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Article

VAK Learning Styles and Study Habits to improve academic performance

Estilos de Aprendizaje VAK y hábitos de estudio para mejorar rendimiento académico

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Abstract

Taking into account that human beings have different perception channels to mentally represent the information that arrives from the outside to their brain and that each person will do it through the most developed channel, the objective of the research is to identify the relationship between learning styles, study habits and academic performance. A quantitative research of correlational-explanatory scope was carried out, the population refers to 11 students of the seventh grade of the Fidel de Montclar Educational Institution. The results showed that 100% of the students and 50% of the teachers have a kinesthetic learning style. The study habits showed that 45% have great empathy for study, but 72% do not have an adequate physical environment to study, 36% do not have any study habits, 63%, in spite of not being organized, do comply with their

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homework. The academic performance showed that 63% of the students have a basic average, 18% a high average, 18% a low average, concluding that both the learning style and study habits influence the academic performance of the students.
Key words: Learning styles, Study habits, Teaching strategy, Academic performance.

Resumen

Teniendo en cuenta que los seres humanos tienen diversos canales de percepción para representar mentalmente la información que llega desde el exterior a su cerebro y cada una de las personas lo hará por la vía que más desarrollada tenga, el objetivo de la investigación es identificar la relación entre estilos de aprendizaje, hábitos de estudio y rendimiento académico. Se realizó una investigación cuantitativa, de alcance correlacional-explicativo, la población, refiere 11 estudiantes del grado séptimo de la Institución Educativa Fidel de Montclar. Los resultados, demostraron que el 100% de los estudiantes y el 50 % de los docentes, manejan un estilo de aprendizaje kinestésico. Los hábitos de estudio, mostraron que el 45% tienen gran empatía por el estudio, pero un 72% no tienen el ambiente físico adecuado para estudiar, el 36% no presenta ningún habito de estudio, el 63%, a pesar de no ser organizados, si cumplen con la entrega de sus deberes. El rendimiento académico demostró que el 63 % de los estudiantes tiene un promedio básico, el 18% un promedio alto, 18% un promedio bajo, llegando a la conclusión que tanto el estilo de aprendizaje como los hábitos de estudio influye en el rendimiento académico de los estudiantes.
Palabras clave: Estilos de aprendizaje, Hábitos de estudio, Estrategia de enseñanza, Rendimiento académico.

Introduction

González, (2011), states that: learning styles can be copied, that is, they are imitated from one person to another as long as the pattern is positive. The student can even use combinations of styles and over the years, according to his interests and possibilities, he will consolidate a particular style, which is nothing more than the sum of previous experiences regarding the confrontation with knowledge.

The influence of learning styles on the development of autonomy in learning is a topic that is currently very little studied. In general, the

processes related to learning are studied independently and no interrelationships are established between them. Today, when learning to learn is one of the demands of the context, it is necessary to diagnose the learning styles of students, which can more clearly guide the development of autonomy. Based on theoretical precepts and experiences (González, 2011).

Each student receives the information provided by the way he prefers, and will express it according to different factors, such as his style, his sensory and cerebral dominance, but it is not known if the receiver understands it with the same communicative purpose that the sender does, then, It is there where it must be taken into account if what is learned daily, the way of receiving classes, the way of communicating with other people, is the most adequate and if it is somehow possible to modify one's own learning style so that all people can communicate, understanding the same message even if they have a very different style among them. The Neurolinguistic Programming Model of Bandler and Grinder, according to the manual of learning styles proposed by the Secretary of Public Education (2004), this model, also called visual-auditory-kinesthetic (VAK), takes into account that we have three major systems to mentally represent information, the visual, auditory and kinesthetic:

We use the visual representation system whenever we remember abstract (such as letters and numbers) and concrete images. The auditory representation system is the one that allows us to hear in our mind voices, sounds, music. When we remember a melody or a conversation, or when we recognize the voice of the person speaking to us on the telephone, we are using the auditory representation system. Finally, when we remember the taste of our favorite food, or what we feel when we listen to a song, we are using the kinesthetic representation system.

Most of us use representation systems unevenly, enhancing some and underutilizing others. Representational systems develop more the more we use them. The person accustomed to selecting one type of information will more easily absorb information of that type or, planning it the other way around, the person accustomed to ignoring information received through a particular channel will not learn the information received through that channel, not because they are not interested, but because they are not accustomed to paying attention to that source of information. Using a system more implies that there are systems that are used less and, therefore, that different representation systems will have different degrees of development. Representation systems are not good or bad, but more or less effective in performing certain mental processes. If I am choosing the clothes I am going to wear, it can be a good tactic to create an

image of the different items of clothing and mentally "see" how they combine with each other.

