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The Impact of Learning Styles on the Academic Performance of Middle School Students at the Santa Rosa De Lima Fiscomisional Educational Unit, Cañar Canton, Cañar Province, 2022–2023

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ABSTRACT

Low student academic performance is a problem that has been addressed in recent decades. It is expected that these learning problems will be addressed through teaching practices, improving their methodological processes in response to diversity in the classroom. Learning styles are an orientation that allows us to understand this diversity and improve methodological proposals. The objective of this research is to describe the effect generated by various learning styles on the academic performance of middle-level basic general education students in the 2022–2023 school year. For this, a mixed approach research is proposed, with a descriptive scope and field research through the use of the VARK test for learning styles, a grade record to determine academic performance and an observation sheet for teachers. A student population of 88 students and observation of 3 teachers from the institution were considered. The results of the research show that teachers do not tend to generate novel methodological practices, while in learning styles, a prevalence was found in the kinesthetic and visual style, the latter having a correlation with academic performance.

Keywords: Learning styles, Academic performance, Teacher methodology

INTRODUCTION

Interest in the study of learning styles has been growing in recent years, especially regarding its relationship with academic performance, as this reality represents new demands in teaching practices based on the type of students according to their learning styles.

Understanding academic performance as an indicator of the level of learning achieved is currently a subject of debate, as various aspects of learning have yet to be fully measured in the academic sphere, with theoretical learning still prevailing, which often does not translate into practical learning (Bustamante & Cabrera, 2022).

At the same time, the methodologies used by teachers continue to be framed within memoristic-theoretical models, lacking motivation for learning from new theories emerging from an understanding of the learning process itself, which should encourage substantial changes in educational

models, as well as innovative practices within the classroom capable of addressing the diversity in learning styles present in students.

This reality is partly responsible for deficiencies in learning processes within the context of Latin America, and specifically, also in Ecuador.

According to the publication in the Mexican newspaper "El Economista," Latin America has been stagnant at the same academic level for ten years, according to the results of the PISA-D tests (Program for International Student Assessment for Development), which are used as a global reference. In Ecuador, in the same assessment conducted in 2022, it was determined that 49% of students reach the minimum level of reading competencies, 29% in mathematics, and 43% in the area of sciences (OECD, 2023). This highlights the academic reality that must be addressed in the country.

While efforts have been made in recent decades to address this issue, the truth is that problems with the quality of educational performance persist. In this sense, research efforts are important to guide teaching practices that improve academic performance and the quality of learning in students (Muñoz & Fabara, 2018; Estrada, 2018).

Various studies have addressed the relationship between academic performance and learning styles. Generally, these studies have been contextualized in university settings, as specialized teaching processes allow for more precise guidance of teaching-learning methodologies tailored to learning profiles linked to specific fields of study (Díaz, 2019).

Olmedo (2020) states that there is a significant relationship between learning styles and academic performance, based on research conducted with students in Bogotá. The author concludes that this reality influences teaching practices to facilitate better learning processes adapted to students and their learning characteristics.

According to Caballero et al. (2020), the most common learning style among students is the theoretical-pragmatic style, according to Honey Alonso. It has been determined that there is a correlation between this learning style and higher academic performance.

In the Ecuadorian context, Estrada (2018), also found a predominance of the reflective learning style and its positive impact on academic performance. The author further develops a theoretical section suggesting that the reflective style adapts better to traditional pedagogical practices, thus students with this type of learning style benefit more from teaching-learning processes, leading to better academic performance.

Theoretically, learning styles are defined as "ways in which each student learns a particular subject; that is, each one has a different way of learning a subject or a particular task" (Alanya, et al., 2021, p. 420).

Meanwhile, Gutiérrez (2018) states that knowledge of a learning style is predominant when this tendency leads to the possibility of adapting techniques used in the teaching-learning process. This implies that different learning styles coexist in students, but there is usually a predominance of one of those styles.

Learning styles are classified differently by various authors. David Kolb identifies four styles: accommodator, convergent, assimilator, and divergent. Neil Fleming's VARK model, widely used in academia, categorizes

styles based on sensory preferences: visual, auditory, reading/writing, and kinesthetic. (Alanya, et al., 2021).

Understanding learning styles is an approach to grasping the complexity of thought processes and information retention. Each person has a unique way of learning, and classifying learning styles helps in recognizing these individual differences (Marsiglia, et al., 2020).

