

ORIGINAL

Study Techniques and Academic Performance in Human Medicine at a University in Cajamarca 2024

Técnicas de Estudio y Rendimiento Académico en de Medicina Humana en una Universidad de Cajamarca 2024

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Citar como: Gonzales Carranza ÁR, Huamán Florián MA, Bazualdo Fiorini E, Saavedra Alvarado TW, Leyva Chávez MA. Study Techniques and Academic Performance in Human Medicine at a University in Cajamarca 2024. Neurodivergences. 2025; 4:182. <https://doi.org/10.56294/neuro2025182>

Enviado: 21-03-2025

Revisado: 17-06-2025

Aceptado: 07-10-2025

Publicado: 08-10-2025

Editor: Prof. Dr. Javier González Argote 

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ABSTRACT

Objective: determine the relationship between study techniques and academic performance of students. second and third year students of Human Medicine at a university in Cajamarca 2024.

Method: quantitative, non-experimental, transectional and correlation-type study, with a sample made up of 108 students from the second and third year of the Human Medicine degree in the year 2024. A reliable unified questionnaire was used (Study techniques and academic performance in Human Medicine students Cronbach 0,72), the statistic was used for data analysis descriptive and inferential, determining significance at $p<0,05$.

Results: no one found relationship between the variables of study techniques and academic performance. It was observed that the is the most used technique at 42,6 %, while active memory and repetition spaced are the least used at 50,0 % and 38,9 % respectively. Furthermore, it was found a significant relationship of the variables gender and academic condition with academic performance in 0,045 and 0,003 respectively.

Conclusion: there is no positive relationship between the techniques of study and academic performance. It was identified that the most used study techniques are those of low and medium utility. It was also established that the academic performance category was superior to the average. Finally, it was found that other factors can influence academic performance. such as the female sex and the regular academic cycle.

Keywords: Study Techniques; Academic Performance; Active Memory.

RESUMEN

Objetivo: determinar la relación entre las técnicas de estudio y el rendimiento académico de los estudiantes de segundo y tercer año de Medicina Humana en una universidad de Cajamarca 2024.

Método: estudio cuantitativo, no experimental, transeccional y de tipo correlacional, con una muestra conformada por 108 alumnos del segundo y tercer año de la carrera Medicina Humana en el año 2024. Se usó un cuestionario unificado confiable (Técnicas de estudio y rendimiento académico en estudiantes de Medicina Humana Cronbach 0,72), se utilizó para el análisis de datos la estadística descriptiva e inferencial, determinando la significancia en $p<0,05$.

Resultados: no se encontró una relación entre las variables de técnicas de estudio y rendimiento académico. Se observó que la autoexplicación es la técnica más usada en un 42,6 %, en cambio el recuerdo activo y la repetición espaciada son las menos utilizadas en 50,0 % y 38,9 % respectivamente. Además, se encontró una

relación significativa de las variables género y condición académica con el rendimiento académico en 0,045 y 0,003 respectivamente.

Conclusión: no existe una relación positiva entre las técnicas de estudio y el rendimiento académico. Se identificó que las técnicas de estudio más utilizadas son las de baja y media utilidad. También se estableció que la categoría del rendimiento académico fue superior al promedio. Finalmente, se encontró que otros factores pueden influenciar en el rendimiento académico tales como el sexo femenino y el ciclo académico regular

Palabras clave: Técnicas de Estudio; Rendimiento Académico; Autoexplicación; Recuerdo Activo.

INTRODUCTION

The human medicine degree is a challenging path for university students due to the breadth of new knowledge they encounter. Therefore, they must decide on the best techniques that allow them to study adequately and advantageously.⁽¹⁾ These techniques make it easier for students to approach, understand, execute, and retain information on a topic.⁽²⁾ Indeed, to have a good study technique, students need to show interest, because if there is no motivation to learn, no method will be effective, as motivation is the most significant predictor of academic performance.⁽³⁾ Academic performance evaluates purposes and objectives in education, as poor academic performance indicates difficulty in learning a subject.⁽⁴⁾ That is why it is grouped into two categories: satisfactory performance (excellent, good, and fair) and unsatisfactory performance (poor).⁽⁵⁾

