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Los estilos de aprendizaje a partir del modelo de los hemisferios cerebrales

Learning styles based on the model of the cerebral hemispheres

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RESUMEN

El objetivo de esta investigación es determinar el estilo de aprendizaje por el modelo de los hemisferios cerebrales. En el presente trabajo se aplicó la encuesta correspondiente al modelo. El procesamiento de los datos se realizó por el programa SPSS Versión 21. Se realizó el análisis de la fiabilidad del instrumento, el análisis de media y análisis comparativo de la misma, pruebas de hipótesis, además de otras técnicas de investigación científica. La estrategia de aprendizaje por experiencia directa resultó muy oportuna y favorable en el proceso de enseñanza-aprendizaje en la Educación de Jóvenes y Adultos.

Palabras clave: Estilos de aprendizaje; Hemisferios cerebrales; Estrategias de aprendizaje

ABSTRACT

The objective of this research is to determine the learning style by the model of the cerebral hemispheres. In this paper, the survey corresponding to the model was applied. The data processing was carried out by the SPSS Version 21 program. The analysis of the reliability of the instrument, the average analysis and comparative analysis of the instrument, hypothesis tests, and other scientific research techniques were performed. The direct experience learning strategy was very timely and favorable in the teaching-learning process of Chemistry in Adult Education.

Key words: Learning styles; Brain hemisphere; Learning strategies

INTRODUCCTION

The constant improvement of the National Education System in Cuba devotes great attention to the constant elevation of the quality of the teaching-learning process in order to obtain more relevant results in the instruction, education and development of the new generations.

In this sense, there are many investigations that are developed to look for advanced ways that allow a process of assimilation of the content by the students in a more active and developing way.

The determination of learning styles in students has become a very modern theme in order to develop learning strategies that allow addressing the individual differences of students in the teaching process - learning Chemistry in Education Adults.

The term “learning style” refers to the fact that each person uses their own method or strategies to learn” (Woolfolk according to the General Directorate of Baccalaureate (DGB, 2004, p.4) meaning that each individual learns in a way in particular, creating a wide variety of ways to capture and process information.

The model of the cerebral hemispheres offers information on the potential of students as they predominate in the left hemisphere or the right hemisphere, which constitutes an important premise for the most differentiated attention to the way of learning, the development of capacities and the use of the cognitive potential of each student in Adult Education.

The knowledge about learning styles is very important as a mean of diagnosis for raising in quality the teacher learning process, allow teacher the selection and application an effective and appropriated methodology for the transmission of Knowledges and developing skills and values in students.

In case of the development of capacities and sporting skills, the diagnostic derived from the brain hemisphere model allows to select an effective methodology for the development of athletes, according to their corresponding learning style, in this case the predominant hemisphere and the own potentialities according to the personal characteristics and collective participation.

DEVELOPMENT

There are varied definitions of learning styles, but for the purpose of this research, the one proposed by Keefe cited by Alonso, et al. (2007) is assumed in which it states that learning styles "are cognitive, affective traits and physiological that serve as relatively stable indicators of how subjects perceive, interact and respond to their learning environments."

The determination of learning styles in students constitutes one of the most innovative lines of research in the scientific-research work of teachers working in the general education subsystem of the Ministry of Education in Cuba, however the need for Chemistry teachers get involved in such an important process, which, followed by the development of appropriate teaching strategies, would lead to the achievement of high efficiency results in student learning in Adult Education.

To carry out this work on learning styles, the Model of the cerebral hemispheres was chosen, which establishes that each hemisphere is responsible for the half of the body located on the opposite side: that is, the right hemisphere directs the left part of the body, while the left hemisphere directs the right part.

Each hemisphere presents specializations and potentials that allow the development of certain tasks. There are people who are dominant in their right hemisphere and others dominant in their left hemisphere.

The knowledge of the predominant style allows the elaboration of teaching strategies that are effective to take advantage of the potential of the students in the process of construction and assimilation of their own knowledge.

