the world a new learning approach – 'suggestopedia'. His pioneering work raises awareness of the importance of the emotional dimension. The American educator Carl Rogers agrees with the opinion of the Bulgarian suggestologist. A relationship of trust and mutual respect must be established, which requires from the teacher theoretical knowledge in psychology but also the possibility of establishing and maintaining positive contact. [8] Dr Lozanov call the opposite of authority the process of 'infantilization', spontaneity and enthusiasm. In the suggestipedic language course each student chose a new name and a new life story. This approach liberates the students from their normal roles and permits a more spontaneous expression. [6]

In the brain, the amygdala is a very important element whose role is to regulate emotions. It has the shape of a small almond (*amygdalum* in Latin and *amadula* in lower Latin) located in the center of the brain. Along with the hypothalamus, the amygdala is the main source of chemicals in the brain which controls several hormones. Experiences show that our emotionally charged experiences stimulate the hormonal system and the brain and help to affirm memories.

The interdependence between our cognitive abilities and our emotions has already been scientifically proven in the book *Emotional brain* by Joseph Ledoux, a famous neuroscientist at the Center for Neural Research at New Work University. With his research he unequivocally proved that the connections between emotional brain centers (amydgala) and the cognitive system (neocortex) are strong and any emotion like threats, anxiety and fear can generate a kind of static tension and sabotage the prefrontal lobe's efforts to maintain working memory. [5]

The teaching approach that Georgui Lozanov proposes is a communicative method that awakens and releases the potential 'hidden' reserves of our brain by calling on all types of intelligence: the seven types of intelligence are stimulated according to Gardner's theory of 1985: linguistic, logical-mathematical, visual-spatial, body-kinetic, musical, interpersonal (the ability to understand the expectations, motivations and desires of other people) and intrapersonal (the ability to understand oneself and one's own feelings and motivation). [4] In traditional training the linguistic and logical-mathematical types are most commonly used.

IV. The Use of Music in Learning

The music can be used as an aid to learning. A study conducted at the University of Edinburgh by Karen Ludke shows that singing increases the capacity of memory. He experimented with participants who listened to a series of words, then repeated them for 15 minutes - some by reciting them in the traditional way, others by singing. They were then subjected to a test to note the words that were retained. The adults who chose to sing, remembered twice as many words as their peers – are result that also applies in the long term.

Research with stroke victims indicates that songs actually bridge the hemispheres – the right hemisphere learn the melody while the left learns the words. Therapists find that some patients who have lost the ability to talk can learn to speak and remember simple phrases when the phrases are set to musical fragments.[2]

Music influences the brain's ability to learn. It leads to a widening of the cortical areas devoted to hearing and movement. Certain musical works have a relaxing, regenerating power and can help with concentration and improve performance and abilities. The 'Mozart effect' is also used by Dr. Alfred Tomatis, and through Mozart's music and special sound filtering he trains and strengthens the ear muscles and thus helps to learn languages faster, improve performance, treat dyslexia, autism and even problems in motility. [10] The violin is the musical instrument with the most high frequencies. The high frequencies bring about a state of relaxation and stimulate the cortex.

In addition to singing suggestopedia uses background music to facilitate and accelerate the learning of foreign languages. Hypermnesia can be achieved in states of concentrative pseudo-passiveness with an increased alpha rhytm.

Neuroscience is really opening up new trails for improving education. In the cognitive domain all

questions refer to the functioning of the brain. Anything is possible if we believe in the unlimited capacities of the human brain and overcome the barriers that come from our psychological blocks, preconceived ideas, conditioning and limitations of societal norms.

The good news is that neuroscientists have clearly shown that the brain displays plasticity as a result of the creation and strengthening of neural connections throughout life. Emotions 'sculpt' the neural tissue. It is clear how important it is to adopt a holistic approach, which takes into account the close links between physical and intellectual well-being, emotional and cognitive aspects, the analytical mind and creative capacities. This learning contributes to the personal growth of the student.

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