

Student learning strategies according to years spent studying for a degree in dentistry

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ABSTRACT

Learning strategies are a set of organized, conscious, intentional tasks performed by a student to achieve a learning objective effectively in a given social context. The aim of the present study was to determine the type and frequency of use of different learning strategies among students taking the subject "Comprehensive Clinic II", which corresponds to the 3rd year of the 6-year general syllabus of the undergraduate course at the School of Dentistry, Buenos Aires University, and to analyze the use of these learning strategies according to the number of years elapsed between each student's admission to dental school and the time he/she took that subject.

Dental students (n=189) filled in the Learning and Study Strategies Inventory (LASSI). Seventy-five percent were female. The tool includes 10 dimensions, organized in 77 items. Responses to each question were recorded using a Likert type

scale (5 choices). Total scores were obtained by assigning values to the responses. The students were grouped according to time elapsed from year of admission to dental school to the year in which they took the subject (Institutional Persistence, TI). Statistical analysis included mean and confidence intervals for scores (total and for each domain) and comparisons among TI groups using one-way ANOVA and Tukey's post hoc test. Total score for the sample was 275.3 (71.5% of maximum possible score). There were differences in the use of learning strategies reported by dental students in the tool. Students with shorter institutional persistence times scored higher in the following dimensions: attitude and interest, motivation, self-discipline, willingness, self-testing and reviewing.

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Key words: dental education; learning strategies; dental students.

Relación entre estrategias de aprendizaje y permanencia en el ciclo curricular en estudiantes de Odontología

RESUMEN

Las estrategias de aprendizaje son un conjunto organizado, consciente e intencional de lo que hace el estudiante para lograr con eficacia un objetivo de aprendizaje en un contexto social dado. El objetivo de este trabajo fue determinar el tipo y frecuencia de uso de estrategias de aprendizaje en estudiantes del curso de Clínica Integrada II, que corresponde al 3er año del programa general de 6 años de la Carrera de Odontología, y analizar su utilización en función del tiempo de permanencia en la Facultad. Los alumnos (n=189) respondieron el cuestionario "Inventario de Estrategias de Aprendizaje y Estudio" (LASSI). Este instrumento consta de 10 dimensiones organizadas en 77 reactivos. Las respuestas a cada reactivo fueron registradas mediante una escala de Likert (5 opciones). El puntaje total se obtuvo mediante asignación de valores a las respuestas elegidas. Los estudiantes

fueron agrupados de acuerdo con el tiempo transcurrido entre el ingreso a la carrera y el la fecha en que cursaron la asignatura elegida. (Permanencia institucional, TI). Procesamiento estadístico: cálculo de media e intervalo de confianza para puntajes (total y por dominio) y comparación entre grupos (PI) mediante ANOVA de un factor y post hoc Tukey. El componente femenino fue 75%. El puntaje total para la muestra fue 275,3 (71,5% del máximo posible). Se comprobaron diferencias en el uso de estrategias de aprendizaje. Los alumnos con menor tiempo de permanencia institucional mostraron puntajes mas altos en las siguientes dimensiones: actitud e interés, motivación, autodisciplina, disponibilidad y autoevaluación / repaso.

Palabras Clave: educación odontológica; estudiantes de odontología; estrategias de enseñanza.

INTRODUCTION

Current educational research focuses on students achieving academic performance that will enable them to attain significant learning. This includes cognitive, linguistic, motor and social skills, which

can take many forms, expressed in attitudes and behaviors¹.

According to Cabrera et al.², it is critical to determine the variables associated with academic performance, since low performance levels in

university students are associated with high drop-out and low persistence-to-degree rates.

Learning strategies are academic procedures applied in a controlled fashion, following a pre-established plan, to attain a set target³. They include any thoughts, behaviors and emotions that facilitate the acquisition, understanding, and subsequent transfer of new knowledge and skills. Underlying these strategies are components associated with skill and self-regulation. With regard to affective and motivational states, if there is no interest in learning, learning just does not happen.

The Learning and Study Strategies Inventory (LASSI) is a tool to diagnose students' learning strategies and study methods. It is based on the assessment of thoughts and implicit and explicit behaviors that lead to learning. It can be used to evaluate the intellectual profile of a student, and ultimately, to plan actions aimed at improving student achievement⁴.

This diagnostic process enables the identification of weaknesses. Once a diagnosis has been established, the information can be used by the students to re-orient their strategies, and by the teacher to implement actions aimed at improving learning. A timely re-assessment enables outcomes to be measured.

Mayor et al.⁵ and Beltrán⁶ emphasize the importance of studying the relationship between what is taught and how students learn it, i.e., the content compared to the process. Hence, it is important to identify the predominant learning strategies used by young and adult university students.⁷⁻⁹

Table 1: LASSI domains.