This study investigates the impact of learning styles and teachers' methodologies on students' academic performance at the middle school level in the 'Santa Rosa de Lima' Educational Unit in Cañar. The aim was to describe how different learning styles affected academic performance during the 2022–2023 school year.

METHOD

This article is based on the interpretive paradigm, which in turn is grounded in the epistemology of constructivism, through which humans do not discover knowledge but construct it systematically (Martínez, 2013).

The study employed a mixed-method approach, incorporating both qualitative and quantitative elements, as the dimensions of the study align with this typology.

The research had a descriptive cross-sectional scope concerning the collection of quantitative data on students' learning styles and the quantification of academic performance.

The sources of information were students and teachers from "Santa Rosa de Lima" Educational Unit in the Cañar canton, categorizing the research process as field research.

The information was obtained through the VARK test for learning styles. In the case of teachers, an observation form was also used to determine their methodological practices, along with a rubric, in addition to quantifying grade records during the specified research period.

The sample consisted of 88 students from the middle school cycle of "Santa Rosa de Lima" Educational Unit in the Cañar canton.

The pedagogical work of three teachers working at the same middle school level of the institution under study was also analyzed.

The data collection instrument was the "VARK Learning Style Inventory," which was developed in 1992 by researchers Freming and Mills. This test determines learning styles based on four variables: visual, auditory, reading-writing, and kinesthetic. Its validation has been conducted in various research studies; specifically, its adaptation and validation into Spanish was carried out by Leite et al. (2009), where reliabilities of 0.85, 0.82, 0.84, and 0.77 were determined for each of the variables (Espinoza, 2019).

With regard to the academic performance variable, it was analyzed through the teaching records in the areas of mathematics, language and literature, social studies, and natural sciences. These grading records are interpreted according to the following table:

Table 1. Qualitative and quantitative qualification records.

Qualitative scale	Quantitative scale
Master the required learning	9-10
Achieve the required learning	7-8,99
Are close to achieving the required learning	4.01-6,99
Not reach the required learning	≤ 4

Source: Ministerio de Educación del Ecuador (2016).

The teaching methodology was evaluated using a checklist (yes/no) with the following indicators:

- The teacher has a variety of teaching materials in order to attend to the diversity of students in the classroom.
- Students' learning rhythms are respected in the process.
- The use of ICT's is characteristic of work in the classroom
- Students have spaces in which, in addition to knowledge, they can develop and show their skills.
- The teacher plans differentiated tasks for students according to their characteristics.
- The teacher uses visual or multimedia material, to support classroom topics.
- Practices are carried out aimed at consolidating knowledge or demonstrating the context of its use.

Finally, the obtained data were processed using SPSS 25 statistical analysis software. Frequency indicators, data dispersion analysis, and correlational analysis of variables were conducted using the Pearson chi-square statistical test.

RESULTS

The assessment of learning styles was conducted using the VARK questionnaire, analyzing the dispersion of scores for each student across different learning styles. These results are presented in the following table.

Table 2. Dispersion analysis of learning styles.

		Statisticians			
		Visual	**Auditory**	**Reader**	**Kinesthetic**
N	Valid	88	88	88	88
	Lost	0	0	0	0
Mean		4,5455	3,4091	2,7841	5,2614
Median		5,0000	3,0000	3,0000	6,0000
Mode		5,00	3,00	2,00	6,00
Dev. Deviation		1,25862	1,20951	1,19817	1,28201

Source: survey applied to students

The analysis of dispersion statistics reveals that the kinesthetic learning style has the highest score, with a mean of 5.26 points, followed by the visual learning style, with 4.54 points. On the other hand, the reading and auditory learning styles have lower mean scores, with 2.78 and 3.40 points respectively.

Statistical Analysis of Academic Performance

Table 3. Statistical analysis of academic performance.

		Statisticians				
		Language and literature	Mathematics	Social Studies	Natural Sciences	Average
N	Valid	88	88	88	88	88
	Lost	0	0	0	0	0
Mean		9,3043	9,2714	9,3909	9,4119	9,3446
Median		9,4500	9,3800	9,6200	9,6350	9,4775
Mode		9,89[a]	9,89	9,98	9,91	9,89
Dev. Deviation		,58379	,58423	,68082	,57907	,51291

a. There are multiple modes. The smallest value is displayed.