As for the way of thinking, the predominant of the left hemisphere present a thought: logical and analytical, they present the information in a sequence of the parts at all, linear, realistic, verbal and temporal, while those that have a predominance of the right hemisphere, have A thought: holistic and intuitive, concrete, global, present the information in a sequence of everything to the parties, random, fantastic and nonverbal.

The predominant of the left hemisphere develop the skills associated with writing, symbols, language, reading, spelling, speaking and listening, while in the right

hemisphere skills associated with spatial relationships, forms and patterns are developed, mathematical calculations, singing and music, sensitivity to color, artistic expression and creativity.

Related to the behavior of students in the classroom, those of predominance in the left hemisphere visualize abstract symbols (letters, numbers) and have no problem understanding abstract concepts, verbalize their ideas, learn from the parts at all and quickly absorb the details , facts and rules and analyzes the information step by step and those of predominance in the right hemisphere visualize images of concrete objects but not abstract symbols such as letters or numbers, think of images, sounds, sensations, but do not verbalize those thoughts, learn completely to the parties and to understand the parts you need to start from the global image, it does not analyze the information, but rather synthesizes it.

It is important to mention that the fact of having inclination to a cerebral hemisphere is not decisive in the way of knowing, conceiving the world or acting in different situations, so that “one hemisphere is not more important than the other: in order to perform any task we need to use both hemispheres ... but most of us tend to use one more than the other, or we prefer to think in one way or another. Each way of thinking is associated with different abilities” according to (DGB, 2004, p.36).

Analysis of the results:

The variables investigated show below important data that will then be used in other analyzes

Reliability: 87%

Mean Determination

Left hemisphere

Right hemisphere

The same, according to the Kolmogorov-Smirnov test of a sample follow a normal distribution with a significance level greater than 0.05 (Annex 2).

A mechanism to establish the learning style or styles in a group would be to compare the average scores achieved by both hemispheres.

We want to find out if there are significant differences between the average score reached by the students of the group in the variables:

• Left hemisphere

• Right hemisphere

Ho: There are no significant differences between the average score reached by the students of the group in the left and right hemispheres.

p-value <0.05

critical level <0.05

significance of the test <0.05

Sig. <0.05 reject Ho

Results Report

In order to compare the average score reached by the students of the group in the aforementioned variables, the T test was performed for two related samples after analyzing the normality of the differences between the means. The contrasted null hypothesis is not rejected with 95% confidence and p = 0.157 then Ho is accepted, which means admitting that there is no prevalence of any style and if a balance between the two. (See annex 3).

Ho: There are no significant differences between the average score reached by the students of the group in the left and right hemispheres.

The analysis of the data determined that the left hemisphere had a higher average or average, one might think that this was the predominant one, however these differences cannot be explained by chance and when applying a hypothesis test and there are no significant differences between the means of both hemispheres in the study group, it can be admitted that in the group there is a balance between the said hemispheres according to this model.

Learning strategy by direct experience.

Teaching should encourage the development of strategies to learn to learn, learn to know, but also to learn to be and learn to feel (Delors, 1996), must achieve the development of general skills for the organization, reception, storage, interpretation, elaboration and communication of the information, the exposition and solution of problems, among others and at the same time, incentivize in the

students intrinsic motives towards the learning, obtaining more and more the autonomy and self-regulation of their own learning processes and their personal development, It is also necessary to convert social and emotional relationships into learning objects, achieving unity between the school and extracurricular world, because, as Piaget said, “inventing is understanding”. Piaget (1978).

The study of learning strategies, as a psychological and pedagogical phenomenon, has its roots in the fusion of research related to study habits and skills that were developed in the 50s and 60s of the 20th century, carried out mainly by Castañeda (1961), Ausubel (1983), Novak & Gowin (1984), Ausubel and Novak, although they tangentially addressed the problem of a strategic ordering of the activity of learning by the apprentice, turned their investigation basically towards meaningful learning, semantic maps as a derivation of meaning, etc., although they are not, strictly speaking, pure theorists of the Learning Strategies.