On the other hand, study habits are the steps we must follow to achieve a school discipline that contributes to obtaining a good academic performance. Study habits are the way in which "knowledge of certain environmental conditions of time and space is acquired" (Escalante et al., 2008, p.2). Authors such as Escalante et al. (2008) state that study habits, techniques for researching, understanding or learning, organizing material, taking notes, summarizing, reviewing what has been learned and organizing schedules are used to study. Escalante (2008) presents the following components of study habits that should be considered in the teaching-learning process: first, hygiene strategies: activities that promote physical and mental health. Second, material conditions: resources necessary for the study of each area, as well as the physical space and its characteristics. Thirdly, study strategies: how the individual learns, involving will, motivation and psychological isolation; and finally, study capacity: mental operations such as observing, associating, synthesizing, etc.

Regarding the major objectives of current education, to form a responsible student who is aware of his or her own learning process and of the most effective strategies to achieve it, authors such as Parra et al. (2011) quote Herrera and Lorenzo (2009), who assert that for a student to build knowledge, he or she must have autonomous learning since childhood, as well as learning strategies and time organization and study environment. These aspects are closely related to learning styles. On the other hand, regarding the role of the teacher in the development of habits, authors such as Aguilera and Ortiz (2008) assert that it is the teacher who is responsible for developing study skills and learning styles in students, guiding them to understand psychological, pedagogical and learning processes, where the student assumes an active position, builds knowledge, interprets the world and learns to organize space and time. Finally, for an integral development of the student, it is necessary that he/she "organizes his/her study time, considering periods of rest, fun, sports, and socializing with family and friends to improve his/her school performance" (Escalante et al., 2008, p. 11). Study habits, as well as learning styles, present traits specific to each person, which depend on the physiological development, the affective and emotional part, and to a great extent on the environment created at the moment of facing the teaching-learning process.

Through academic performance, students, disciplines and educational institutions themselves are qualified and rated, which is why so much importance has been given to this aspect in the search

for academic quality. Academic performance is "the set of effective ratios obtained by the individual in certain academic activities, as a response to a process of instruction or training interpretable according to previously set educational objectives or purposes" (Pizarro (1985) and Novaez (1986), cited by Velásquez et al., 2008). Students' academic performance, low or successful, is subject to both external physical aspects of the environment such as environments, classmates, class activities, methodologies, subjects, among others; and internal aspects, such as motivation, interest, self-esteem, previous knowledge and cognitive processes, to mention a few. In this regard, González (2003) presents two types of variables that influence academic performance. First, personal variables such as intelligence, aptitudes, learning styles, age, gender and all affective aspects. Secondly, socio-environmental variables that refer to family, economic and organizational aspects of the educational institution. González (2003) states that the most studied variable is the cognitive variable because it is through activities and tasks that students' cognitive processes are put into play. Similarly, González (2003) asserts that there is a significant relationship between aptitudes and good academic performance. Finally, González (2003) states that school success or failure does not only depend on intelligence "but also on how the student uses this potential through the so-called learning styles (...). Thus, depending on the personal style adopted, there will be a greater or lesser probability of school success" (González, 2003, p. 250).

Materials and methods

The study has a quantitative approach, since it works with statistical data, to determine predictions or patterns of behavior of the phenomenon or problem posed, in this case the result of academic performance that is affected by not taking into account the learning styles of students and their study habits. This approach uses data collection to test hypotheses, which it is important to note, have been raised in advance of the methodological process; with a quantitative approach a problem is posed and specific questions from which the hypotheses are derived. (Hernandez, et al. 2010, p.5)

In addition, this research has a correlational-explanatory scope, which as Hernández, et al. (2010) express, being explanatory, its interest is focused on explaining why a phenomenon occurs and under what conditions it manifests itself or why two or more variables are related, and correlational because its purpose is to know the relationship or degree of association that exists between two or more concepts, categories or variables in a particular sample or

context. Sometimes only the relationship between two variables is analyzed, but frequently links between three, four or more variables are found in the study, in this case with three variables: learning style, study habits and academic performance, which are worked with preset instruments, which are related to each other.

It also has characteristics of a quasi-experimental research, since there is an experimental group in which "the dependent variable" has been manipulated, but there is no control group or "input" or "before" measurements in the group that is the object of the program. (Agudelo, et al., 2010).

