

La predominancia hemisférica. Incidencia en la forma de actuación en profesores de Matemática y Física
Hemispheric predominance. Incidence in the way of acting in teachers of Mathematics and Physics

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Resumen

En este artículo se presenta un estudio sobre el estilo de aprendizaje de los profesores de Matemática y Física de la Universidad de Guantánamo, basado en el Modelo de los hemisferios cerebrales para lograr una organización en la conducción de las actividades metodológicas, utilizando la estrategia del pensamiento visual. En su desarrollo se aplicaron encuestas para la obtención de información y el análisis e interpretación de los datos recogidos se realizó a través del paquete estadístico Statistical Package for the Social Sciences, vol.20, obteniendo que el estilo predominante de los encuestados es del hemisferio izquierdo lo que corrobora la manera de actuación.

Palabras clave: Estilos de aprendizaje, Representación gráfica, Hemisferios cerebrales, Pensamiento Visual

Abstract

This article presents a study on the learning style of the professors of Mathematics and Physics of Guantanamo University, based on the Model of the cerebral hemispheres to achieve an organization in the conduct of methodological activities, using the thinking strategy visual. In its development, surveys were applied to obtain information and the analysis and interpretation of the collected data was carried out through the statistical package Statistical Package for the Social Sciences, vol.20, obtaining that the predominant style of the respondents is from the left hemisphere, which corroborates the way of acting.

Keywords: Learning styles, Graphic representation, Cerebral hemispheres, Visual thinking

Introduction

Currently, various researchers on the subject agree that people learn in different ways depending on whether they are children or adults, the country to which they belong, the culture or traditions in which they developed; among other factors of diverse nature. Among these last factors, physical, environmental, cognitive, affective, cultural and socioeconomic factors can be established; those that determine the way people use to acquire new knowledge.

Referring to the previous idea, Cavellucci (s.a.) states that “each learning has its life story, successful learning experiences, others not so much; all of which serve as a learning aid.”(p. 11).

It is a reality that in terms of ways of learning, each person has their preferred environments, their special methods, their own motivations and objectives, their techniques for remembering, etc., all of which define in the individual a personal way of learning, or be a learning style.

In this way, the notion that each person learns differently from the others allows one to search for the most appropriate ways to facilitate learning, however, care must be taken, since learning styles, although relatively stable, can change; they may be different in different situations; they are capable of improvement; reason why it is convenient to know how the people with whom we interact learn, that is, their learning style, thus achieving greater effectiveness.

That is why this study presents a study on the learning styles of the professors of Mathematics and Physics at the University of Guantánamo, based on the Model of the cerebral hemispheres with the aim of achieving organization in the conduct of activities. methodological using the strategy of visual thinking in order to improve their quality and in turn gain efficiency at work.

Development

Currently there are different models and theories on learning styles; those that, from different perspectives, offer a conceptual and explanatory framework of the behavior of the person who learns and the type of didactic action that can be more effective at a given moment of learning.

There are several models to determine the predominant learning style, the one based on the cerebral hemispheres, is inspired by the theory of dominance of the cerebral hemispheres. Navas maintains 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 has specializations that allow it to take on specific tasks. (2004, p. 35)

It is not that one hemisphere is more important than the other, the use of both hemispheres is important in the performance of tasks, especially in those complicated tasks.

In order to learn well, we need to use both hemispheres, but most of us tend to use one more than the other, or we prefer to think one way or the other The complementary functioning of both hemispheres is what gives the mind its power and its flexibility. We do not think with one hemisphere or the other, both are involved in higher cognitive processes. Together, words and images communicate more clearly than one or the other alone. (Navas. 2004, p 36-37)

Material and method

In the research carried out, the study population consisted of 35 professors of Mathematics and Physics from the University of Guantánamo, a sample of 12 professors was taken at random, representing 34.28% of the population.

To determine the predominant learning style, the questionnaire was applied to identify hemispheric predominance of the Model of the cerebral hemispheres, authored by Parra (2004) according to the General Directorate of the Baccalaureate (DGB), which has 20 questions each with two sections (items a-refer to the left hemisphere and items b-refer to the right hemisphere). For this reason, a total of 40 variables were declared referring to said questionnaire, in addition two more variables were declared that included the score in each cerebral hemisphere and another that determines the hemispheric predominance of each individual in the sample that is analyzed classified as a qualitative variable as well than sex and specialty.

The processing of the results was carried out in the SPSS, using position and dispersion statistics as techniques: mean, median, mode, variance and standard deviation, among others, the T test was used for related samples and the Non-parametric testing was performed for a sample in order to determine if the variable was normally distributed.