From a global perspective, one option that leads us towards effective learning is the exploration of techniques in various countries and their relationship with academic performance. In Spain, at the end of 2022, Amaia Urrizola concluded that practice tests are one of the most effective learning techniques among university students, while rereading, underlining, and summarizing are less effective.⁽⁶⁾ In the same year, Ana Francisco and colleagues mention that study techniques are perceived as difficult, but once learned, they can be used to one's advantage and facilitate learning a subject.⁽⁷⁾ Furthermore, in Iran, Ramezani and contributors indicate that university students who use strategic and in-depth study perform better than those who memorize details without any coherence.⁽⁸⁾ However, other factors, such as alcohol consumption, skipping breakfast, and lack of sleep, can also negatively influence academic performance.⁽⁹⁾

In Peru, Najarro Vargas notes that the advantages of study techniques include reducing the time spent studying, as underlining, making notes in the margins of books, and speed reading decrease the number of repetitions required to learn a subject.⁽¹⁰⁾ In the same year, a study of third-year medical students in Lima revealed that they possess an excellent attitude and strong motivation to study, as they manage their time effectively, concentrate during study sessions, process the information they learn, and review it daily before exams, resulting in good academic performance.⁽¹¹⁾ In this regard, months later, Soto and Rocha concluded that cognition, motivation, study techniques, and learning styles all contribute to determining academic performance.⁽¹²⁾ However, other factors that affect academic performance, according to Otero Zapata, in students in Lima in the first semester of 2020, are: age, anxiety, depression, symptoms similar to ADHD, and drug and alcohol use.⁽¹³⁾ However, an anonymous survey of 88 medical students conducted in Tacna in 2021 determined that motivation does not affect academic performance.⁽¹⁴⁾ Additionally, within the same year, many medical schools in Lima employed active learning or recall, with simulation being one of the primary tools, enabling students to construct their own education⁽¹⁵⁾ individually. Furthermore, over the course of a year, an observational study of students in Huancayo revealed that 70 % of them employed active recall techniques, such as spaced repetition, with flashcards and self-assessments being the most commonly used by high-performing students.⁽¹⁶⁾

This study is essential because most medical students lack adequate study techniques, and improving them would save time, facilitate a better understanding of the subject being studied, enable long-term retention of information, enhance learning capacity, and lead to improved academic performance. At the regional level in the department of Cajamarca, no similar research was found, leaving us with the question: How does the use of study techniques influence academic performance in human medicine students at a university in Cajamarca in 2024? We propose the hypothesis that there is a relationship between study techniques and academic performance in human medicine students at a university in Cajamarca during the study period. Therefore, the main objective was to determine the relationship between study techniques and academic performance in Human Medicine students. Other objectives were to identify the different types of study techniques, establish the category of academic performance, and finally find other factors that influenced the academic performance of medical students at the University of Cajamarca during the study period.

METHOD

The study was quantitative because it sought to verify the validity of the hypothesis. It was non-experimental

in design, as no variables were manipulated to reflect the objective reality of academic performance and its relationship to study techniques. It was cross-sectional because it was conducted at a single point in the scholastic period, between April and May, among UNC students, and it was correlational in nature, as it established the relationship between the variables “study techniques” and “academic performance”.⁽¹⁷⁾

The study population consisted of 150 second and third-year medical students, and a non-probabilistic sampling method was employed. To find the sample, the finite population formula was used, resulting in a necessary sample size of 108 students with 95 % confidence and 5 % error.

Data collection was obtained through an indirect survey, using the online Google Forms questionnaire to determine the use of study techniques. The questionnaire “Study techniques and academic performance in human medicine students at a university in Cajamarca 2024” includes an introduction, presentation, and general data on the respondent. The study technique variable has 10 questions and 10 dimensions: question formulation, self-explanation, summarizing, underlining, mnemonics, images for text, rereading, active recall, spaced repetition, and interleaved practice. The Likert scale was applied, with one indicating “never” and five indicating “always,” using closed questions, and categorized into low, moderate, and high utility techniques. Meanwhile, for academic performance, a closed-ended question was used, based on the annual weighted average grade, and the following scale was used: above average (15-20), average (13-14,99), and below average (00-12,99). The variables demonstrated an acceptable reliability (Cronbach’s alpha) of 0,72, as reported in a study conducted in Lima⁽¹⁸⁾.

Likewise, for data analysis, SPSS version 26 statistical software was used, employing descriptive techniques to calculate percentages and present the results in frequency tables. Inferential statistics were also employed to establish the relationship between the variables and address the project’s objectives. The Kolmogorov-Smirnov test revealed that the data did not follow a normal distribution, with a significance level of $p > 0,05$ (0,159) for study techniques and $p < 0,05$ (0,000) for the academic performance variable. Therefore, the Spearman test was used to compare the two variables, yielding a significance value of $p < 0,05$.