Results

According to the objectives of this research, to identify the relationship between learning styles, study habits and academic performance, and thus be able to develop strategies for study habits and improve academic performance in students, the results obtained were as follows:

The VAK test to determine the predominant learning style of students and teachers yielded the data shown in the following tables and graphs.

Table 1. *Students' learning style*

PARTICIPANT	VISUAL	AUDITORY	KINESTESICO	READER-WRITER
STUDENT 1	2	1	8	0
STUDENT 2	3	0	10	0
STUDENT 3	5	2	6	1
STUDENT 4	3	1	8	1
STUDENT 5	2	1	9	0
STUDENT 6	4	0	8	1
STUDFIANTE 7	4	0	9	0
STUDENT 8	2	1	10	0
STUDENT 9	3	1	9	0

STUDENT 10	1	0	12	0
STUDENT 11	0	0	13	0

Table 1 shows that 100% of the students have a kinesthetic learning style, 91% of them have a visual learning style as a second learning style, only 9%, which corresponds to one student has a combination of kinesthetic-visual style (bimodal), 54% use the auditory style, but in low frequency.

Table 2. *Teachers' learning style*

PARTICIPANT	VISUAL	AUDITORY	KINESTESICO	LECTESCRITOR
MATHEMATICS TEACHER	3	5	2	3
TEACHER SPANISH AND ITERATURE	2	4	7	0
SOCIAL TEACHER	0	3	5	5
BIOLOGY TEACHER	1	0	6	6
TEACHER TECNO. E INFORM.	1	1	5	6
TEACHER ENTREPRENEURSHIP	1	5	7	0
ART EDUCATION TEACHER	2	7	2	2
PHYSICAL EDUCATION TEACHER	1	1	10	0
ENGLISH TEACHER	3	1	9	0
RELIGIOUS EDUCATION TEACHER	3	3	7	0

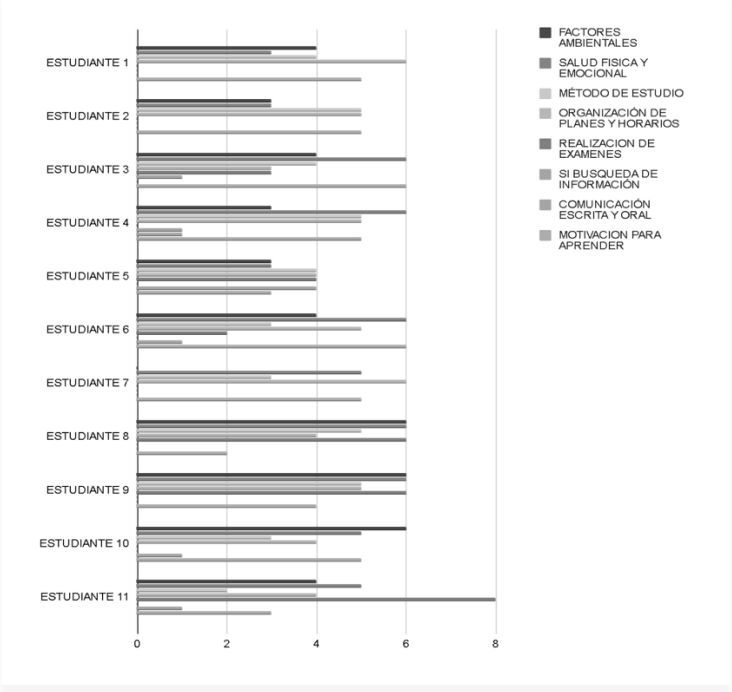
Table 2 shows that 20% of the teachers use a bimodal style for their teaching-learning process, between reading-writing and kinesthetic. Fifty percent prefer the kinesthetic style, 20% use the auditory style, and there is little preference for the visual style.

In general, the average of students and teachers with visual style is 1.90 and the auditory style is 2.05, compared to the kinesthetic style which has a higher average of 8.0.

Another objective of the research is to determine the study habits used by students and thus identify possible problems in terms of performance and attitudes and motivation to study. The graph

shows1 the data obtained from the H.E.M.A. test on Study Habits and Motivation for Learning.

Figure 1. Students' study habits



It is evident that only 27% of the students have adequate environmental factors to study, 72% do not have a physical and environmental environment conducive to study, with a total average of 3.91 students. The same happens with the study methods, it is observed that only 36% practice some study methods, another 36% use them moderately with a mode of 3,91.

