

THE RELATIONSHIP OF STUDY HABITS AND LEARNING STYLES WITH ACADEMIC PERFORMANCE AMONG PROPAEDEUTIC STUDENTS FROM CHAPINGO

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ABSTRACT

The aim of this study was to relate learning styles (LS) and study habits (SH) to academic performance (AP) for propaedeutic students from the Chapingo Autonomous University. To obtain this information, we applied two methods: the Honey-Alonso learning style questionnaire (HALSQ) and the study habits and techniques questionnaire (SHTQ). The sampling included 142 propaedeutic students, from whom we obtained their course grades. The answers to the questionnaire on SH and the LS were analyzed using the Kruskal-Wallis test and the correlation between the different ratings was evaluated. During the first semester, those who stated they had moderate habits achieved the lowest grade (77), and those with good and excellent habits attained similar grades (81.5-81.7). During the first semester, students with very good LS achieved the lowest grade (79). Among students with active LS, no correlation was observed with grades. We conclude that the correlation of study habits and learning styles with academic performance among propaedeutic students at Chapingo Autonomous University was very limited and in many cases there was no significance.

Keywords: agronomy, learning, grades, education, teaching.

INTRODUCTION

In recent years, educational processes have evolved to adapt to technological advances (Juárez, 2018). Education in Mexico has also been progressing and in order to achieve great potential, the Ministry for Public Education (SEP) has generated an agreement, number 01/01/18, which establishes and regulates the National System of High School Education. (DOE, 2018). This has resulted in the application of new methods designed to improve and ensure the acquisition of knowledge required both in personal life and in the informal and formal education of students (Small, 2020). During the educational process, some of the factors that affect academic performance (AP) include socioeconomic level, cultural background, and family influence (Chaparro *et al.*, 2016). However, after the educational reform of High School, the need to also strengthen teaching on the part of parents or guardians, in order to improve academic results has been revealed (DOE, 2018). Students who enter further education at undergraduate level at the Chapingo Autonomous University (UACH) do so in two ways; after secondary to enter the agricultural high

Citation: Peña-Escalona FL, Victorino-Ramírez L, Salinas-Martínez JA, González-Garduño R. 2023. The relationship of study habits and learning styles with academic performance among propaedeutic students from Chapingo. *Agricultura, Sociedad y Desarrollo* <https://doi.org/10.22231/asyd.v20i1.1526>

ASyD 20(1): 92-108

Editor in Chief:
Dr. Benito Ramírez Valverde

Received: March 17, 2022.
Approved: January 9, 2023.

Estimated publication date:
March 16, 2023.

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school and after high school to initiate as propaedeutic students (Rueda and Victorino, 2018). In both cases, entering the UACH causes the students to separate from the family environment when they leave their home and join a new environment, in some cases to live in the university residences and in others by staying in nearby areas, with the support of a scholarship that leads them to become personally and economically independent. This implies a change in study habits (SH) and learning styles (LS), making it important to evaluate and correlate these with AP, as detecting them serves as a reference to design learning environments, where didactic strategies are used to address their learning methods and encourage self-learning (Esquivel *et al.*, 2013).

Results from previous studies indicate differences in the SHs of students; some become autonomous and like to study on their own, however others are not capable of doing this and fail to learn effectively (Kumar, 2015). The development of SHs helps to improve habits, resulting in better learning of knowledge so that in academic training, greater academic performance can be achieved (Ríos-Falcón and Ramos-Enciso, 2013). For this, it is necessary that the student has access to the best conditions in terms of location, techniques and organization of their time, in order to develop methods which they can use during their studies (Sánchez *et al.*, 2016). In this way, good SHs will be developed that allow students to react to new content, which they can appropriate, understand and implement (Mondragón *et al.*, 2017).

Analyzing LS, makes it possible to categorize students according to similarities in the way they learn, implying that instruction based on the theory of LS can result in greater academic achievement (An and Carr, 2017). The evaluation of LS and its aspects, has permitted the development of several models in different contexts, of which the one most commonly applied is the Honey-Alonso questionnaire (Alonso *et al.*, 2007), which has been used widely in research (Quintanal and Gallego, 2011; Esguerra and Guerrero, 2010) and at different levels of study, such as in high school (Zárate *et al.*, 2017).

Therefore, the hypothesis put forward was that students with improved habits and better learning styles would achieve greatest academic performance, so the objective set out in the study was to relate learning styles and study habits to the academic performance of undergraduate students in their propaedeutic year at Chapingo Autonomous University.

METHODOLOGY

The study was of a descriptive-explanatory type, in addition to the SH and LS being correlated with the AP, for which a non-probabilistic convenience sampling was used to quantitatively determine SH and LS.

