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**UPDATING THE SCHOOL: NEURODIDACTICS  
IN FOREIGN LANGUAGE TEACHING**

**SUMMARY**

Neurodidactics or brain-based learning, a relatively new interdisciplinary science, constitutes an interface between didactics, neuroscience, pedagogy and psychology. Based on the latest findings of brain research, it provides principles and suggestions for effective brain-based learning and teaching. This paper entitled "Updating the school: neurodidactics in foreign language teaching" describes the principles of neurodidactics or brain-based learning with reference to foreign language teaching. It presents the basics of neurodidactics and brain-based teaching and the way it affects learning and memory. With this in mind, some brain-based ideas and approaches for the foreign language classroom are explained which may help to find a better and more effective way of foreign language learning and teaching.

**Key words:** neurodidactics, brain-based learning, foreign language teaching, multitasking, webquest, the Moodle platform

**STRESZCZENIE**

**Aktualizacja szkoły: neurodydaktyka w nauczaniu języków obcych**

Neurodydaktyka lub nauczanie/uczenie się przyjazne mózgowi to stosunkowo nowa nauka interdyscyplinarna, która sytuuje się pomiędzy dydaktyką, neurologią, pedagogiką i psychologią. Artykuł zatytułowany „Aktualizacja szkoły: neurodydaktyka w nauczaniu

języków obcych” opisuje działanie neurodydaktyki w odniesieniu do nauczania języków obcych. Przedstawia najważniejsze zasady neurodydaktyki, nauczania/uczenia się przyjaznego mózgowi i pamięci. Ponadto prezentuje wybrane techniki, które mogą być z powodzeniem użyte podczas lekcji języka obcego w szkole. Mogą one pomóc w znalezieniu lepszego i bardziej skutecznego sposobu uczenia się i nauczania języków obcych.

**Słowa kluczowe:** neurodydaktyka, nauczanie/uczenie się przyjazne mózgowi, nauczanie języków obcych, multitasking, platforma Moodle

*How can you prepare students for the future  
if you are stuck in the past?*

Robert Murdoch

*Those who know, do. Those that understand,  
teach.*

Aristotle

*I never teach my pupils,  
I only attempt to provide the conditions  
in which they can learn.*

Albert Einstein

Although the history of foreign language teaching methodology is relatively short, it is quite stormy and full of dramatic turns of action and bold ideas. It may seem everything has already been said and tested including behaviorism, cognitivism, language acquisition device, error analysis, humanistic approach, and even hypnose, just to mention a few, to offer the best tool of mastering foreign languages. Nonetheless, the reality is far from ideal. According to the European Survey on Language Competences, Polish primary school pupils have a poor knowledge of English. After six years of learning a foreign language in primary school every fourth pupil has no basics of English, a compulsory subject in each school<sup>1</sup>. This shocking fact should definitely result in a critical debate about the nature of modern schooling and serious conclusions should be drawn to re-think the foundation of the institution whose basic task is to prepare children to become full members of society in the era of globalisation with English being one of the most popular languages of communication.

Poor performance of primary school pupils during their English exam is just part of the iceberg, revealing Polish school's failure. Other European countries face a similar situation, which has resulted in a worldwide debate with more and more

<sup>1</sup> M. Żylińska, *Neurodydaktyka. Nauczanie i uczenie się przyjazne mózgowi*, Toruń 2013, s. 97-103.

educators pointing out the need to update the institution of school in its present form<sup>2</sup>. Indeed, modern pupils are different from those of the previous century. Their world is highly “digital” – computers, iphones and ipods are an essential part of their life. Young people are used to a great speed of life and multitasking has become their lifestyle – watching TV is combined with texting, surfing the Internet or doing homework. These “digital” individuals go to a traditional school which much too often has not changed for centuries and they are taught by teachers who use traditional methods of teaching. Marc Prensky introduced the concept of “digital immigrants” – individuals born before the appearance of digital technology. He juxtaposes “digital natives” who were born after the digital explosion (today’s students) to digital immigrants (yesterday’s teachers) claiming that the two sides are opposite in terms of thinking. Therefore, digital immigrants cannot effectively reach digital natives because they think differently and even use different languages. Moreover, Prensky argues that digital immigrants should learn the learning preferences of digital natives, such as teamwork, flexibility in the learning environment, and respect for student voices<sup>3</sup>.