From an ethical perspective, the voluntary participation of students, integrity, and the avoidance of harm to the respondent were ensured, and validity was of utmost importance throughout the study. For this reason, information on other variables affecting the student was requested. In addition, the information obtained from the participants was confidential, as the names of the respondents were not disclosed. Participation was also voluntary, as an informed consent form was presented before the survey. Information was also requested on other variables that influenced the participants, to ensure their confidentiality subsequently.

RESULTS

Table 1. General characteristics of second- and third-year human medicine students at a university in Cajamarca, 2024

	Nro.	(%)
Total	108	100 %
Age (Average)	20,51	
Under 20	58	53,7 %
21-25	48	44,4 %
Over 25	2	1,9 %
Number of courses enrolled in (average)		
Year of study		
Second	63	58,3 %
Third	45	41,7 %
Gender		
Male	53	49,1 %
Female	55	50,9 %
Perceived socioeconomic status		
Wealth	2	1,9 %
Middle class	83	76,9 %
Poverty	20	18,5 %
Extreme poverty	3	2,8 %
Hours of study per day		
Less than 1 hour	18	16,7 %

Between 1 and 2 hours	53	49,1 %
Between 3 and 4 hours	22	20,4 %
More than 4 hours	15	13,9 %
Academic status*		
Regular	97	89,8 %
Irregular	11	10,2 %

Table 1 shows that the predominant socioeconomic level is middle class, at 76,9 %, followed by poverty, at 18,5 %. With regard to study hours, the vast majority study between 1 and 2 hours, representing 49,1 %, followed by 20,4 % who study between 3 and 4 hours. Academically, most students have a regular academic status, representing 89,8 %, while 10,2 % have an irregular status.

Table 2. Use of study techniques according to their usefulness in second- and third-year human medicine students at a university in Cajamarca, 2024

LOW-UTILITY TECHNIQUES	Nro.	(%)	Promedio
Summary			
Low frequency	58	53,7 %	
High frequency	50	46,3 %	
Highlighted and underlined			
Low frequency	46	42,6 %	
High frequency	62	57,4 %	
Keyword mnemonics			45,7 %
Low frequency	57	52,8 %	
High frequency	51	47,2 %	
Images for text			
Low frequency	60	55,6 %	
High frequency	48	44,4 %	
Rereading			
Low frequency	69	63,9 %	
High frequency	39	36,1 %	
MODERATELY USEFUL TECHNIQUES			
Question formulation			
Low frequency	68	63,0 %	
High frequency	40	37,0 %	
Self-explanation			36,7 %
Low frequency	42	38,9 %	
High frequency	66	61,1 %	
Interleaved practice			
Low frequency	89	82,4 %	
High frequency	19	17,6 %	
HIGH-UTILITY TECHNIQUES			29,6 %
Active recall			
Low frequency	64	59,3 %	
High frequency	44	40,7 %	
Spaced repetition			
Low frequency	76	70,4 %	
High frequency	32	29,6 %	

Nota: Baja frecuencia: Nunca, A veces y la mitad de las veces; Alta frecuencia: Frecuentemente, Siempre

Table 2 shows that the most commonly used study techniques are of low usefulness, with underlining and summarizing being the most frequent at 45,7 %, while techniques of moderate usefulness accounted for 36,7

%, with self-explanation being the most commonly used, followed by question writing and spaced practice. However, 29,6 % used highly useful techniques, such as active recall and spaced repetition.

Table 3. Academic performance based on the weighted average of second- and third-year human medicine students at a university in Cajamarca, 2024

ACADEMIC PERFORMANCE	No.	%
Above Average 15-20	77	71,3
Average 13-14,99	29	26,9
Below average 00-12,99	2	1,9

Table 3 shows that a large proportion of students have above-average academic performance, representing 71,3 %, within the average 26,9 %, and below average 1,9 %.