Tools for evaluation

To obtain the information, two tools were used for evaluation; the Honey-Alonso learning styles questionnaire (HALSQ) (Alonso *et al.*, 2007), containing 80 items altogether, assessing 20 aspects to determine each LS (active, reflective, theoretical and pragmatic)

that were combined throughout. The other tool applied was the questionnaire on habits and study techniques (SHTQ) by Álvarez and Fernández (2015). This was modified according to the methodology used in a previous study (Peña *et al.*, 2021), as this modification achieved positive results, when adapting LS scores to the current scenario. The questionnaire consisted of 60 questions for which six scores were determined: attention in the classroom (AC), study location (SL), study planning (SP), study techniques (ST), projects (PR) and general attitude (GA), each rating was assigned a score from 0 to 100. The evaluation tools were applied in person from January to May 2020, involving a visit to the Eastern Regional University Center (ERUC) in Veracruz and the South-Southeast Regional University Unit in Tabasco. Visits were scheduled in advance and a class timetable was used. After a brief explanation concerning the questionnaires, a printed format was distributed, and any doubts or questions were dealt with, as each form was filled out.

Sample of participants

A non-probabilistic convenience sampling was applied to propaedeutic year students from the Chapingo Autonomous University (UACH), whose programs were designed with reference to proficiency. The study population included all the students (men and women) in their propaedeutic year at UACH and although questionnaires were applied in Yucatán and Texcoco, the sample only consisted of the 142 students from the Tabasco and Veracruz campuses, from whom it was possible to obtain all first and second semester grades. The sample consisted of 51 men with an average age of 19.7 years and 91 women of 20 years of age. All of them answered the two questionnaires and they had access to the grade record for the subjects that made up the first semester of the propaedeutic year, which aims to bring agronomic knowledge up to the same level and includes the following courses (botany of plants with seeds, social sciences I, animal diversity, basic experimental physics, introduction to agricultural and environmental chemistry, mathematics I, agricultural production systems, integrative field trip I, tutorials I), second semester (social sciences II, mathematics II, animal production systems, forestry production systems, integrative study tour II, tutorials II) and options and choices (systematic botany, environmental and ecological economics, communicative English II, introduction to genetics, the cooperative, meteorology, plant propagation, topography, agronomic zoology, fundamentals of transformation and conservation of agricultural products, fruit production, introduction to organic agriculture, plant functions).

Restructuring of the database

To determine the relationship between academic performance and SH and LS, we took high school grades from the first and second semester, together with the general average for the propaedeutic year, and these were correlated with the levels for SH and LS, modified according to the following methodology.

Learning styles. Three categories (Moderate, progressive and very progressive learning style) were generated, independently of LS (active, reflective, theoretical and pragmatic), considering the maximum score for any of the LS. Each student's style was classified according to ratings (Table 1), which were processed using the methodology provided by Alonso *et al.* (2007).

Study habits

Four categories were generated (No habits, moderate habits, good habits, and excellent habits) based on the average for the seven SHTQ ratings with scores from 0-100. However, only three categories were retrieved for the correlation analysis because no data were recorded for the “without habits” category (Table 2).

According to the new categories of SH and LS, the procedure for statistical analysis occurred as follows (Table 3).

Information analysis

The information was processed using the JASP program (JASP Team, 2020) to develop the descriptive statistics of the variables, both overall and for each of the groups studied. The Shapiro-Wilk test was also applied to determine the normality of the response variables and the analysis of variance (ANOVA) was performed using the R program (R

Table 1. Ratings for learning style (number of affirmative answers) for students during their propaedeutic year at Chapingo Autonomous University.

	10%	20%	40%	20%	10%
	Very low preference	Low preference	Moderate preference	High preference	Very high preference
Active	0-7	8-10	11-13	14-15	16-20
Reflective	0-10	11-13	14-16	17-18	19-20
Theoretical	0-9	10-12	13-15	16-17	18-20
Pragmatic	0-9	10-12	13-15	16-17	18-20

Source: self elaborated.

Table 2. Ratings developed for study habits and learning styles.

Study habits		Learning style	
Category	Score	Category	Preference-ratings
No habits (NH)*	<25		
Moderate habits (MoH)	>25 y <50	Moderate style (MoS)	Very low, low and moderate
Good habits (GH)	>50 a <75	Good style (GS)	High
Excellent habits (ExH)	>75 a <100	Very good style (VGS)	Very high

*No student conformed to this category.
 Source: self elaborated.

Table 3. Number of students categorized according to learning style and study habits.

Study habits	Learning style			Total
	Moderate (MoS)	Good (GS)	Very good (VGS)	
Moderate (MoH)	10	11	1*	22
Good (GH)	32	46	23	101
Excellent (ExH)	7	7	5	19
Total	49	64	29	142

*A single student with a very good learning style and moderate study habits was included in the category of good learning style and moderate study habits for purposes of analysis of variance.
 Source: self elaborated.

Core Team, 2020) and the Kruskal Wallis test for variables without normal distribution. Besides this, the correlation between the different ratings for LS, SH and the first and second semester grades, as well as the general average, were evaluated using the Spearman correlation procedure.

RESULTS

During the first semester, those who reported having moderate habits achieved the lowest score (77), while those with good and excellent habits showed a higher score (81.5-81.7) although mutually similar. The average high school grade did not present differences ($P > 0.05$) concerning any of the independent variables studied. There were also no differences between men and women in terms of any of the scores. For LS during the first semester, behavior was not as expected, as the VGS group achieved the lowest score (79) and the same for the general average. Grades for both the first semester, second semester and general average were higher among students from Veracruz than among those from Tabasco. During the second semester, no differences were observed for LS and for SH, the highest score was obtained by those with good habits (Table 4).