Digital natives taught in a traditional way get bored easily and traditional lessons do not result in the desired outcomes. Therefore, teachers should prepare lessons based on active methods and techniques<sup>4</sup>. Materials for digital natives should be designed accordingly. Traditional coursebooks are designed to enhance linear information digestion, reducing the student’s being active. As a result, Marc Prensky postulates changes in the education system with regards to school materials. The coursebook writers should consider the way digital natives learn allowing them to decode and encode information in the way they do it in everyday life instead of giving them tasks based on testing, reception and reproduction<sup>5</sup>.

Prensky’s voice echoes the questions asked by neuroscientists in the debate regarding the role of modern school. Are the hard skills evaluated by school tests the main and only criteria of the successful student? What about the soft skills necessary to be able to survive in the globalisation times and business culture? According to neuroscientists, the modern school in its present form does not support the student’s natural process of learning and is not a friendly place for the individual growth of the person. What is more, in their opinion, the modern school is based on our assumption of what the school should be. As a result, the institution of school should be redefined and designed from scratch going away

<sup>2</sup> Ibidem.

<sup>3</sup> M. Prensky, *Digital Natives, Digital Immigrants*, 2001, s. 1-6, [online], <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>

<sup>4</sup> M. Żylińska, *Neurodydaktyka. Nauczanie i uczenie się...*, op. cit., s. 188-189.

<sup>5</sup> Ibidem.

from the evaluation model of teaching through constant testing towards creative teaching based on individual approach and flexible learning environment.

Neurodidactics or brain-based learning seems to offer a perfect remedy for this impasse. Neurodidactics or brain-based learning is a term combining “neuro” and “didactics”, which emphasises the interdisciplinary nature of the science. It aims at “integrating findings of neuroscience and brain research in didactics [and] tries to work out principles and proposals for effective teaching and learning (...)”<sup>6</sup>.

Thanks to neuroscience tools, such as fMRI (Functional Magnetic Resonance Imaging) and PET (Positron Electron Tomography) we have gained a new insight into the nature and principles of the brain development process. This allows to draw critical conclusions as to the effectiveness of teaching and learning. In fact, many of the research findings are not new, corresponding with the main assumptions of Maria Montessori’s principles “Help me to do it myself!” or “The teacher has to be passive so that the student can be active”.

Marzena Żylińska, a famous Polish researcher in the field of brain-based learning, has put the main neurodidactics principles in her book entitled “Neurodydaktyka. Nauczanie i uczenie się przyjazne mózgowi”<sup>7</sup>. The author gives suggestions how to put the knowledge proposed by neurologists and neuropsychologists into school practice. She describes school system errors that block the individual development of the child instead of supporting it. The most serious errors include:

1. Disregarding the principles according to which the brain absorbs information – there is evidence that the brain effectively absorbs information when it is indirectly associated with the production of “pleasure hormones” and this process requires individual discovery of the child and activities associated with fun;
2. Disregarding the principle according to which the brain contains only those neural connections which are needed. This means that the knowledge that the brain finds unnecessary will not be absorbed;
3. Avoiding opportunities to develop interpersonal skills of the child. School age children are particularly “susceptible” to acquire social and interpersonal skills, mainly through play;
4. Teachers are not aware of the fact that the brain is greatly stimulated by art and music;

<sup>6</sup> B. Sabitzer, *Neurodidactics: Brain-based ideas for ICT and Computer Science Education*, “The International Journal of Learning” 2011, Volume 18, Issue 2, s. 167, [online] [http://www.academia.edu/4370959/Neurodidactics\\_Brain-based\\_Ideas\\_for\\_ICT\\_and\\_Computer](http://www.academia.edu/4370959/Neurodidactics_Brain-based_Ideas_for_ICT_and_Computer)

<sup>7</sup> M. Żylińska, *Neurodydaktyka. Nauczanie i uczenie się...*, op. cit.

5. Frequently teaching takes place for the sake of testing, which means that students are not taught to think; they are expected to reproduce the given knowledge in a fragmentary and chaotic way, which does not support their understanding of the real world;
6. Students are often “labelled” and “patterned”, which blocks their potential and discourages effective learning;
7. Ignoring students’ “emotional” factor enhancing effective learning;
8. TV and modern technologies abuse while working with primary school children<sup>8</sup>.