ANX	Anxiety and worry about school performance
ATT	Attitude and interest
CON	Concentration and attention to academic tasks
INP	Information processing, acquiring knowledge and reasoning
MOT	Motivation, diligence, self-discipline and willingness to work
SFT	Self-testing, reviewing and preparing for classes
SMI	Selecting main ideas and recognizing important information
STA	Use of support techniques and materials aids
TMT	Use of time management principles for academic tasks
TST	Test strategies and preparing for tests

The aim of this study was to determine the type and frequency of use of different learning strategies among students taking the subject "Comprehensive Clinic II", which corresponds to the 3rd year of the 6-year general syllabus of the undergraduate course at the School of Dentistry, Buenos Aires University, and to analyze the use of these learning strategies according to the number of years elapsed between each student's admission to dental school and the time he/she took that subject.

MATERIAL AND METHODS

The study was conducted on a selected sample of 3rd year dentistry students at Buenos Aires University. The "Learning and Study Strategies Inventory" (LASSI) was applied. The LASSI consists of a validated inventory of 77 items distributed among 10 domains (Table 1)¹⁰. Responses were recorded using a Likert-type scale with the following five choices: not at all typical of me, not very typical of me, somewhat typical of me, fairly typical of me, very much typical of me. All participants agreed to participate in the study, and signed a written consent, keeping their anonymity.

The sample (189 students) was divided into 5 groups according to year of admission (from 2013 to 2017). The sample size selected provides 90% statistical power to detect relevant differences between groups.¹¹

The socio-demographic profile of the students in each group was determined (Table 2).

Statistical analysis involved:

- Calculating the score for each response per domain.
- Calculating scores corresponding to items and domains answered by the students.
- Comparing mean age between sexes using Student Test for independent samples.
- Comparing scores corresponding to the 10 dimensions and total score according to year of admission using Analysis of Variance (ANOVA) and Tukey's HSD post hoc test for independent samples.

The null hypothesis was rejected at a significance level of $p < 0.05$.

RESULTS

Statistically significant differences ($p=0.015$) in the ATT (attitude and interest) domain were observed among the students who began their professional

Table 2: Sex per Group and Age.

Year of admission		Sex		Total
		Female	Male	
2013	N	20	5	25
	%	80.0%	20.0%	13.2%
2014	N	19	5	24
	%	79.2%	20.8%	12.7%
2015	N	30	9	21
	%	76.9%	23.1%	20.6%
2016	N	46	11	57
	%	80.7%	19.3%	30.2%
2017	N	34	10	44
	%	77.3%	22.7%	23.3%
Total	N	149	40	189
	%	78.8%	21.2%	100.0%

Pearson Chi-Square: $p=0.990$

Age (years)	N	%	Mean	Standard Deviation	Minimum	Maximum
Female	149	78.8%	23.7	3.7	20	56
Male	40	21.2%	24.7	3.9	20	38
Total	189	100.0%	23.9	3.8	20	56

Student Test for independent samples: $p=0.163$

training in the years 2013, 2016 and 2017.

Statistically significant differences ($p=0.006$) in the MOT domain (motivation, self-discipline, willingness) were observed among the 2013, 2014, and 2017 groups (Table 3). Analysis of the TST domain (test strategies) showed statistically significant differences at a value of $p=0.001$ between groups with longer (2013, 2014 and 2015 groups) and shorter (2016 and 2017 groups) institutional persistence times (Table 3).

The results showed differences in the use of learning strategies among dentistry students, with students with fewer years elapsed from year of admission to time of the subject showing higher scores.

A mean cut-off was established for the mean percentage of the maximum possible score for each domain; mean value was 71.5% (Fig. 1).

In students with fewer years elapsed between admission and taking the subject, the values