Considering the total number of students involved, 32.4% were located in the middle values for the two ratings, that is, with a good learning style and good study habits, and the second combination that included the most students, manifested moderate style and good habits with 22.5%. Only 3.5% considered themselves to have excellent habits and very good learning style (Table 5).

Study habits and learning style in relation to academic performance

The categories formed by combining SH and LS showed that the students from Veracruz maintained higher grades in most of the categories. Veracruz students with excellent study habits and good and very good learning styles had the highest averages. However, among those from Tabasco the opposite occurred. Behavior concerning good habits and moderate habits, showed a very similar response in both Tabasco and Veracruz (Figure 1).

Table 4. Average grades for students in their propaedeutic year in the Tabasco and Veracruz regions.

Variables	N	Academic achievement (Grades)			
		High school average	Prepaedeutic 1st Semester	Prepaedeutic 2nd. Semester	General average
Study habits		ns	**	**	**
Moderate	22	86.6 ^a	77.1 ^b	75.8 ^b	78.6 ^b
Good	101	87.3 ^a	81.7 ^a	85.8 ^a	84.6 ^a
Excellent	19	88.4 ^a	81.5 ^a	79.4 ^b	83.7 ^a
Learning style		ns	*	ns	**
Moderate	49	87.8 ^a	82.2 ^a	84.3 ^a	85.2 ^a
Good	65	86.8 ^a	80.8 ^{ab}	83.7 ^a	83.5 ^{ab}
Very good	28	87.6 ^a	79.1 ^b	81.4 ^a	81.1 ^b
Origin		ns	**	**	**
Tabasco	59	88.7 ^a	75.9 ^b	76.5 ^b	80.0 ^b
Veracruz	83	86.3 ^a	84.5 ^a	88.0 ^a	86.1 ^a
Sex		ns	ns	ns	ns
Men	91	86.6 ^a	81.4 ^a	83.2 ^a	83.7 ^a
Women	51	88.6 ^a	80.1 ^a	84.0 ^a	83.4 ^a
Standard deviation		7.2	6.0	8.2	6.6

N: Number of students.

Source: self elaborated.

Correlation Between Study Habits and Grades

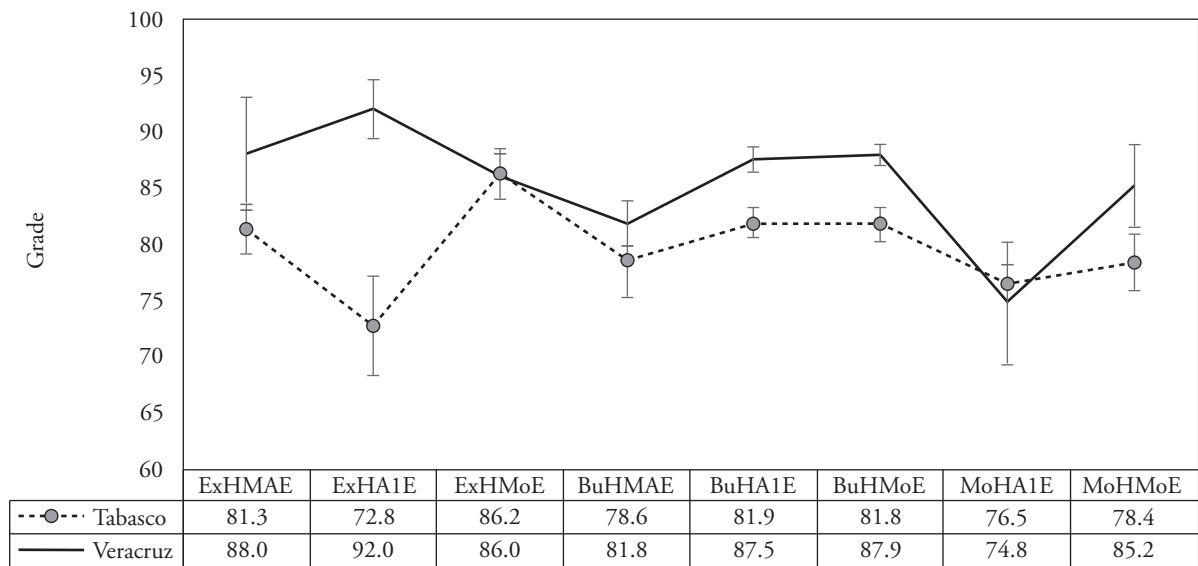
The lowest average for SHs corresponded to study planning, valued at 25 on a scale of 100. All the other SHs were above 60 and the general average for SHs was 63.2. The first semester grade was lower than the second semester grade. The Shapiro-Wilk test revealed that not all SH ratings and grades presented normal distribution; only those for the first semester, so the correlations were analyzed using Spearman (Table 6).

Spearman's correlations are presented in Figure 2. Evidently, none of the grades correlated with the SH by more than 30%, so we can conclude that correlations with SH scores were low.