In relation to learning strategies, it can be affirmed that this is a controversial and contradictory issue if one takes into account the number of definitions that exist in the literature on the subject and the diversity of terms used in defining this construct. Some of those definitions are:

- Psychological processes that are more complex than skills and differ from them by having a well-defined purpose, being composed of different actions and modifications in a flexible way to adapt to different contexts Nisbett and Shucksmith cited by (Pozo, 1996).
- All and any activity or activities that end in some delimited and objectionable learning product Pramiling cited by (Bernard, 2002).
- Process of conscious and intentional decision making, in which the student chooses and recovers in a coordinated manner, the knowledge he needs to fill a specific demand or objective, depending on the characteristics of the educational situation in which the action occurs (Monereo, C., Castelló Monserrat, C. M., Palma, M. y Pérez, M. L. (2004).
- In terms of information (as fundamental content to be processed during learning) the strategies would be those activities with their structure of actions and operations that the individual uses to select, build or rebuild,

appropriate, store, extract and use the information needed to guarantee their learning (Rodríguez, 1996).

- Certain acquired ways of using the individual cognitive activity that the subject deliberately uses, with the intention of planning in a conscious or partially conscious way, how to solve problems that involve obtaining learning (Rodríguez, 2003).
- Organized and aware set of what the apprentice does to perform specific learning tasks (Bernad, 2002).
- It is a sequence of procedures for learning and the specific procedures within this sequence are called learning tactics Shmeck cited by (Pozo, 1996).
- Integrated sequence of procedures or activities chosen for the purpose of facilitating the acquisition, storage and / or use of information or knowledge Dansereau and Nisbet and Shucksmith cited by (Pozo, 1996).
- Weinstein and Mayer talk about them as “necessary and useful competences” for effective learning, the information retention and its later application” (Weinstein y Mayer, 1986, p.393). More than twente years after this definition, Mayer defines them in a more general way as a “cognitive process carried out by students during learning orientated for improving learning” (Mayer, 2014, p.551). It is about a type of knowledge, like will be facts, attitudes or procedures.

The so-called cognitive strategies are understood as operations and procedures that the student can use to acquire, retain and recover different types of knowledge and execution... they represent the student's representation abilities (reading, images, speech, writing and drawing), abilities of selection (attention and intention) and self-direction capabilities (self-programming and self-control) (Castillo, 2005).

On the other hand, Politzer, Oxford & Ehiman cited by (Hernández & Rodríguez, 1996), studied the correlation between strategic preferences and other factors affecting learning. There are also studies carried out with the objective of training in the use of strategies and proposals that promote the strategic behavior of

apprentices Chamot & Kupper, Willson cited by (Hernández & Rodríguez, 1996) and (Monereo, 1991, 1994).

There are different types of learning strategies, but taking into account the individual characteristics of the students and the determination of their learning style using the brain hemisphere model in this investigation we use the learning strategy by direct experience.

The direct experience learning strategy refers to the opportunities inherent in active participation in a learning environment which definitely conform intelligence in an individual way. When students have a little or a misunderstood knowledge of a certain topic, direct experience needs to achieve understanding, to create, change and refine a mental model.

This strategy is very favorable in eminently practical subjects such as Chemistry. Next, it will be proposed a teaching task as part of the direct experience learning strategy that is appropriate to use in the subject of chemistry during the study of the acid-base properties of solutions.

As an assurance at the starting level, the teacher will explore the students' previous knowledge about the composition, structure and properties of acids and bases, for this purpose it will make a list on the board of substances of both types, making clear the presence of hydrogen atoms in the composition of acids and OH-groups, hydroxyls in the bases, will use indicators that consolidate both classifications. At this time, he will represent on the board the formula of the ammonia substance, NH3 and ask the students to predict the acid - base character of its dissolution.

As this substance is observed, it presents hydrogen atoms in its composition, so many students will classify it as acidic, at that time the teacher indicates to identify it through the use of indicators, the test is contradictory, since it has behavior as a base. As you can see in the proposed activity, a problem situation is created for the students during their solution, which achieves the desired success only if the teacher created the favorable preconditions for that purpose.