Results

The questionnaire was applied to 12 teachers who represent 34.28% of the total number of teachers who find themselves facing full-time teaching. Of these, 5 are female, representing 41.7%, and 7 are male, representing 58.3% of the sample analyzed.

It is important to know that it was applied to teachers of the two specialties having a representation of both specialties, 66.7% are Mathematics teachers and 33.3 are Physics teachers, taking into consideration a greater representativeness of Mathematics teachers as this is a subject that shows low learning results.

In order to identify the hemispheric predominance of the teachers who made up the sample, a frequency distribution of this variable was made, it can be seen that the predominant hemisphere is the left, since 8 teachers representing 66.7% manifest a use of the left hemisphere, therefore has a higher frequency, while 4 teachers in the sample, representing 33.3%, show a use of the right hemisphere and a balance in the use of both hemispheres.

This analysis does not give us the certainty that the predominant hemisphere is left, so it was necessary to carry out a hypothesis test with 95% confidence and a level of significance $\alpha = 0.05$, which guarantees brain predominance in professors from the departments of Mathematics and Physics at Guantanamo University.

In order to analyze whether the HI and HD variables are normally distributed, the Kolmogorov-Smirnov test was used. The null hypotheses tested were:

H0: The distribution of the variable HI is normal, with a mean of 12.58 and a standard deviation of 2.57.

H0: The distribution of the HD variable is normal, with a mean of 7.50 and a standard deviation of 2.43.

The results of the Kolmogorov-Smirnov test (p-value $0.671 > 0.05$ and $0.542 > 0.05$ respectively) indicate retaining the null hypothesis; therefore, it is stated, with 95% confidence that the variables follow a normal distribution with means of 12.58 and 7.50 and standard deviation 2.57 and 2.43 respectively. (See table 2) After this analysis, a T test was carried out for two samples related to the objective of comparing the average score reached in the Mathematics and Physics teachers, in the variables: "HI" and "HD", after analyzing the normality of the differences between the means (p: 5,083). The null hypothesis tested was:

"There are no significant differences between the average score that the teachers of Mathematics and Physics achieve in" HI "and" HD "; which is rejected with 95% confidence (p: 0.005)

Discussion of results

The results obtained express that if there is a significant difference among the average score that the teachers achieve in “HI” and “HD”, therefore there is a predominance of the left hemisphere, being consistent with the characteristics that the theory shows of how people who have a predominance of such hemisphere.

Consequently, we can affirm that the Mathematics and Physics teachers show, among other characteristics, that:

- They have no trouble understanding abstract concepts, they verbalize their ideas.
- Learn from part to whole and quickly absorb details, facts, and rules.
- They analyze the information step by step.
- They like things well organized.
- They need clear, written and specific guidance.
- You are uncomfortable with open and unstructured activities.

The above is corroborated with the actions of these teachers, which makes this information of great importance for those who have the responsibility of organizing the processes that are run from the departments.

Methodological proposal

How to organize an activity knowing that in the departments of these specialties the learning style of the teachers has a predominance of the left hemisphere?

One way to organize an activity taking into account learning styles is through the use of learning strategies, among which visual perception is interesting.

What does Visual Thought consist of?

According to Valín, visual thinking is “a process that consists of overturning and manipulating ideas in a drawing or mental map, using related elements to try to understand it better, identify problems, discover solutions, simulate processes and discover new ideas” (2012 , p.3).

Visual thinking works because when you see an idea through your eyes, and not just your mind, you greatly expand your ability to show what only the mind has trouble showing.

Therefore visual thinking has a triple mission that begins with sight.

- Observation is a basic means of gathering and interpreting information in most fields.
- Teaching to understand and use graphic representations provides an instrument that improves your understanding and allows you to clarify your thinking and communicate ideas to others.
- And finally Visualize, that is, the ability to generate and manipulate visual images, helps in a wide variety of tasks, including remembering information, learning to spell words, performing mathematical functions and solving practical problems involving spatial relationships.

How to develop visual perception taking into account the mission of this type of teaching strategy?

One of the best ways to train observation skills is drawing. Drawing requires careful looking and observing both details and spatial relationships in general.

Verbal Description

Just as drawing can sharpen and improve observation skills, verbal description can also contribute to this. However, any kind of language is not suitable for this. Searching for an accurate verbal description does three things:

- It intensifies visual memory by relating visual images to existing verbal knowledge.
- Discipline vision by bringing together visual and verbal search.
- Educate thinking with both hemispheres.