Table 5. Percentage of students in their prepaedeutic year at Chapingo Autonomous University, in terms of their learning style and study habits.

Study habits	Learning style			Total
	Moderate (MS)	Good (GS)	Very good (VGS)	
Moderate (MoH)	7.0 %	7.7 %	0.7 %	15.5 %
Good (GH)	22.5 %	32.4 %	16.2 %	71.1 %
Excellent (ExH)	4.9 %	4.9 %	3.5 %	13.4 %
Total	34.5 %	45.0 %	20.4 %	100.0 %

Source: self elaborated.



Study habits and learning style

Source: self elaborated.

Figure 1. Average grades of students from Tabasco and Veracruz in relation to study habits and learning styles.

Correlations Between Learning Styles and Grades

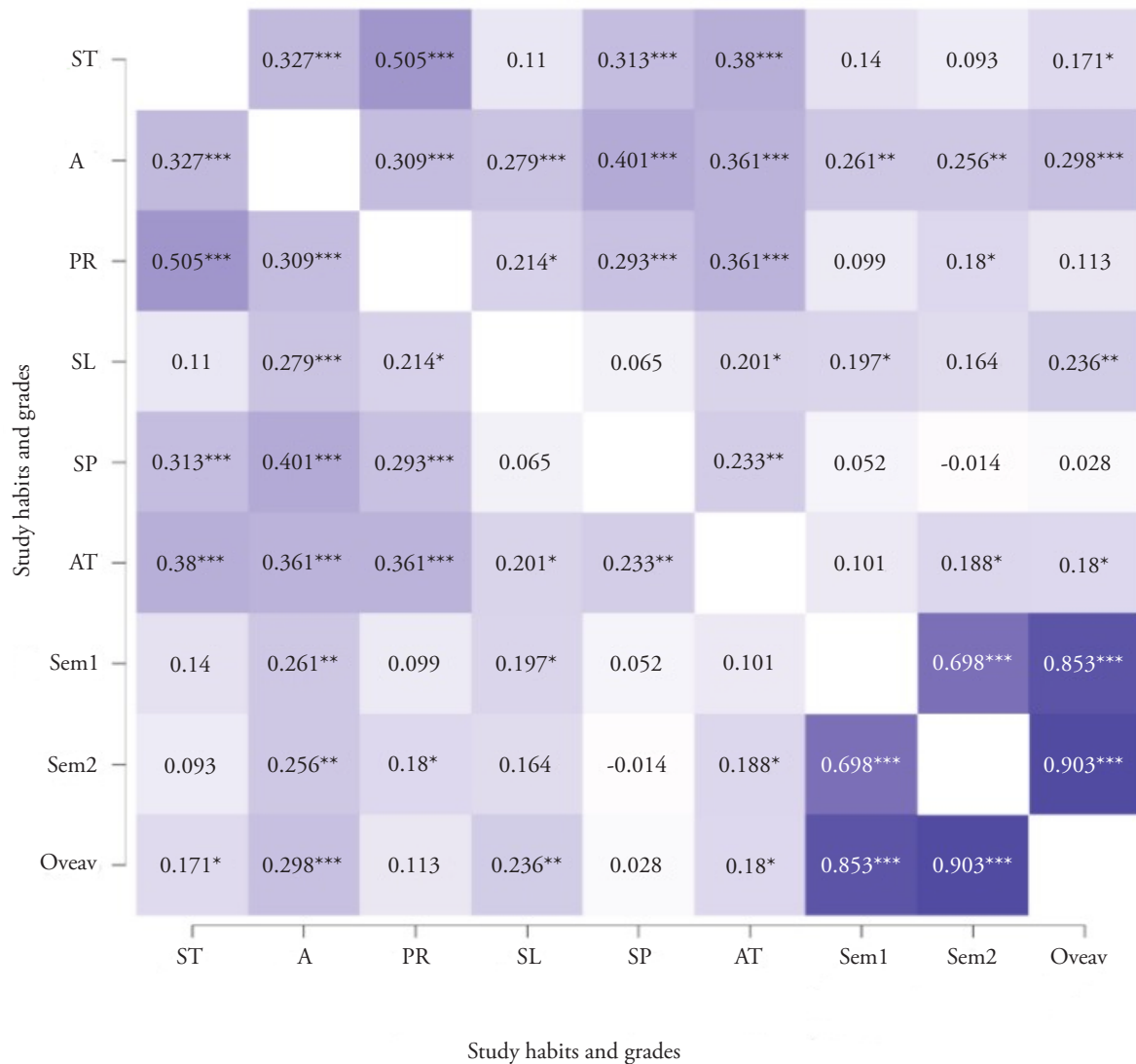
Tests indicated that learning styles were average, and reflective, theoretical and pragmatic styles did not have a normal distribution; however active style showed a normal distribution (Table 7).

Because most of the learning styles did not present a normal distribution, we applied Spearman's correlations between learning styles and grades. In a way similar to SH, in the case of LS, the highest correlation coefficients were 0.18, which indicates that LS does not

Table 6. Averages for study habit ratings and academic performance (grades) by semester and overall, for students from Veracruz and Tabasco.