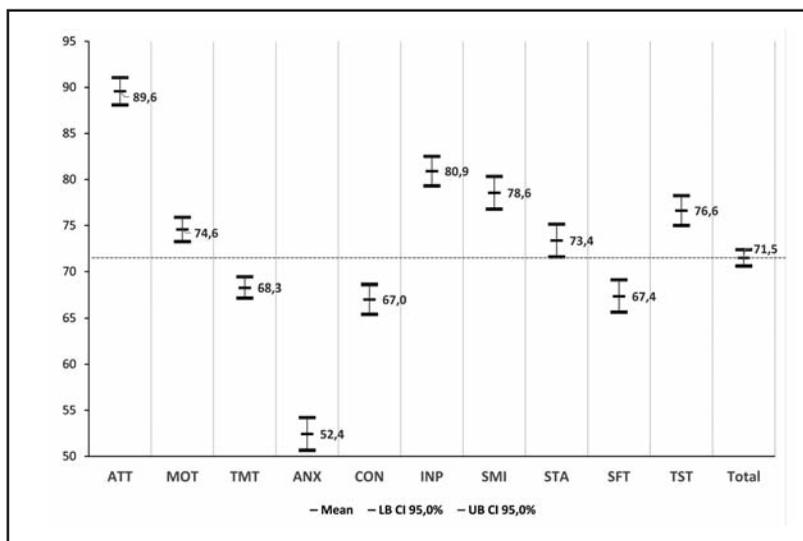


Fig. 1: Domains: mean percentage of the maximum possible score.

corresponding to domains ATT (Attitude and Interest), MOT (motivation), INP (information processing), SMI (selecting main ideas), STA (study aids) and TST (test strategies) were higher than the mean percentage of the maximum possible score; whereas scores corresponding to domains TMT (time management), ANX (anxiety and worry about academic performance), CON (concentration

Table 3: Scores for domains per group.

Domains	Year of admission	N	Mean	Std. Dev.	95% CI for mean		% of the maximum score of the mean	p-value
					Lower Bound	Upper Bound		
ATT	2013	25	29.2	3.8	28.2	30.2	83.5	0.015
	2014	24	31.3	3.6	29.7	32.8	89.3	
	2015	39	31.1	4.5	29.6	32.5	88.8	
	2016	57	32.0	2.6	31.3	32.7	91.3	
	2017	44	32.1	2.7	31.3	32.9	91.6	
	Total	189	31.4	3.6	30.8	31.9	89.6	
MOT	2013	25	27.6	3.2	26.9	28.3	68.9	0.006
	2014	24	30.0	3.5	28.5	31.5	75.0	
	2015	39	29.3	3.1	28.3	30.3	73.3	
	2016	57	30.6	3.2	29.8	31.5	76.5	
	2017	44	30.5	3.6	29.4	31.6	76.2	
	Total	189	29.8	3.7	29.3	30.4	74.6	
TST	2013	25	28.0	5.1	25.9	30.1	70.0	0.001
	2014	24	29.5	5.8	27.0	31.9	73.6	
	2015	39	29.4	4.4	28.0	30.8	73.5	
	2016	57	32.0	3.7	31.0	33.0	80.0	
	2017	44	32.2	3.4	31.1	33.2	80.4	
	Total	189	30.7	4.5	30.0	31.3	76.6	

and attention), and SFT (self-testing and reviewing) were lower than the mean percentage of the maximum possible score (Fig. 1)

The highest value corresponded to the ATT domain (attitude and interest), with a mean percentage of the maximum possible score of 89.6. The lowest value, 52.4, corresponded to the ANX domain (anxiety and worry about academic performance).

DISCUSSION

Analysis according to demographic variables

In agreement with previous studies¹² in a population with similar socio-demographic characteristics, our results showed significant differences between male and female participants.

At present, strategic learning presents as a need of the community for information and knowledge, and has a significant impact on academic performance.¹³⁻¹⁶

Modern educational research increasingly assigns importance to academic success and failure at universities. There is consensus on their multifactorial

causes, including inadequate learning strategies. Reliable tools are therefore needed to evaluate learning strategies. In dental degree courses, it is important to analyze the teaching-learning process. Many different learning problems can impact students at a given time. There is evidence showing that one of these is not knowing how to learn, which implies that most students do not use adequate strategies to achieve significant learning.¹⁷

Association between learning strategies and LASSI domains

- **Attitude and Interest:** Students' overall attitudes to studying and their motivation to achieve academic success have an impact on their diligence when studying, particularly in autonomous situations when they must study alone. Our results showed significant differences among groups according to year of admission, and scores were lower among students with longer times elapsed between admission and taking the subject, which could be explained by a decrease in interest in achieving the expected goal (graduation).