Table 4. Characteristics of second- and third-year human medicine students at a university in Cajamarca according to their academic performance, 2024							
	Academic performance						p-value
	Above average		Average		Below average		
	Nro.	(%)	Nro.	(%)	Nro.	(%)	
Total	77		29		2		
Age							
Under 20	43	39,8 %	13	12,0 %	2	1,9 %	0,857*
21-25	32	29,5 %	16	14,8 %	0	0,0 %	
Over 25 years old	2	1,9 %	0	0,0 %	0	0,0 %	
Current year							
Second	48	44,4 %	15	13,9 %	0	0,0 %	0,130*
Third	29	26,9 %	14	13,0 %	2	1,9 %	
Gender							
Male	32	29,6 %	19	17,6 %	2	1,9 %	0,045*
Female	45	41,7 %	10	9,3 %	0	0,0 %	
Perceived socio-economic status							
Wealth	0	0,0 %	1	0,9 %	1	0,9 %	0,882
Middle class	62	57,4 %	21	19,4 %	0	0,0 %	
Poverty	13	12,0 %	7	6,5 %	0	0,0 %	
Extreme poverty.	2	1,9 %	0	0,0 %	1	0,9 %	
Hours of study per day							
Less than 1 hour	14	13,0 %	3	2,8 %	1	0,9 %	0,572
Between 1 and 2 hours	37	34,3 %	15	13,9 %	1	0,9 %	
Between 3 and 4 hours	17	15,7 %	5	4,6 %	0	0,0 %	
More than 4 hours	9	8,3 %	6	5,6 %	0	0,0 %	
Academic status							0,003*
Regular	72	66,7 %	24	22,2 %	1	0,9 %	
Irregular	5	4,6 %	5	4,6 %	1	0,9 %	
Note: *Pearson's chi-square							

Table 4 shows that among students with above-average academic performance, females predominate with 41,7 %, with a high significance of 0,045. It also shows that regular academic status, with 66,7 %, has a high significance of 0,003 with respect to academic performance. Furthermore, the middle class is predominant at 57,4 %, followed by those in their second year at 44,4 %, those under 20 years of age at 39,8 %, and those who study 1 to 2 hours at 34,4 % with high academic performance; however, no significant relationship was found in

any of the characteristics mentioned.

Table 5. Relationship between study techniques and academic performance in second- and third-year human medicine students at a university in Cajamarca, 2024

	Academic performance						p-value
	Above Average		Average		Below average		
	Nro	(%)	Nro	(%)	Nro	(%)	
STUDY TECHNIQUES							0,574
LOW-UTILITY TECHNIQUES							
Summary							
Low Frequency	41	38,0 %	15	13,9 %	2	1,9 %	0,593
High Frequency	36	33,3 %	14	13,0 %	0	0,0 %	
Highlighted and underlined							
Low frequency	33	30,6 %	11	10,2 %	2	1,9 %	0,878
High frequency	44	40,7 %	18	16,7 %	0	0,0 %	
Keyword mnemonics							
Low frequency	39	36,1 %	17	15,7 %	1	0,9 %	0,670
High frequency	38	35,2 %	12	11,1 %	1	0,9 %	
Images for text							
Low frequency	43	39,8 %	16	14,8 %	1	0,9 %	0,818
High frequency	34	31,5 %	13	12,0 %	1	0,9 %	
Rereading							
Low Frequency	51	47,2 %	16	14,8 %	2	1,9 %	0,282
High frequency	26	24,1 %	13	12,0 %	0	0,0 %	
MODERATELY USEFUL TECHNIQUES							
Question formulation							
Low Frequencya	46	42,6 %	21	19,4 %	1	0,9 %	0,168
High frequency	31	28,7 %	8	7,4 %	1	0,9 %	
Self-explanatio							
Low frequency	31	28,7 %	10	9,3 %	1	0,9 %	0,907
High frequency	46	42,6 %	19	17,6 %	1	0,9 %	
Interleaved practice							
Low frequency	66	61,1 %	22	20,4 %	1	0,9 %	0,193
High frequency	11	10,2 %	7	6,5 %	1	0,9 %	
HIGH-UTILITY TECHNIQUES							
Active recall							
Low frequencya	42	38,9 %	23	19,4 %	1	0,9 %	0,213
High frequency	35	32,4 %	6	7,4 %	1	0,9 %	
Spaced repetition							
Low frequency	54	50,0 %	22	20,4 %	0	0,0 %	0,820
High frequency	23	21,3 %	7	6,5 %	2	1,9 %	
Note: low frequency: never, Sometimes, and Half the time; High frequency: requently, Always							

Note: low frequency: never, Sometimes, and Half the time; High frequency: requently, Always

Table 5 shows that students with above-average academic performance have a low frequency of rereading (47,2 %), but a high frequency of highlighting and underlining (40,7 %). This is in relation to low-use study techniques. In addition, among moderate-use study techniques, the most commonly used is self-explanation (42,6 %). However, highly useful study techniques, such as active recall and spaced repetition, are used less frequently, at 38,9 % and 50,0 %, respectively. Nevertheless, there is no significant correlation between study techniques and academic performance, demonstrating that there is no relationship between these two variables (p-value = 0,574).