As can be seen, brain-based learning can deliver valuable information on what the education process should look like. What is more, neurodidactics can successfully be applied in the field of foreign language teaching methodology. This brings good news since foreign language classrooms are often the place where students are expected to memorise words by heart and be able to use grammar rules in context. The primary aim of the teacher is to prepare the students to pass a final exam. Little real communication takes place<sup>9</sup>. Judi Lombardi in her article “Practical ways brain-based research applies to ESL learners” claims that teachers who want to “update, refresh and rejuvenate” their teaching practice should apply neurodidactics<sup>10</sup>. 12 principles given by researchers Renate Caine and Geoffrey Caine in their book “Making connections: teaching and the human brain” should become the foundation of the highest quality foreign language teaching and learning<sup>11</sup>:

**Principle 1:**

*The brain is a complex adaptive system.* It functions on many levels and in many ways simultaneously. Therefore, a perfect task for foreign language students is the one involving all the senses and aimed at different learning profiles.

**Principle 2:**

*The brain is social.* Nobody is an island and the brain eagerly responds to social engagement. The implication for foreign language teachers is clear – cooperative learning based on structuring the task, assigning roles and teams, taking the initiative and learning to function within a group should become the landmark of effective foreign language teaching.

<sup>8</sup> Ibidem, s. 227-277.

<sup>9</sup> Zob. M. Badecka-Kozikowska, *Siedem grzechów głównych nauczycieli języków obcych (oraz jak je przekuć w metodyczne cnoty)*, Warszawa 2008.

<sup>10</sup> J. Lombardi, *Practical ways Brain-based research applies to ESL learners*, “The Internet TESL Journal” 2004, Vol. X, No. 8, [online], <http://iteslj.org/Articles/Lombardi-BrainResearch.html>

<sup>11</sup> R. Caine, G. Caine, *Making connections: teaching and the human brain*, New York 2014, s. 79-88, [online], <http://files.eric.ed.gov/fulltext/ED335141.pdf>

**Principle 3:**

*The search for meaning is innate.* The brain likes to know the purpose of the task – *Why am I doing this? What is the purpose of the task? Is it meaningful?* Thus, teachers should explain the purpose of the task so that the students can see it in a broader context and from a wider perspective.

**Principle 4:**

*The search for meaning occurs through patterning.* When the brain encounters a new idea, it searches for prior knowledge and experiences similar to the new concept. Effective foreign language teachers use prediction strategies and introduce vocabulary to prepare the students' brain for the new knowledge to come.

**Principle 5:**

*Emotions are critical to patterning.* Simply saying, optimists and people with well-developed interpersonal skills get better results. Reducing the stress level and creating a safe and friendly classroom environment will result in better outcomes when it comes to foreign language teaching.

**Principle 6:**

*Every brain simultaneously perceives and creates parts and wholes.* Left-part brain research explains the ways the brain divides learning tasks between verbal and visual, analytical and global and creative. Successful foreign language teaching creates tasks which engage both hemispheres – left and right – to enhance the learning process.

**Principle 7:**

*Learning involves both focused attention and peripheral perception.* In everyday life we get information not only through direct channels but also by paying attention to nuances, such as body language, speech tones, intonation, etc.

**Principle 8:**

*Learning always involves both conscious and unconscious processes.* Much of what is learned lies beneath the surface. Students should relate the knowledge they receive with what they already know by making analogies, reflection and metacognition.

**Principle 9:**

*We have at least two ways of organising memory.* Teachers should organize activities so that the new material can easily pass from short-term memory into long-term memory. This could be done by organizing activities into meaningful parts, placing ideas into context and infusing a range of learning styles and a combination of multiple intelligences into classroom practice.

**Principle 10:**

*Learning is developmental.* Learning something new helps the brain to grow by building new, neural pathways and connections. Effective teachers bear this in mind by applying the new strategies, eg. modalities of learning.

**Principle 11:**

*Complex learning is enhanced by challenge and inhibited by threat.* Successful foreign language teachers create a friendly atmosphere in the classroom by showing respect to their students and challenging and motivating them to work hard.

**Principle 12:**

*Every brain is uniquely organized.* Every student is different, bringing a different collection of talents, skills and fears. A good teacher can recognize the strong sides of each student and work on them accordingly to motivate and assist the student towards success<sup>12</sup>.