Regarding students' academic performance, the averages for each subject area were quantified, and subsequently, the overall average of the four areas considered for this research was also calculated. Overall, it is observed that academic performance is at a high level, categorized as "Exceeds required learning," with an overall score of 9.47, indicating that students demonstrate favorable performance. In terms of each subject area, students' performances are higher in Social Studies and Natural Sciences, with averages of 9.62 and 9.63 respectively. There is not a significant difference in the areas of Language and Literature and Mathematics, which had performances of 9.45 and 9.38 respectively. These data indicate that students' academic performance is highly satisfactory.

Qualitative Analysis of Teachers' Methodological Practices

The qualitative analysis was based on observation forms of teaching practices conducted in each of the areas analyzed with students. The results are described for each area in Table 4, for all areas.

In the Social Studies area, none of the teachers have a variety of didactic materials to address the diversity of students in the classroom. Regarding learning rhythms, none of the three teachers respect the learning process of each student. Regarding the use of ICTs, this was only evidenced in the sixth-grade teacher, while in the other teachers, these materials for learning were not observed. Regarding spaces also destined to develop skills, none of the teachers made use of these learning possibilities. Neither was there recorded visual or multimedia material to support learning in the classroom. Finally, all teachers comply with practices aimed at consolidating knowledge or demonstrating its context of use. In general, the positive scores were: 1, 2, and 1 for each fifth, sixth, and seventh-grade teacher, respectively. That is to say,

the methodology used lacks the capacity to address the diversity of learning types in the Social Studies area.

Regarding the Natural Sciences area, only one teacher showed interest in using visual or multimedia material to support classroom topics (fifth grade), as well as conducting practices aimed at consolidating knowledge or demonstrating its context of use (only present in the fifth-grade teacher). These results indicate that in this area, attention to learning styles is limited.

Regarding the Language and Literature area, it is observed that it is the area where the most use is made of possibilities to address the diversity of learning types. The use of ICTs was reported in the classroom by the fifth and sixth-grade teachers. Additionally, the use of visual or multimedia material to support topics in the classroom was reported, and finally, it was observed that practices aimed at consolidating knowledge or demonstrating its context of use in relation to the learning topic were carried out. This was present in all teachers. The positive scores in this case were: 3, 3, and 3 for each respective teacher.

Regarding the Mathematics area, only two behaviors were recorded in classroom practices that are considered and allow for addressing the diversity of learning styles: one related to the use of visual or multimedia material to support the topics covered in class, observed in all teachers, and practices aimed at consolidating knowledge or demonstrating its context of use, also present in all teachers.

The observational analysis, described narratively, reveals that overall, teachers do not develop activities that allow for addressing the various thinking styles. The classroom work process is largely guided by the textbooks of each knowledge area, prioritizing the reading learning style and relegating other styles that may be more comfortable for each student.

Correlational Analysis

The correlational analysis was conducted using Pearson's chi-square statistical test. A cross-tabulation of variables was performed between each learning style in relation to the overall average of the students. The results are described below.

Regarding the visual learning style with the overall average, a value of $p = 0.043$ was determined, which is less than 0.05, implying that there is a correlation between the variable and academic performance. This suggests that visual learning styles tend to exhibit higher academic performance.

Regarding the auditory learning style and its correlation with the overall average, it was determined that there is no correlation between these variables ($p = 0.58$).

Regarding the variable of the reading learning style and the overall average, a p-value of 0.066 was determined, which is higher than 0.05, indicating no correlation between these variables and academic performance.

Finally, the statistics also indicate that there is no relationship between the kinesthetic learning style and the overall average of the students ($p = 0.805$).

Table 4.