On the other hand, the physical and emotional health that can influence attitudes and motivations to study, 45% of the students present good emotional and physical behaviors, compared to 36% that present less empathy to study, with a mean of 4.91 and a median of 5. This coincides with the motivation to learn, where 45% of the students show interest to learn, 18% are highly motivated and 36% are lowly motivated, with a mean of 4.45.

Regarding the organization of plans and schedules when studying, 18% have good habits to comply with activities, 63% are less organized, but still comply with their activities, and only 18% are more unconcerned about complying with their activities, presenting a high average of 6.36.

Regarding the ability to demonstrate success in taking exams, the mean or average is 2.64, where only 36% have good practices when taking an exam, 36% do not have habits to study for evaluations and 27% do not worry when taking an exam.

When speaking of information search and analysis of documentation, it can be observed that the majority of students are not concerned about searching for information individually to improve their knowledge on the topics studied, with an average of 0.18. The same happens with the verbal and written attitudes when it comes to transmitting correctly what has been learned, the average is 0.73, only 9% of the students have the ability to transmit their knowledge,

These results show that as long as there are no study habits, academic performance will not be able to surpass the basic level.

For the third specific objective, which is to establish relationships between learning styles, study habits and academic performance, the grades of all subjects of the first period of the 11 students were taken into consideration. The report of the number of subjects with low, basic, high or superior performance is recorded. That as we indicated previously, according to decree 1290 of 2009 of the Ministry of Education, to exceed the required performances in relation to the mandatory areas, it is necessary to have a basic performance, which numerically is equivalent to grades between 3.0 to 3.9. (Convenio Andrés Bello, 2014)

Table 3 . *First period grades of seventh grade students.*

PARTICIPANT	MATHEMATICS	ENGLISH	BIOLOGY	SOCIALS	ENGLISH	TECHNOLOGY	E. ARTISTIC	E. PHYSICS	E. RELIGIOUS	VENTURE
EST. 1	3	2.8	3,1	3,1	3,3	4,2	2,6	3,3	4	3
EST. 2	3	2,7	2,1	3,3	4,5	3	2,6	3,6	4,5	4
EST. 3	4,2	4,2	3,4	3	4,5	3,8	4	4	4,1	4,2
EST. 4	3,3	4	3,1	4,1	4,7	3	3,8	4,5	3,8	3,5
EST. 5	3,3	3,6	2,7	4	3,9	4,1	3,7	3,5	1,5	2

EST. 6	3	3	3,2	4	3,5	3,6	3,7	3,4	3	3,5
EST.7	3	3	2,2	3	3,6	2	2,6	3,5	3,3	3,5
EST. 8	3,1	3,3	2,7	3	3,8	2,2	2,6	3,5	3,1	3,7
EST. 9	3	3,7	3,2	4	4,2	4,2	4	3,7	4,2	4
EST. 10	2	1	2	2	3	1	2	3	2	2
EST. 11	2	1	2	2,5	3,5	1	1	3	4	3,5

Regarding academic performance by subject, taking the highest valuation, it can be observed that for the subject of mathematics most students have a basic average with 72%, for the subject of Spanish 45% is basic and 36% low, for the subject of biology is 54% basic, social 45% basic, English 63% basic, technology 36% basic and 36% low, art education 54% low, physical education 81% basic, religious education 45% high and entrepreneurship 54% basic.

Table 4. *Academic performance of students in the first period*

ACADEMIC PERFORMANCE				
PARTICIPANT	**BAJO**	**BASIC**	**ALTO**	**SUPERIOR**
STUDENT 1	2	6	2	0
STUDENT 2	3	4	3	0
STUDENT 3	0	3	7	0
STUDENT 4	0	6	3	1
STUDENT 5	3	5	2	0
STUDENT 6	0	9	1	0

STUDFIANTE 7	3	7	0	0
STUDENT 8	3	7	0	0
STUDENT 9	0	4	6	0
STUDENT 10	8	2	2	0
STUDENT 11	6	3	1	0

Both in table and 34, it can be observed that the academic performance in general is basic, 63% of the students have a basic average, 18% have a high average, another 18% have a low average. Comparing this behavior with the questionnaire on study habits, it is evident that students 3 and 9 have better study habits, better physical and emotional health, better oral and written communication, on the contrary students 10 and 11 have a very poor study method, and taking into account that they are students with a purely kinesthetic learning style, in reality they do not have a good study method because they do not know how to do it, the same happens with students 2 and 8 who present grades below the basic average, who despite having higher than average scores in study habits, their grades are low, but it should be noted that their learning style is 76% kinesthetic, which also suggests that academic performance does not only depend on study habits but also on learning styles.