Statistical	Study habits						Grades			
	ST	A	PR	SL	SP	AT	Sem1	Sem2	Gral	AvSH
Average	66.7	80.0	60.0	62.5	25.0	72.0	81.0	83.6	84.0	63.2
Mid point	69.9	79.0	57.9	56.2	33.0	74.2	80.9	83.5	83.6	61.7
Standard error	1.4	1.5	1.8	1.4	1.9	1.3	0.6	0.9	0.6	1.0
Standard deviation	17.0	17.9	21.0	17.2	23.2	16.0	7.5	10.3	7.6	11.9
Shapiro-Wilk (P)	**	**	**	**	**	**	ns	**	**	*

ST: Study technique, A: Attitude, PR: Projects, SL: Study location, SP: Study Planning, AT: Attention in class, Sem1: 1st semester, Sem2: 2nd semester, Gral: General average for prepaedeutic year, AvSH: Average for study habits.
 Source: self elaborated.



ST Study technique, A Attitude, PR Projects, SL Study location, SP Study Planning, AT Attention in class, Sem1 1st semester, Sem2 2nd semester, Oveav Overall average.

Source: self elaborated.

Figure 2. Correlations between study habits and academic performance (grades) among high school students from Tabasco and Veracruz.

correlate with grades. The correlation coefficient was negative in many cases, especially concerning the active style, whereas the other styles had no correlation with AP (Figure 3).

Correlations between study habits and learning style

Low correlations were apparent between SH and LS. The highest value corresponded to 38% for theoretical style that involved greater planning. It was also apparent that

Table 7. Learning style averages for students from Veracruz and Tabasco.

	Statistical	Active	Reflexive	Theoretical	Pragmatic
N		142	142	142	142
Mid point		12.0	15.0	14.0	14.0
Average		11.8	14.6	13.5	13.5
Standard deviation		2.9	2.9	3.0	3.1
Variance		8.8	8.8	9.1	9.7
P value for Shapiro-Wilk		ns	**	**	**

Source: self elaborated.

theoretical students score higher for study techniques, whereas the study location was the category that had the lowest correlation with LS (Figure 4).

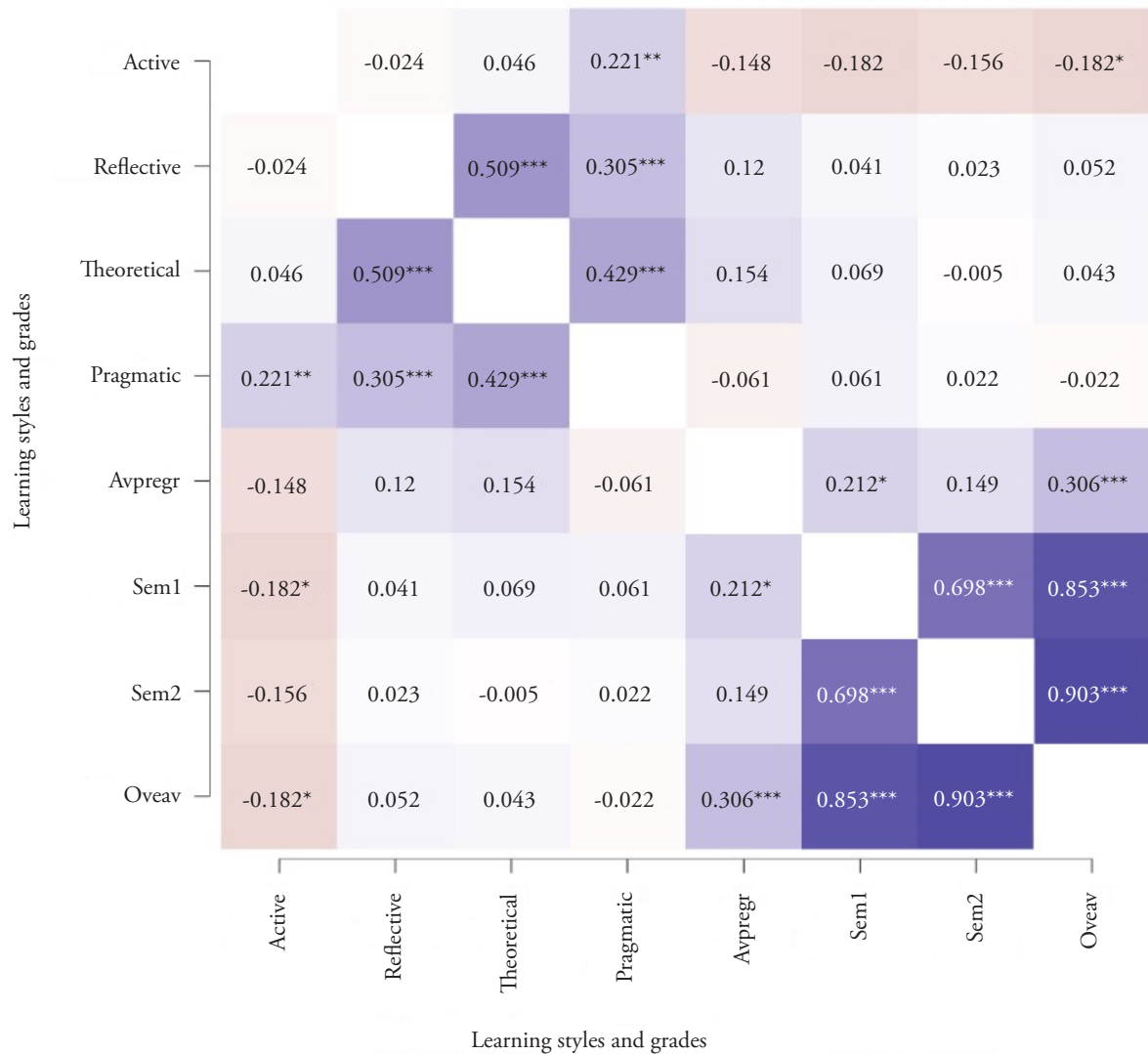
Number of students who failed in each category