La representación gráfica

Information can be recorded and represented in various ways. The most common in our society is written language, but it is not always the best and by itself it is not nearly as effective as if it is complemented by a graphic representation of the same information.

There are two main points to keep in mind when integrating visual representation into activities

- Present and clarify ideas graphically.
- Teach students to interpret and use graphic representation.

During most of their time, the teacher uses graphical images in order to present and clarify ideas and concepts. Since these images are learning tools, they should represent careful reflection on the subject. They do not need to be beautiful or adorned, but they must be clear.

When using the visual thinking strategy, it is significant to recognize, taking into account the characteristics of these teachers and in correspondence with their learning styles, that each of them is aware that their ideas are taken into account in the framework of the meetings. and spaces that they have in their departments to deal with the different issues of the work in question.

In the opinion of the authors of this work, it is interesting to show a set of actions that must be taken into account when planning any activity in these departments, and they are:

- In principle it must be well organized.
- The guidelines must be clear and precise, taking into account the specificities for each person.
- You must have a time controller.
- Circulate the topics to be discussed in each of the activities in correspondence with the type of meeting or activity and specify who is responsible for each topic.
- Having determined from the control that people have that will intervene in each topic that will be analyzed.

The one who directs the activity must:

- Know how to listen.
- Use questions in your speech that stimulate a dynamic process of inquiry.
- Give opportunity for reflection, each expressing her own ideas.
- Have the ability to organize the debate by relating the similar or different opinions that may arise.
- Know how to synthesize all the opinions for the closing of each analyzed topic.

Next, we will show the preparation of a planning meeting in order to guide teachers in the Mathematics department so that they are more efficient in their work.

This is the first meeting of the month where the main objective is to inform the collective of workers of the fulfillment of the activities of the previous month and the different activities of the work plan for the current month are oriented, so it is suggested as an order of the next day:

- Balance of compliance with the activities of the previous month. (15 min.)

Speaker: Head of the department.

- Behavior of the efficiency indicators in the race. (10 minutes.)Speaker: Head of race.
- Compliance with programs. Main difficulties. (10 minutes.)

Speaker: Heads of Disciplines.

- Details of the work plan for the month. (15 min.)

Speaker: Head of Department.

For the development of the meeting, it is important that the first point presented by the head of department is not only based on the report that he will present, but also is supported by slides that illustrate the percentage of activities carried out the previous month and how he behaved the attendance of workers to them, here would be the use of the visual perception strategy, the teachers will be reflected in the participation of these activities and will be able to make their notes for the enrichment of the same as the information is presented in the slides, this is a way of establishing an emulation among the workers from the administration because it is necessary to highlight the people who stand out in the fulfillment of the activities, but it would also be a form of monthly evaluation for each teacher.

Regarding the second aspect in the preparation meeting, the head of the race should be instructed to show in a table the behavior of the efficiency indicators so that it is evident which year is the most difficult, since from there the interventions for the debate and agreements will be made for its improvement. It is considered that in this way the best experiences can be socialized to improve these indicators.

Point three will be presented verbally by the heads of each discipline, fundamentally assessing compliance with the programs, the main difficulties (delays) they have and the plan of measures for their solution.

For point 4 it is necessary that the department head make a classification of activities taking into account the participation of the workers in each of them.

It is suggested that:

- Activities that involve the participation of all workers. (year groups, cloisters, methodological meetings, etc.) will be presented in red.
- Activities that are considered more specific because they require the participation of a specific person (Head of the year, head of disciplines, head of career,) will be presented in green.
- Permanent activities (compliance with teaching hours, brigade meetings, etc.) are presented in yellow.

For this, it will be supported by the use of technology so that it differentiates with colors the classification of the previous activities so that they can complete their individual work plan.

Conclusions

Knowing the learning styles of the people with whom you interact, allows you to determine their potential and preferences when learning, which reverts to the removal of barriers to learning, all the positive elements of the style can be reinforced and reverse the negative, in this way it is possible to equip these people with strategies to improve their way of learning.

Consequently, visual thinking is a basic part of our functioning that we use at all times. The value of studying its applications and getting to know the role it plays in teaching lies in the fact that it allows us to make conscious use of a powerful instrument, and thereby expand our effectiveness.

Therefore, it is considered pertinent to continue deepening the study by expanding the selected sample to identify the learning styles of the groups as a whole and thus make rational use of the learning strategies, especially visual perception, which will allow for a better organization and management of activities in the departments, achieving greater efficiency in our work.

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