

THE IMPORTANCE OF READING, WRITING AND MATHEMATICS IN THE DEVELOPMENT OF COMPLEX COMPETENCIES

MIGUEL ANGEL MONTES MONTAÑO. Mathematician - Superior School of Physics and Mathematics - Polytechnic Institute in Mexico. Specialist in Pedagogy for Autonomous Learning of UNAD a Master in Education - Emphasis in Mathematics - Universidad del Norte. E-mail: icaroulises@yahoo.es. Teacher

Summary. This paper focuses on the development of complex competencies in students through the articulation of coding and decoding processes of linguistic meanings in reading, writing and mathematics. The articulation of these three areas of knowledge requires coordinating a variety of mental abilities found in the right and left hemispheres of the brain in support of the formation of integrated thinking in the student.

Equally, it is understood in this text that the acquisition of knowledge and the development of thinking abilities are fundamental elements in the development of one's cognitive, evaluative and procedural competencies. Furthermore, the development of complex competencies through the relationship of these three areas of knowledge allows the formation of discerning professionals in their environment with highly developed abstract intellectual capacities that allow them to face uncertainty in the midst of complexity. U had this as one sentence!! Check against the below please.

De igual manera, en este texto se entiende que la adquisición de conocimiento y el desarrollo de habilidades de pensamiento son elementos fundamentales en la persona para desarrollar competencias cognitivas, valorativas y procedimentales, por lo que el desarrollo de competencias complejas a través de la relación de éstos tres conocimientos, permite formar profesionales críticos de su entorno y de sí mismos, con altas capacidades intelectuales abstractas que le permiten afrontar los problemas inciertos dados en el paradigma de la complejidad.

Key Vocabulary: Complex competencies, writing, formation, thinking abilities, reading and mathematics.

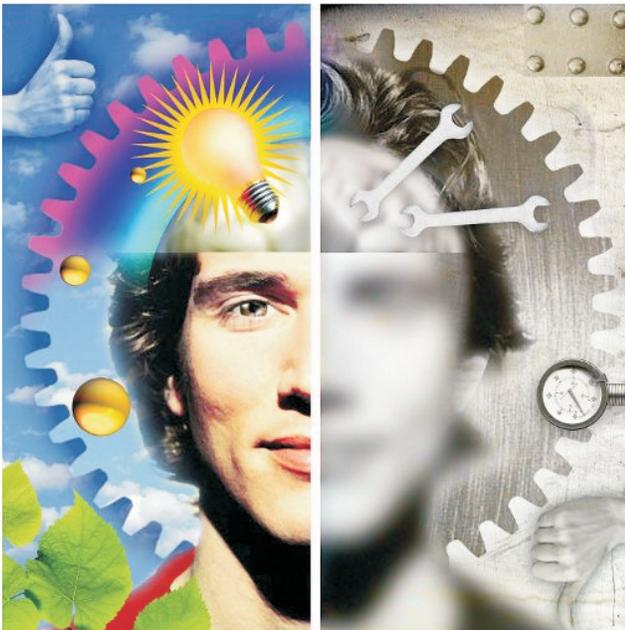
The question of competencies dates back to ancient Greece. The Greeks, as skilled thinkers and scientists, began to question themselves about the intellectual capacity of

man. They were the first to reflect on these attributes and their impact on the environment. A group of wise men dedicated themselves to the study of the intellectual development of



man. Among them were Protagoras and Platon, known today for the depth of their analysis regarding the intellectual capacities of the human being.

The first one claims that man is the measure of all things—the being that regulates, forms and transforms his environment from his praxis. The second one holds that ignorance is a disease that impedes the development of rationality or the intellect. It is only reached through permanent reflection and its application to the solution of real problems. In other words, the development of mankind's intellectual capacities is a permanent struggle in the quest to understand his state as a rational being.



Platon expresses the problem of knowledge metaphorically as a source of intellectual illumination and, “compares our nature related to education and

ignorance...”(Platon: 2005;445) In this metaphor, the Greek philosopher explains the manner in which man frees himself of ignorance through knowledge in order to seek the truth. In current times we would say that there is a search for permanent knowledge which allows man to clearly understand the problems he studies. From these ideas one can understand the importance that knowledge plays in the life of the human being as the principal character in the formation and transformation of his own knowledge, his environment, and the desire to enrich his culture in every dimension.

The question of knowledge is important and has been studied intently throughout the human history. Today, with the paradigm of complexity, Colombian universities are striving to development teacher knowledge though training programs and learning strategies. Thus teachers enhance competencies in the areas of self, knowledge, know-how, and cognitive and meta-cognitive elements related directly to knowledge. In this case, it is understood that competencies are the product of knowledge, of conceptual clarity that a person has, which “... are formed through cognitive structures that can be modified by the influence of learning experiences.”(Tobon 2005;30).

With the appearance of Cognitive Psychology, educational science has been developing the field of knowledge and it is from this perspective that learning or knowledge structures are understood as conceptual

networks that allow the individual to understand, interpret, analyze and solve problems conceptual nets which are formed through the learning process and search for relevant information through the reading and writing processes which activate all cognitive processes making the development possible, not only in cognitive but in procedural and evaluative competencies generated by the proposed nature of the text through rigorous and profound reading, in the search of the multiple senses that a text might have..

For the above mentioned reasons, it can be affirmed that reading, writing and mathematics are benchmarks used to build knowledge and develop cognitive abilities in order to achieve competence in any context where the student chooses.