The above principles may be put into practice with the use of webquest – “an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet, optionally supplemented with videoconferencing”<sup>13</sup>. Students get a well-formulated task but it is up to them how they are going to solve the task, they should decide themselves which methods and tools to use to solve it. What really matters is the final result which is subject to evaluation. Below is a sample procedure of the webquest application<sup>14</sup>:

Stage	Effects of learning
Webquest is presented to the students.	Necessary language and structures are learned
Students meet and assign roles.	Cooperative work, task assignment, social interaction, motivation
Students seek information (individually or in groups).	Passive and active learning structure and vocabulary learning, negotiation and support (through cooperation) professional development
Students meet to propose the procedure.	Students exchange information, social interaction, passive and active reading, structure and vocabulary learning, output after learning
The group produces a report.	Students exchange information, social interaction, passive and active reading, structure and vocabulary learning, output after learning
A presentation is given to the rest of the class.	Students exchange information, social interaction, passive and active reading, structure and vocabulary learning, output after learning

Source: based on Jesus Garcia Laborda, Using webquests for oral communication in English as a foreign language for Tourism Studies, “Educational Technology and Society” 2009, 12 (1).

<sup>12</sup> Ibidem.

<sup>13</sup> [http://webquest.sdsu.edu/about\\_webquests.html](http://webquest.sdsu.edu/about_webquests.html)

<sup>14</sup> J. G. Laborda, *Using webquests for oral communication in english as a foreign language for Tourism Studies*, “Educational Technology and Society” 2009, 12 (1), s. 258-270.

As can be seen, webquests encourage students to learn to cooperate, negotiate and take the initiative. What is more, students get to know their personal preferences and styles of learning, which is a highly valuable skill.

Another solution to be implemented during foreign language lessons is the use of YouTube and the Moodle platform. YouTube can be a great source of ideas for the foreign language classroom. It offers songs, sitcoms, speeches and even grammar lessons to be developed into up-to-date classroom materials to practise both receptive and productive skills. The Moodle platform is another tool which has been gaining popularity among foreign language teachers. The platform allows students to do some guided tasks in the form of resources, quizzes, or assignments. Their efforts are constantly guided and monitored by the teacher. Thus the Moodle lessons activate students by providing instruction, reference and guided practice (supported by feedback) and extra ideas in the form of successive HTML pages. What is important is that each step the student takes should be monitored by the teacher and each portion of knowledge he learns should be consolidated before the student is admitted to another one. Moodle lessons are followed by quizzes which show the students' progress.

To sum up, today's school should be different from what it used to be several decades ago. Students have little patience with long lectures conducted in a traditional way with the teacher reading the notes and the students taking them. A lack of dialogue between teachers and students is another obstacle to achieve success in the modern school. All teachers should realize the need to update their way of teaching. From the teacher's perspective it is essential to remember that the brain is "sculpted" by being active and challenged. When overused, every apparent "facilitation" as a calculator, ready-given notes, scripts or dictionaries can certainly slow down the process of learning instead of helping it. The brain is generated to make new connections by discovery and challenge. Paradoxically, the role of the teacher is not to "transmit" information, but help students first find information and then select the most essential bits of it. For the teacher this means giving up being "omniscient", which, in turn, could represent a real challenge. The second element which must not be forgotten is the emotional aspect in the education process. "Emotional" information is much better assimilated. Hence the conclusion that good relationship in the classroom is a highly beneficial factor. This information is especially valuable for university lecturers who frequently prefer a "serious" approach based on the "appropriate" distance (expressed even in the manner of address), and a lack of the friendly lecturer - student relationship may be observed.

Another important aspect worth mentioning is technological advance and the need for the students' development of the media competence. Modern teachers should realize that because of the progressive digitization of the brains of



their students makes them perform differently. On the one hand, school should prepare young people to steadily increase their digital competence. On the other hand, educators should encourage youngsters to establish “real” relationships in the “real” world. The modern teacher should be ready to react against students’ different autism spectrum disorders, lack of patience, constant asking for the answer “at once”, the inability to effectively find and select information, and the overuse of the “copy – paste” skill.

The basic knowledge of neurodidactics will certainly enhance the quality of teaching as well as encourage both teachers and students to experiment with brain-based learning. Neurodidactics applied in foreign language teaching will certainly invite students into excitement of learning through strategies that reveal the amazing power of the brain and the hidden energy of the human spirit.

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