Methodology observation criteria for attention to learning styles.			The teacher has a variety of teaching materials in order to attend to the diversity of students in the classroom.	Students' learning rhythms are respected in the process.	The use of ICT´s is characteristic of work in the classroom.	Students have spaces in which, in addition to knowledge, they can develop and show their skills.	The teacher plans differentiated tasks for students according to their characteristics.	The teacher uses visual or multimedia material, to support classroom topics.	Practices are carried out aimed at consolidating knowledge or demonstrating the context of its use.	Total
Social Studies	5th	yes							X	**1**
		no	X	X	X	X	X	X		**6**
	6th	yes			X				X	**2**
		no	X	X		X	X	X		**5**
	7th	yes							X	**1**
		no	X	X	X	X	X	X		**6**
Natural Sciences	5th	yes						X	X	**2**
		no	X	X	X	X	X			**5**
	6th	yes								**0**
		no	X	X	X	X	X	X	X	**7**
	7th	yes								**0**
		no	X	X	X	X	X	X	X	**7**
Language and Literature	5th	yes			X			X	X	**3**
		no	X	X		X	X			**4**
	6th	yes			X			X	X	**3**
		no	X	X		X	X			**4**
	7th	yes				X		X	X	**3**
		no	X	X	X		X			**4**
Mathematics	5th	yes						X	X	**2**
		no	X	X	X	X	X			**5**
	6th	yes						X	X	**2**
		no	X	X	X	X	X			**5**
	7th	yes						X	X	**2**
		no	X	X	X	X	X			**5**

Source: survey applied to teachers.

From the correlational analyses, it was determined that the visual learning style is the one that has a direct relationship with the highest averages recorded in middle school students.

RESULTS DISCUSSION

Regarding students' learning styles, it was evident that the most relevant ones are kinesthetic and visual learning, which are the most significant in the student group. In a similar study conducted by Rodríguez et al. (2016), it was determined that kinesthetic and visual learning were the most relevant, with equal prevalence (32.5 each) for each of these styles. Visual learning style was the least prevalent in this research. These results differ from those found in the present study; however, it is worth noting that the cited research only focused on the area of mathematics.

In this same line of research, Gómez et al. (2017) found, in a group of students, the prevalence of visual and auditory learning styles, which the author also associated with an active learning style. It was also noted in this same

study a marked tendency towards kinesthetic style in younger students. These findings, according to these authors, allow for a better orientation of methodological practices. Furthermore, it is observed that these data align with those of the present study, in which it was determined that the kinesthetic style is the most prevalent, and it corresponds to younger ages of learning, in this case, middle school.

Regarding students' academic performance, the results revealed that on average, half of the students have reached the required learning (AAR, 50%), while the other half of students are close to reaching the required learning (PAAR, 50%), meaning their scores are approaching but not meeting the required average to pass the course. There were no scores recorded for students who exceed or master the required learning. These findings suggest that students do not have optimal academic performance. These results are below the findings of other research, such as López (2022), whose study determined that the overall average of students was 8.73 and 8.68 points for the groups of students who participated in their research. Scores that exceed the overall average of the students in the present study, which was 6.89.

Furthermore, it was also determined that teachers' methodology does not address the diversity of learning styles, with it being common that ICTs, skills, visual elements, multimedia, and other alternatives to improve the learning experience and address the diversity of learning styles in students are not taken into account. In this regard, Flores's research (2021) indicates that teachers in a large part of their activities do not apply diversity to address learning styles and that generally a class only caters to the reading and visual style. These results are consistent with the findings of this research.

Finally, in the correlation of results, it was determined that the visual learning style correlates with better academic performance. These results align with the findings of Estrada (2018), who states that students with predominantly active learning styles, such as kinesthetic and visual, generally correspond to better results in the classroom. It is also important to consider that academic performance depends not only on this factor but is mediated by multiple factors that should also be taken into account. Particularly, in the present study, it was found that students at this educational level tend to have a preference for kinesthetic thinking, which may also be related to the stage of development they are going through. This guides the methodological possibilities that teachers should capitalize on in these groups of students.

CONCLUSION

According to the present study, it was found that students at the middle basic education level of the Santa Rosa de Lima Educational Unit in the Cañar canton tend to have a preference for the kinesthetic learning style, which is related to activity and the use of the body for learning processes. This characteristic may be related to the developmental stage that students are going through. It was also observed that visual learning is also relevant in students, which allows for the orientation of possible pedagogical practices in these groups for better utilization of methodological processes in teaching practices.

Regarding teaching practices, it was determined in this research that the use of text is the main methodological process that guides their activity in the classroom. Attention is not given to the diversity of learning styles, and learning is reinforced, as a methodological novelty, through the use of images, thus favoring students with a prevalence in visual learning style. These results show the urgency of developing new methodological proposals in teaching practices.

The academic performance recorded in this research was high in most cases. This is because the final records include pedagogical recovery processes that allow students to improve their grades at the end of the year. Possibly, this represents a research bias of the study presented here, as actual performances throughout the year tend to be more diverse than those recorded here.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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