Firstly, reading is of paramount importance in the individual's formation process. It can be said that a person who exhibits a love for reading is a person who accelerates his formation process and is constantly transforming himself intellectually and spiritually. Therefore, he improves his actions, because to read is to know, dialogue, and engage with others who possess a wealth of experience about different worlds and cultures. Reading feeds, nurtures and transforms the soul. It is like a sedative that strengthens and transforms. It can reestablish and it can also improve. By reading, the cognitive is nurtured and the being is expanded and becomes sensitive and flexible in all types of circumstances.

Reading is a meaning decoding process that engages the reader in a permanent struggle with the unknown to learn the ciphered meaning. Reading is a constant struggle with known and unknown ideas. It is a constant exchange of thought between the one who writes and the one who reads.

Reading changes our parameters of knowledge and therefore, our beliefs and worldview. Conversely, for the non-reader, the world is an empty place, experience without knowledge, without cognitive resources that allow him to discern and discuss problems of competence. He is condemned to live in a world unnoticed and barren of knowledge, a prisoner of his own ideas that torment and torture him; unable to expand his psychic horizons. This is why reading is so important for the development of superior or complex competencies.

On the other hand, writing plays a fundamental role in the development of thinking abilities, because in order to write one must think as you modify, change, reason, cross out words to form new ones, new speeches, and new ideas. When writing, you take on an arduous task, a reflexive and constructive fabric. "... writing makes the subject permanently evaluate and revise his own cognitive domain, to put ideas in crisis..."(Jurado :1996;57).

Everyone who write has the right to think, and to think and be thought about and as a thinking human being to put his reality on



paper because to write is to think and to think is to activate mental processes that make it possible to put into play all the abilities of thought. In short, writing is a language that reveals "... the fundamental structure of thought..."(Lledo:1995;132)

Just as reading and writing play a fundamental role in developing divergent thinking, mathematics does the same but with convergent thinking. When we speak of mathematics, the concept of numbers comes to mind. Numbers are abstract elements invented by man to label and represent objects. Mathematics as an abstract language obliges a higher level of thought, reflection, interpretation, analysis, understand natural phenomena and find order through logical mathematical processes. Thus, to learn mathematics is to develop abstract thought, unique to human beings, that allows them to infer what we cannot see but we can reason through inference.

With reading, writing and mathematics two hemispheres of the brain are integrated and this is done when one "...experiences the emotional states of happiness and joy, which produce the necessary neurotransmitters for learning and creativity."(Garcia:2002;32). The integration of these two hemispheres is important because the individual is totally formed and developed, which is an important requisite required in the complexity paradigm needed to be competent in a globalized world. This is because "...mathematization and formation has disintegrated human beings

more and more..." (Morin:1990;30) and the consequences are grave for humanity and the planet in general.

For these reasons, it is indispensable that the professor, teacher or tutor take on the challenges of integrating these three disciplines in his formation as an educator and transformer of society. As a resultant, the development of his own formation and that of the student is more complex, integrated and fruitful.



In this sense, as was stated before, hemispheric brain development is complementary; the right side sees the development of reading and writing and the left side, mathematical and logical processes. The development and unification of these two areas form students that are self-critical and can critique others. Therefore, it is useful to think in the formation of a mathematics teacher that understands the importance of

integrating these three processes in the development of students.

To improve education is to transform society and enrich culture, because the unification of this triad (reading, writing and mathematics) requires commitment, conscience and responsibility towards the subjects that form this part of the educational process and to understand that they play an important role in the development of life competencies.

To develop these three, interrelated, complex competencies (reading, writing and mathematics) is to commit to rigor, perseverance, dedication, struggle and uncertainty in the search and construction of knowledge. That is, "...a systemic focus that allows for the development of the capacity to "see" and think about the existing relationship between all the systems with which we interact day by day"(Garcia : 2002;17)

The aforementioned calls for the categoric imperative of "...reforming teaching to reform thinking, and must reform thinking to reform teaching"(Tobon: 2006; 168). This is not an easy task because of the pedagogical, epistemological and philosophical implications which clash with the teachers' beliefs as regards teaching and learning.

Today's society requires teachers to be in step with technological advances and with the new globalized society, which requires

competencies coherent with the new forms of knowledge production in which the unification of reading, writing and mathematics builds new interactive forms of speech and writing and interrelates the various scientific discourses.

BIBLIOGRAPHIC REFERENCES.

GARCÍA S. J. L. 2002. Creativity, Thought Engineering. Editorial trillas. México.

GONZÁLEZ M. S. 2001. Complex Thinking in Surroundings Edgar Morin, Latin America and the Educational Processes. Editorial Magisterio. Colombia.

LLEDÓ E. Philosophy and Language. Editorial Ariel. Spain 1995.

MORIN E. 2001. The Seven Necessary Knowledges for Education in the Future. Bogotá.

MORIN E. 2001. Introduction to Complex Thinking. Editorial Gedisa. Spain.

O'CONNOR. J. McDermonntt I. 2000. Introduction to Systemic Thinking. Editorial URANO. Spain.

PLATÓN. 2005. Republica. Editorial Losada. Argentina.



VALENCIA J. F. Bustamante Z. Guillermo.
1996. Writing Processes. Editorial
magisterio. Bogotá.

TOBÓN T. S. 2005. Formation Based on
Competencies. Editorial Ecoe
Ediciones. Bogotá.

TOBÓN T. S. 2006. Competencies in Higher
Education. Editorial Ecoe Ediciones.
Bogotá.

ZULETA E. 1994. In Praise of Difficulties and
Other Essays. Editorial Fundación
Estanislao ZULETA. Cali, Colombia.