On the other hand, referring to the learning style of the teachers we can observe something very particular, the art education teacher has an auditory learning style and relating it to the academic performance of the students, we see that 46% of them have a low average in the subject, showing the lack of knowledge of the teaching-learning process in students with a kinesthetic learning style. Likewise, we can see that English and physical education teachers, who are 100% kinesthetic, obtain grades from their students with averages that do not go below a basic average.

Biology, social studies and technology teachers have a bimodal learning style, one of the styles being kinesthetic, but when imparting knowledge to their students they do not use an appropriate methodology for kinesthetic students, who on the contrary use more

the reader-writer style, therefore, there will be children who understand and pay attention, but others do not.

On the other hand, in the test that was conducted to determine and search for the best strategy to carry out the teaching-learning process in students with a kinesthetic learning style, results were obtained that are consigned in the test conducted to teachers, to determine how much they know about learning styles and if they themselves have knowledge of their style and thus be able to use it in a better way to reach the student.

Table 5. *Result of the survey conducted with students after the proposed class*

ITEMS	YES	REGULAR	NO
Did you know what learning styles are?		11	
According to the test you can identify your learning style?	5	3	3
Do you like the methodology that the teachers are using in the last classes?		11	
Do you like the educational resources teachers use to teach the class?		11	
Would you like teachers to continue teaching classes with the new methodology?		11	
After you learned your learning style, did you change your study habits?	3	4	4
Do you find that you understand more of what you study with the new study habits?	4	7	
Has academic performance improved with the new classes?	2	7	2

After having received the proposed classes with the learning style in table 5 it can be observed that 100% of the students prefer the proposed learning style, which is kinesthetic, it can be deduced that after explaining what a learning style is 100% of the students understand it, 45% of them already understand what their style is, 27% understand it regularly and 27% do not understand it yet. 100% of the students like the educational resources and methodology used by the teachers and would like to see this learning style used more frequently. After knowing the learning style 27% started to use their own style, 36% did it regularly and 36% did not try it. On the other hand, 63% of the students say they understand the classes better with the new proposed style and their grades improved.

Table 6. *Results of the survey conducted with teachers after the proposed class*

ITEMS	YES	REGULAR	NO
Were you aware of VAK learning styles?	2	5	3
Do you know which learning style you master: visual, auditory or kinesthetic?		7	3
Do you think all students understand your subject in the same way?	6	4	
Do you have sufficient resources to teach your class?		10	
Do you feel good about teaching your subject in front of students?	10		
Do you feel good about teaching the class using all three learning styles?	6	4	
Do you think your students understand you better by applying the three learning styles?		10	

When taking your course evaluations, did students get better grades after using the three learning styles?		10	
Do you think it is necessary to use all three learning styles for students to achieve better academic performance?	2	6	2

In the table6 , it can be seen that 45% of the teachers regularly knew what a learning style was, 27% do not know and only 18% have knowledge that it is a learning style. 63% of the teachers regularly know what learning style they master, and 27% have no knowledge of what style they master. 54% believe that all students understand in the same way, and 36% are not very sure. 100% believe that, despite having some educational resources to teach, they are not enough, but they feel very well dictating their class their way. 54% feel very well dictating their classes applying the three learning styles, and 36% not very well. 100% of the teachers think that, if the three styles are applied at the time of teaching, the students understand better, because they realize that they get better grades, although only 18% believe that it is necessary to use the three styles and 54% believe that it would be useful and 18% believe that it is not necessary.

Discussion

In this section, we highlight the discussions on the pedagogical models examined, which focus on the reasons for learning rather than on the ways of learning. This was done by means of a social functional criterion, determined by the learning purposes of the individuals on which the different pedagogical models applied are based. Apart from "why learn" and "what are the purposes of learning", the research analyzed relates the factors of the learning process that differentiate each of the above-mentioned proposals.
Thus, Gravini (2006), in his research proposal states that: "Current pedagogical models, based on cognitive and sociocultural theories, demand new conceptions, relationships and actions in the teaching

and learning processes" (p.3). (p.3). In concomitance with analyzed documents such as Quintero, et. al. (2021), which emphasize the use of virtual and experimental laboratories, applied in a didactic sequence mediated by information and communication technologies (ICT), reaffirming the need to move from the traditional model of education, whose main objective is the content or transmission of knowledge, to the model focused on the construction of knowledge, which takes into account the scientific advances of the different disciplines, as well as the socioeconomic context.