For the solution to the given situation, the teacher will guide the following problem-solving tasks:

1.- The teacher reiterates to the students to proceed to their identification using the indicators.

By identifying it experimentally through indicators, the indicators reaffirm their behavior as a basis, this confirms the existence of a contradictory or problematic situation in the students.

To solve this contradiction, the teacher will guide the realization of a sequence of steps or partial search problems:

a) Analysis of the electronic structure of the nitrogen atom,

b) Determination of the Lewis structure for the ammonia molecule, NH3, emphasizing the three non-shared electrons of the nitrogen atom capable of accepting each a proton (in this case a hydrogen atom).

c) Analysis of the structure of the water molecule.

d) Analysis of the formation, composition and structure of the Ammonium Hydroxide molecule, as a product of the union of the molecules of the previous substances.

NH3 (g) + H2O (l) = NH4OH (ac).

In the resulting substance the presence of the OH- (ac) ion, responsible for the behavior of the ammonia solution against the indicators is confirmed, that is, its basic character; From now on, the concepts of acid and base are expanded in the light of a new theory.

e) Extension of the concept of acid and base according to the Bronsted-Lowry theory. Colectivo de autores (2000)

Acid: Chemical species capable of yielding protons. Colectivo de autores (2000)

Base: Chemical species capable of accepting protons. Colectivo de autores (2000)

In order to achieve a success teacher learning process, it is important to get an appropriated use of teaching methodologies. In good application of learning strategies, the methodology chosen by teachers played an important role.

A teaching methodology suppose a determined way for teaching, method suppose a way, a path, a concrete tool in order to transmit Knowledges, procedures and principles to students and learning objectives proposed by the teacher should be gotten.

To get a little information about teaching methodologies, it will start from the Hernandez model mentioned in (Hernández, Fernández and Baptista, 2010b). The author pointed two opposite dimensions in order to place the teaching methodologies. One about the knowledge's objectivity and the other one about the key role of the activity into the teaching learning process by students.

Researchers such as García and Hernández mentioned in (Hernández, Fernández and Baptista, 2010b), make reference to different methodologies for teaching according to the characteristics of Knowledges and the students, the preparation and experience of teachers, the relationship between methodology and teaching objectives, and also, the edge and interest of students. The following methodologies are proposed:

The explanatory methodology: It is characterized by the exposition of Knowledges to the students. Teacher plays a directive role. In the other hand, students use to be passive into the process, and usually limited to receive Knowledges exposed by teachers.

The interactive methodology. It is a transaction between teachers and students by means of debate or dialogue in order to study a topic in depth.

The methodology of discovery. It is characterized by the use the subject´s experience as learning´s source students get the information in an active and constructive way. There are two variants or types of this method according to the teaching approach and the kind of subject.

When the greater key role is played for teachers refer the explanatory methods, while if the action is for students and teachers in the same way, it is referred to interactive methods as long as if the key role played by students is greater than teacher one it is referred to discovery methods, it can be presented as:

The 'active-productive´ discovery method. In this method teachers still passive and students played an active role into the learning process, but it is very focused into the reproduction of Knowledges.

In the 'active-productive´ discovery method, students played a more active role than teachers, but it stresses the students' elaborative possibility. It is a trype of method that allows the productive thinking, it helps students to know and practice

research techniques in the reality, it allows also to apply Knowledges in different situations, and so for.

CONCLUSIONS

The determination of learning styles in students for contributing to the knowledge of their individual differences, constitutes an important premise for the successful application of learning strategies by direct experience. There are various ways and strategies of learning, but its success will depend on prior knowledge of the student's learning style, as well as the teaching resources available, the experience of the teacher and the follow-up of the initial diagnosis of the students. The direct experience learning strategy is an effective means to improve the quality and quantity of students' knowledge in the subject of Chemistry, which by linking theory with practice and the emphasis on demonstrating the structure-properties-applications of substances, contributes effectively to the formation of the scientific conception of the world in students and their significant learning.

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