- **Motivation and Self-discipline:** This domain measures students' overall motivation to achieve academic success. However, although the level of general motivation is important, so is the student's motivation to perform specific tasks related to achievement. Students who score low on this measure need to work on goal-setting, perhaps at the more global levels on the attitude scale, but certainly at the more specific level of individual tasks and assignments. The highest score in this domain corresponded to the group with the shortest length of time elapsed between admission and taking the subject, and was significantly higher than in the remaining groups. This would partly explain the delay in taking a 3rd year course among students who began their studies in 2013. In agreement with a 2006 study conducted by Escurra¹⁸ in students of psychology, we found no significant differences in the remaining domains. Huber et al.¹⁹ highlight the importance of creating a conceptual framework that is in line with the cultural group on which the study is to be conducted.
- **Time Management:** Managing time effectively is an important strategic factor in learning. Most students have demands on their time and can only advance in their studies if they prepare and follow realistic schedules. Time management was best in the group of students who began studying for the degree in 2017, though the difference compared to the remaining groups was not statistically significant.
- **Anxiety and Worry about Academic Performance:** Current conceptions of anxiety emphasize the effects of thought processes and how they affect academic performance. Cognitive worry, an important component of anxiety, is manifested in negative self-referent statements. Our results, below the mean cut-off, involve more cognitive-affective components than learning strategies, which would explain the low level of worry found. Indeed, this was the domain with the lowest value in all study groups.
- **Concentration:** The score on this scale measures students' ability to concentrate and direct their attention to their study tasks. Students who score high on this measure are effective at focusing their attention and maintaining a high level of concentration. Students who score low are less successful at avoiding interfering thoughts, emotions, feelings and situations. Techniques for focusing and maintaining concentration help students to implement effective learning strategies and to make learning and studying more effective and efficient. Students with shorter times since beginning their studies had better scores. This was the group of students who were on-schedule with intended times in the general syllabus.
- **Information Processing:** Learning is enhanced by the use of elaboration and organization strategies. These strategies help build bridges between what a student knows and what he/she is endeavoring to learn and remember. The results for this domain, above the cut-off line, are probably due to the fact that the curriculum contains a program for reinforcement of previous information, a priority condition that enables the student to organize new knowledge.
- **Selecting Main Ideas:** Effective and efficient studying requires students to be able to select the important material for in-depth processing. Most lectures, discussions and textbooks contain redundant material and extra examples of what is being taught or presented. Separating the more relevant from the less relevant is a major task. If a student cannot identify the important information, learning will become more complicated due to the large quantity of material to be learned. The lack of this skill will also increase the student's likelihood of not having sufficient time to study all the material to be covered. Student scores on this scale measure their skills at selecting the important information which they must focus on for further study in the classroom or autonomously. Students who had spent fewer years studying for the degree scored high in this domain. This may be due to better recall of study methods acquired in high school for selecting information.
- **Study Aids:** Students need to know how to use study aids created by other people and how to create their own. Authors usually use headings, special fonts, blank spaces, special marks and summaries to help students learn from written

materials. However, these elements and aids will only be useful to students if they know how to recognize and use them. It is also important for students to know how to create their own study aids using methods such as diagrams, text underlining, graphs and summaries. Other supplementary activities that support and enhance learning include activities such as participating in revision groups or comparing notes with other students to confirm that their own are complete and accurate.

The result obtained for this item would be explained by one of the weaknesses of the LASSI, which is that it does not reflect new technologies used by undergraduate students.

- **Self-testing:** Reviewing and testing level of understanding is important for acquiring knowledge and monitoring comprehension. Both these strategies support and contribute to meaningful learning and effective performance. Without them, learning could be incomplete, or errors might go undetected. Reviewing and self-testing contribute to knowledge consolidation and integration across topics. Using mental reviews, reviewing class notes and texts, thinking up questions to guide reading or help prepare for a test are all important methods for checking understanding, consolidating new knowledge, and determining the need for additional studying. Our study found low values in both study groups. This may be because the students complying with intended timing for the degree and who have good scores in other domains have little available time for reviewing. A more profound analysis of this item may lead to a change in the general number of hours in the degree course.

- **Test Strategies** (Preparing for tests): Preparing for tests includes knowledge on the type of test, such as whether it will be a short-answer or a multiple-choice test, or whether the student will be required to provide a description, or apply concepts, principles and ideas. Test preparation also includes knowing methods for studying and learning the material in a way that will facilitate memorization and use of the material. In other words, test-taking strategies include knowing the characteristics of the test and how to create an effective test-taking plan. The results obtained in the present study are in keeping with findings reported by Olaussen et al.²⁰ in a study conducted in Norway in 2012.

In this line of research, it would be interesting to include studies on teaching methodology applied to the different times of the degree course analyzed herein.

CONCLUSION

This study found differences in the use of learning strategies reported by students of dentistry through the LASSI. Students with fewer years elapsed between admission and taking the subject scored higher in the following dimensions: attitude and interest, motivation, self-discipline and willingness, self-testing and reviewing.

Further studies are needed to confirm these findings before the tool can be adopted or rejected for reliable use in the broader educational context in the dentistry degree at Buenos Aires University.

Some of the most important aspects of education are student intent, planning and effort. These aspects have not received sufficient attention, and members of the faculty could modify their pedagogic practices and use resources that adjust to student profiles.

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