On the other hand, MiPutumayo, (2021), states that the Fidel Montclar Educational Institution, within the teaching-learning process, manages a behaviorist pedagogical model, which is very concerned with transmitting and accumulating knowledge, but not in the student as an active social being, who can create, innovate, reflect, participate, with which, the teacher is restrained in his pedagogical methodology resulting in a learning style very difficult to apply and poor results for both students and pupils. Regarding this text, a parallel is established with the fact that people perceive the world from three channels of visual, auditory and kinesthetic perception (VAK), however, for the case of teaching-learning processes, in the vast majority, individuals tend to develop one more than the other, and to have a leading perceptual channel, kinesic in the case of the present research.

Regarding the relationship of the factors of the learning process, it is observed that the weakest links are given for the four learning styles with the kinesthetic perception channel. Thus, research such as that carried out by Sánchez (2020), establishes the implication of the VAK model and the didactic strategies in the initial level through theoretical arguments and experiences of professionals, including the learning styles in the educational process that allow the child to develop freely in his or her school learning.

It should be noted that, in contrast to the findings of the present study, Velasco (2020), demonstrating a predominant kinesthetic learning style for his population, with 40%, linked the learning styles to potentiate voluntary attention in students through Kolmogorov-Smirnov in the testing of his general hypothesis, where a significance of 0.000 was obtained, indicating that neurolinguistic programming, for its part, does have a considerable influence on the attention of students, and, therefore, with the results of their learning style. Meanwhile, in the present case, it is thought that the fact that

the development of the kinesthetic perception channel is poor, despite being the majority, highlights the need to design activities that optimize its application in the group and do not lag behind the majority learning styles and perception channels.

The Secretary of Public Education (2006) states that the latest research in neurophysiology and psychology has resulted in a new approach to how human beings learn: there is not only one way to learn, each person has a particular way or style to establish a relationship with the world and therefore to learn. With respect to this approach, different models have been developed that approximate a classification of these different ways of learning, so we can confirm that the results of this research are in accordance with these studies, and that all individuals, in any situation, act differently with a different style of teaching and learning, this taking into account that we are always in a constant learning, giving that its usefulness is not only adaptable to the classroom and students, but it is also applicable to any person.

In order to relate the findings of the current study with those of González (2011), it is confirmed that learning is one of the most expensive demands of the context, making it necessary to diagnose the learning style of each student, something that undoubtedly coincides with the rest of the documentation studied as a stimulus to the development of autonomy based on theoretical precepts and pedagogical experiences. According to Velasco (2020), "teachers should know and include the different VAK learning styles in their teaching work, in order to teach in a specialized way and based on the needs and interests of infants, in order to enhance their capabilities, while promoting meaningful learning in early education". Thus, the objective observed in most of the literature was to establish the positive relationship of the VAK method for the promotion of didactic strategies in early education.

Although it can also be presented, that some research such as the one conducted by Hidalgo, A. (2017), denies the existence of any significant relationship between how you do your tasks and learning styles, since a value ($p>0.05$) was evidenced, indicating that the technique used in the development of the tasks is not associated with learning style.

In agreement with Bernal and Rodriguez (2017), for the student's attitude, valued through study habits, these are a factor of direct incidence with the students' academic performance, likewise,

communication with their professors, their academic performance in the commitments and results obtained in the learning units. In the academic field, it is necessary to have diagnostic evaluations of study habits to identify strengths and areas of opportunity to adequately motivate students to face their academic commitments in classrooms, laboratories, clinics and tutoring areas, therefore, all the factors involved in study habits are important in academic performance.

The most important aspects for the optimization of study time are based on the elaboration of a personal study schedule, which also considers the necessary rest time (per hour, day and week); and to establish the practice of the same until it becomes a healthy study habit.

It is agreed with Bernal and Rodríguez (2017), that students limit themselves to comply with the minimum requirements demanded to overcome the performances. This means that their level of motivation is insufficient; they limit themselves to the essential, in order to reproduce in a mechanical way. In such a way that learning is superficial and does not comply with the condition of competence that the demands of current education pose and require, hence the assessment in academic performance, 72% is basic.

In conclusion, the influence of learning styles on the development of learning autonomy is, however, a topic of very little treatment at present. Usually, the processes related to learning are studied independently and no interrelationships are established between them, but it is highlighted in this analysis and discussion of results, that the variables of the different studies, reflected the significant influence of the VAK Model and didactic strategies within the teaching-learning process to promote an optimization of academic performance in the child population.

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