DISCUSSION

In human medicine, it is vital that students can receive, understand, and relate information. The use of study techniques allows students to acquire knowledge and skills independently, which is crucial throughout their studies to improve academic performance.⁽¹⁹⁾ For this reason, we sought to determine the relationship

between study techniques and academic performance; however, no significant relationship was found between the two. These findings are supported by previous research, which has highlighted that there is no correlation between study techniques and academic performance. Among these, we can mention the findings of studies conducted in Iran and India, which indicated that there is no significant relationship between the two proposed variables.^(20,21) Conversely, Nabizadeh et al. found a high significance between these variables.⁽²²⁾

The findings revealed that many students with above-average academic performance regularly use underlining. However, this result contrasts with the findings of Biwer et al. in the US and Toloza et al. in Colombia in 2023, who demonstrated that underlining is not practical or decisive in academic performance.^(23,24) The explanation for this is that students are aware of other, much more effective techniques. Therefore, educators must teach students to utilize various study techniques effectively, enabling them to be more efficient.⁽²⁵⁾ Likewise, among the moderately practical study techniques is self-explanation, which involves students explaining what they are studying in their own words. It is one of the techniques frequently used by students with above-average performance. This result is supported by findings from Spain in 2022, which suggest that self-explanation enhances procedural knowledge and, consequently, academic performance.⁽²⁶⁾ The reason for this is that students feel they are not prepared for what they have read; therefore, they try to explain it to themselves to demonstrate their correct understanding of the topic.⁽²⁷⁾

Additionally, among the most effective study techniques are spaced repetition and active recall, which high-performing students often overlook. Supporting this, Zheng et al. conducted research in the US in 2019, where they asserted that spaced repetition and active recall using flashcards increase academic performance by encouraging frequent and active use of the information learned.⁽²⁸⁾ This was also mentioned by Ferreira and his colleagues in the US in 2022⁽²⁹⁾ and Tais and his contributors in Portugal in 2024. This is due to the accessibility, ease, and availability of flashcards within various mobile phone applications, among which the virtual application Anki stands out, providing flashcards for study, as it allows for the incorporation of surveys into everyday activities.⁽³⁰⁾

However, according to the results, most students perform above average academically. This finding aligns with the results of Chambi et al. among health science students at another Peruvian university. Still, their study differs from the present one in terms of the evaluation methodology, as a score of 15 was used as the cut-off point to classify students with above-average performance (greater than or equal to fifteen) and students with average academic performance (less than fifteen and greater than thirteen).⁽³¹⁾ Different factors condition these results. In our research, the most predominant and significant factor is academic status, as García et al. stated, referring to students with above-average performance who maintain regular academic status by taking all courses usually.⁽³²⁾

Similarly, among other factors that affect academic performance, they showed that most students in the socioeconomic levels of poverty and extreme poverty have average and above-average performance, which is related to the study by Jerant et al. conducted in 2019 in the US, where they asserted that students with socioeconomic disadvantages have better academic performance.⁽³³⁾ In contrast, Ely et al. demonstrated in 2023 in the same country that students with low socioeconomic status perform poorly academically but can catch up with or surpass their peers in residency exams such as the USMLE due to the material barriers that exist during medical school.⁽³⁴⁾ On the other hand, the gender variable was found to be significant, with most women performing above average. These results align with research conducted in the US⁽³⁵⁾, Colombia in 2021⁽³⁶⁾, and Panama in 2023, which found that females outperform males. This is because women manage their study time appropriately. This research also found a significant relationship between gender and academic performance.⁽³⁷⁾

CONCLUSIONS

In conclusion, the study found that the use of study techniques is not significantly related to academic performance in second and third-year medical students at a university in Cajamarca in 2024. It was identified that in our population, a large proportion of students with above-average academic performance use low- and medium-utility study techniques such as underlining and self-explanation, respectively. Additionally, it was found that most students fall into the above-average academic performance category, followed by average and below-average categories. On the other hand, instrumental techniques such as spaced repetition and active recall are the least used by high-performing students. Other determinants of academic performance were also identified, including female gender and regular academic cycle.

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FINANCING

The authors did not receive financing for the development of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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