The students who indicated they had good SH were the ones who registered the highest number of failed subjects, especially those who indicated they had good LS. Those with moderate habits and good style failed up to three subjects and those with excellent habits and very good style failed two subjects (Table 8).

DISCUSSION

Study habits

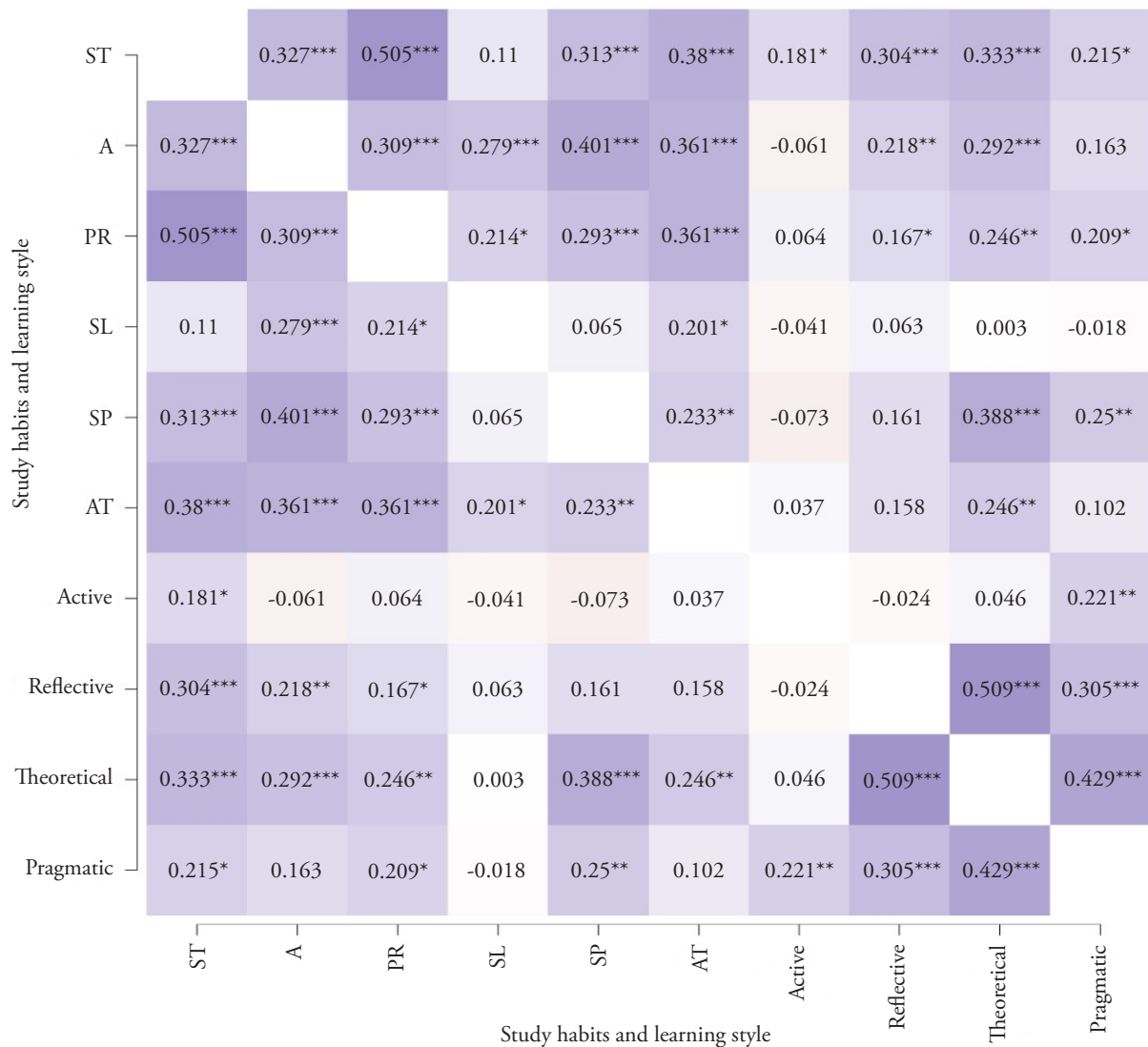
The six SH levels consisting of the environmental conditions of study location (SL), study techniques (ST), attitude (A), attention (AT) and projects (PR), show scores from 60 to 80, except for study planning (SP), which attained a score of 25. These grades manifested a medium to low tendency, similar to that shown by secondary school students (Prada-Núñez *et al.*, 2020). Also among secondary students, the existence of deficiencies in SH has been revealed and generally occurs because students do not organize their time, location, techniques or study methods, prejudicing their academic performance (Manrique and Estrada, 2020). Although unlike what was observed in this study, higher than average scores were also obtained in secondary school, in terms of study planning. For the UACH high school students, this was the rating with the lowest score. Similarly, high school students presented a very low average for the aspects of physical condition and home work (Prada-Núñez *et al.*, 2020). In the case of students in their prepaedeutic year, ratings for home work reached only 57.9 points because of failure to comply with project deadlines, inadequate consultation in books or other sources to clarify doubts, combined with a failure to elaborate study schedules, and the fact that some do not take notes, or identify themes that require study; in addition to problems in writing and spelling. Although no differences were observed between the sexes of students in their prepaedeutic year at UACH in terms of academic performance, according to a previously published general



Avpregr: average previous grade, Sem1: 1st semester, Sem2: 2nd semester, Oveav: overall average.
 Source: self elaborated.

Figure 3. Correlations between learning styles and academic performance (grades) among preparatory students from Tabasco and Veracruz.

study, the SHs of women were better than those of men (Peña *et al.*, 2021). Other literary sources also indicate a higher academic performance among women (Aluja and Blanch, 2004). Concurring with other studies, SH had such low correlations with AP that they are not practically significant, as indicated among undergraduate students of business (Mondragón *et al.*, 2017), and similarly among mechanical engineering students (Bayona and Ricon, 2017). In other cases, correlations are reported between AP and A, PL, SL, ST and PR levels. However, the values for these correlations are less than 40% (Capdevila and



ST: Study technique, A: Attitude, PR: Projects, SL: Study location, SP: Study Planning, AT: Attention in class.
 Source: self elaborated.

Figure 4. Correlations between study habits and learning style among high school students from Tabasco and Veracruz.

Bellmunt, 2016). The same situation has been observed in Ecuador, where the correlations ranged between 22 and 40% between SH and AP (Sánchez *et al.*, 2016). For nursing, using the SH inventory, it was observed that study habit, exam preparation, attention in class and companionship while studying, related to academic performance (Soto and Rocha, 2020). However, the degree that these variables correlated with each other is not indicated, an aspect which is very important for determining ratings that require attention, in order to improve AP.

Table 8. Number of students who failed during the first semester as relates to study habits and learning style.

Habits Style	Excellent			Good			Moderate		Total
	Very good	Good	Moderate	Very good	Good	Moderate	Good	Moderate	
NFS									
0	4	3	7	12	30	23	3	5	87
1	0	2	0	4	9	7	4	2	28
2	1	1	0	3	4	2	4	2	17
3	0	1	0	2	3	0	1	1	8
4	0	0	0	1	0	0	0	0	1
5	0	0	0	1	0	0	0	0	1
Total	5	7	7	23	46	32	12	10	142

NFS: Number of failed subjects.

Source: self elaborated.

When using other tools for evaluating SH among children with high academic performance, it is apparent that seven habits are critical, including reading at home with parents, having family support, a healthy and nutritious diet, early stimulation or preschool education, study habit, the preschool habit of mastering two languages, and adequate rest and sleep (Vilca and Mamani, 2017); aspects that are not included in the SHTQ, meaning comparisons cannot be made.

Few studies report high correlations between SH and AP, as was the case for secondary school students, who show correlation values higher than 56% in terms of completing homework, exam preparation, paying attention in class, and studying. This indicates that if students improve their habits, they will perform adequately and their academic performance will be optimal (Manrique and Estrada, 2020). However, many other studies, including these results indicate limited correlation between SH and AP.

Learning style

Concerning LS and its relationship with AP, the greatest percentage of students (45%) at UACH in their propaedeutic year had a good learning style (GLS) and an inclination to be more reflective, with an average score for all these aspects of 83.5; however, an unexpected outcome showed that students with moderate style (MoS) achieved a higher grade (85.2), indicating that LS is not positively correlated with the grade, which coincided with the negative correlation coefficient obtained. In general, it was apparent that students with active LS had a negative correlation coefficient with the grade for the two semesters, as well as with the general grade average, while the other styles did not present significant correlation with AP ($P > 0.05$).

The literature shows highly variable correlations between AP and LS, some studies indicate significance even when the values are very small and others indicate that there are no correlations between these variables. Some of the cases with apparent positive

correlations indicate that the AP of the participants depends on LS, demonstrating that students with theoretical style obtained the lowest academic performance, because they prefer more structured and complex learning methods (Ramírez *et al.*, 2017). Likewise, in their comparison between Chilean and Mexican students, they found that reflective style was predominant among Chilean students, whereas the Mexican students presented greater tendency towards theoretical and pragmatic styles. Thus, students with high academic performance prefer to embrace an active style, whereas students with regular performance usually employ a theoretical learning style. In a comparative study between various careers, a positive relationship was also observed between pragmatic LS and AP, among students in the Computer Systems and Industrial Engineering careers, whereas a positive relationship was evident between theoretical LS and AP among Electromechanical Engineering students. However, only one case manifested the highest correlation value of 40%, so the correlation values in general were low (Ortiz and Canto, 2013). A very low correlation (20%) was also observed among Psychology students, with a greater tendency towards a reflective style and a significant relationship is indicated between learning style and AR among students employing an active and reflective style (Esguerra and Guerrero, 2010). Few studies refer to the level of correlation between the aspects that comprise each of the four ratings that make up the HALSQ or indicate whether they are high or low, but one study indicates that concerning correlation coefficients for active style; 15 queries showed a moderate correlation ($r \geq 0.30$), three showed a weak correlation ($r \geq 0.20$), and two a poor correlation ($r \geq 0.08$), (Juarez, 2014); it is therefore possible to discover which queries should be addressed to improve grades, because it seems that citing the type of LS only indicates the character of the students, as with the case of the rural sociology students at the UACH, who often manifested reflective style, which is more in line with a scientific context (Aguilar-Antonio *et al.*, 2017); however no data is provided to help improve performance. The Pearson correlation coefficient was used to determine the relationship between the four categories of learning styles. A significant positive relationship was found between the theoretical and reflective learning styles and between the pragmatic learning style and the other three learning styles (active, reflective and theoretical) (Ortiz and Canto, 2013). Using other tools, it becomes apparent that the correlations depend on the aspect (cognitive, procedural or attitude) together with the LS and the way they were implemented, suggesting that the analysis needs to be differential and specific for each student, so that results become an opportunity for students, teachers and the educational community in general to appropriate the particularities and implications of varied LS for the benefit of AP. This will provide institutional curricular proposals, didactic strategies and comprehensive educational approaches that involve the needs and interests of students, and also consider their potential and weaknesses (Olmedo-Plata, 2020)

Limited correlation or the absence of relationships between LS and AP have been shown in nursing, which shows that AP does not coincide with results from LS because although the predominant learning style was reflective in this educational context, a statistical

association with AP was not apparent (Chambi-Choque *et al.*, 2020). The studies that manifest a weak relationship between LS and AP, indicate that there are other factors that influence the AP of students, such as personality, and also cognitive, motivational, and emotional factors that in many cases are not integrated into studies (Magdalena, 2015). It is thus important to consider the student's context; the teaching strategies used by teachers and the curricular content taught for both careers within the educational system (Caballero *et al.*, 2015). Some authors agree that AP does not only depend on a single factor but is the combination of factors specific to the student (learning) such as motivation, lack of study habits and learning styles, or limited stimulation on the part of teachers (teaching) and institutional conditions. In the same way, various studies seek to find reasons for poor AP, which has been attributed to multiple factors (Soto and Rocha, 2020). In the case of the UACH students, the poor correlation between SH, LS and AP suggest that there are other factors involved in AP, as the maximum correlation values found were only 40%, which is a low value.

However, results also depend on way in which the LS are measured, so while the results provided by the HALSQ indicate that the active style is the one that achieves the lowest scores, in the Index of Learning Styles (ILS), it is the active criteria that show an overwhelming predominance over the reflective ones (Escanero-Marcén *et al.*, 2018). It has also been observed that as students progress in their studies, LSs change, so that at the beginning of the degree the reflective style predominated, whereas at the end of the fifth year, this together with the theoretical style were the most represented; at the end of the fifth academic year, 72.47% of the students modified their learning style and obtained better grades; the greatest association was found between the theoretical and reflective styles, and also between the pragmatic and active styles. A correlation was also observed between style and accumulated academic performance (Martínez-Pérez *et al.*, 2021).

The tendency in educational research to measure academic performance is to do this from a practical point of view, where success or failure is related to immediate results, that is, with student grades at a particular time. This regards academic failure as a phenomenon that manifests itself among students who present poor academic performance or who have little chance of passing subjects (Nivela-Cornejo *et al.*, 2019).

CONCLUSIONS

The highest grades were observed among students with good and excellent study habits. The lowest average for study habits corresponded to study planning and none of the scores correlated with study habits by more than 30%, so the correlation of study habits with academic performance was very low.

Students with a moderate learning style achieved the highest grades in both the first and second semester, as well as in their overall average. However, the highest correlation coefficients were 0.18, which indicates that learning style correlates very little with grade.

In some cases the correlation coefficient was negative, whereas some styles showed no correlation with academic performance.

Academic performance was higher among students from Veracruz than Tabasco, while the sex of the students did not influence this variable.

Low correlations could be observed between study habits and learning styles. The highest value corresponded to theoretical style, which implied greater planning. It was also apparent that theoretical students have higher scores for study techniques, whereas study location was the category that had the lowest correlation with learning styles. This must be taken into account by the institution together with the teachers, in order to help improve study habits and also to strengthen the learning styles of students, which will be reflected in better academic performance.

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