

Library and internet use in the self-directed study of university students in different teaching methodologies

Uso da biblioteca e internet no estudo autodirigido de estudantes de fonoaudiologia em diferentes metodologias de ensino

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ABSTRACT

Purpose: To investigate the use of the library and the internet for self-directed learning among Speech-Language Pathology students, and to examine its relationship with study and learning strategies across different teaching methodologies. **Methods:** The study included 100 students from a Speech-Language Pathology program that employs Active Learning Methodologies and 100 students from a program that follows a Traditional Teaching Methodology. The Portuguese version of the Learning and Study Strategies Inventory (LASSI) was administered. Data analysis was conducted using SPSS 20.0 with the Mann-Whitney and Spearman tests, with the significance level set at 5%. **Results:** Students enrolled in active learning methodologies used the library more frequently ($p = 0.014$). Regarding the frequency of library and internet use and their correlation with study and learning strategies, a significant positive correlation was found between library access frequency and information processing ($p < 0.01$), time management ($p < 0.01$), and study aids ($p < 0.01$) among students in active methodologies. In traditional methods, a significant negative correlation was observed between internet access frequency and information processing ($p = 0.031$). **Conclusion:** The internet is the primary research source for university students engaged in self-directed learning, whereas students in active learning methodologies use the library more frequently. Library access positively contributed to information processing, time management, and study support, whereas internet access had a negative impact on information processing.

Keywords: Libraries; Internet; Teaching; Universities; Learning; Speech, language and hearing sciences

RESUMO

Objetivo: verificar o uso da biblioteca e da internet para o estudo autodirigido de estudantes de Fonoaudiologia e sua relação com as estratégias de estudo e aprendizagem em diferentes metodologias de ensino. **Métodos:** participaram 200 estudantes de Fonoaudiologia, sendo 100 de um curso que utilizava Metodologias Ativas de Ensino e 100 de um curso que utilizava a Metodologia Tradicional de Ensino. Foi aplicada a versão em português do inventário *Learning And Study Strategies Inventory*. Os resultados foram analisados no *software* SPSS 20.0, por meio dos testes Mann-Whitney e Spearman, sendo estipulado o nível de significância de 5%. **Resultados:** os estudantes de Metodologias Ativas utilizavam a biblioteca com maior frequência ($p = 0,014$). Quanto à frequência de acesso à biblioteca e o uso da internet para estudo, e a correlação com as estratégias de estudo e aprendizagem, observou-se correlação significativa e positiva em relação à frequência de acesso à biblioteca e o processamento de informações ($p < 0,01$), à organização de tempo ($p < 0,01$) e o uso de auxiliares de estudo ($p < 0,01$) nos estudantes de Metodologias Ativas. Na Metodologia Tradicional, verificou-se correlação negativa significativa entre a frequência de acesso à internet e o processamento de informações ($p = 0,031$). **Conclusão:** a internet é a principal fonte de pesquisa para os estudos autodirigidos de estudantes universitários de Fonoaudiologia, sendo a biblioteca mais utilizada pelos estudantes de Metodologias Ativas. O acesso à biblioteca contribuiu positivamente para o processamento de informações, a organização do tempo e o uso de auxiliares de estudo, enquanto o uso da internet para o estudo teve um impacto negativo no processamento de informações.

Palavras-chave: Bibliotecas; Internet; Ensino; Universidades; Aprendizagem; Fonoaudiologia

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INTRODUCTION

Given the significant changes in the academic world over recent decades, there has been an ongoing debate about the teaching methods used in undergraduate health programs and their effects on students' study habits and learning processes. This study aims to contribute to this debate by examining the influence of teaching methodologies on students' study habits. While higher education institutions (HEIs) that adopt the Traditional Methodology (TM) of teaching—still the vast majority in Brazil—tend to deliver content through lectures in a teacher-centered approach, where instructors act as curators of the information to be transmitted, universities that adopt Active Learning Methodologies (ALM) promote a student-centered approach. In this model, learners take on a leading role, becoming co-responsible for constructing their own knowledge and selecting information autonomously^(1,2).

Although the foundations that support both Active Learning and Traditional Methodologies are frequently discussed, little attention has been given to the influence of the “teaching and learning” approach on the development of self-directed study skills. Learning how to learn and mastering the best tools for acquiring information affect not only academic success but also technical and scientific careers, enabling evidence-based decision-making and leadership in addressing unfamiliar challenges that require practical solutions. To achieve this, it is essential to educate autonomous students capable of becoming actual “decision-makers”^(3,4).

Within this domain of “learning to learn,” two distinct yet complementary resources are available for information retrieval: the use of the internet and access to libraries. This article does not aim to define the best method or strategy but rather to understand how such choices may influence the study and learning strategies of students exposed to different teaching methodologies.

Technological advancements have expanded internet access in Brazil. According to the Regional Center for Studies on the Development of the Information Society (Cetic.br), the percentage of Brazilian households with internet access increased from 71% in 2019 to 92.5% in 2023⁽⁵⁾. Over the years, these developments have impacted various sectors of society and have emerged as tools that enable rapid access to information. Through the internet, geographic and language barriers can be overcome, granting access to scientific materials produced worldwide in various languages. While information once took considerable time to reach a global audience, today it is available with a single click. However, amid this vast sea of available information, it is essential to know how to identify reliable scientific sources and develop a critical and reflective mindset.

On the other hand, university libraries—whose mission is to support teaching, research, and outreach not only through their collections but also through their library services⁽⁶⁾, offer free access to books, articles, dissertations, and theses. These materials undergo prior curation by librarians and managers, who must ensure that the collections remain up-to-date and sufficient to meet the academic community's needs. Nonetheless, libraries currently face a significant challenge: balancing the past and the present, traditional organizational methods and new technologies, while simultaneously providing printed materials and facilitating access to digital information⁽⁷⁾.

Both internet use and library use present strengths and limitations, and it is necessary to understand the behavior of students engaged in Active Learning Methodologies (ALM) and Traditional Methodologies (TM) so that administrators can address this issue by promoting strategies that strengthen positive aspects and encourage digital literacy focused on reliable and evidence-based sources. This study has the potential to inform educational practices and foster critical thinking among students. Although more scientific content is available online than ever before, it is crucial to foster critical thinking when consulting these materials.

Thus, the objective of this study was to examine the use of libraries and the internet for self-directed study among Speech-Language Pathology students and to explore how these practices relate to study and learning strategies across different teaching methodologies.

METHODS

This study was approved by the Research Ethics Committee of the Federal University of Sergipe – CEP/UFS (CAAE No. 33665414.6.0000.5546 – Approval No. 7.276.830) and followed the guidelines established by Resolution 466/12 of the Brazilian National Health Council. All participants were informed about the study and freely provided their consent by signing the Informed Consent Form (ICF).

The sample size calculation considered the total population (374 Speech-Language Pathology students), with a confidence level of 95% and a margin of error of 5%. Thus, the sample size was determined to be 190 students. A total of 200 students participated in the study: 100 enrolled in a program that exclusively used Active Learning Methodologies (ALM Group) and 100 enrolled in a program that exclusively used the Traditional Teaching Methodology (TM Group). Both programs were offered by the same Brazilian public university but were located in different municipalities, which is important to consider due to potential regional differences in resource availability and student demographics.

Participants were recruited through direct invitations sent prior to the start of classes. The inclusion criteria comprised students of both genders, aged 18 years or older, who were actively enrolled in one of the Speech-Language Pathology programs. Exclusion criteria included participants who did not complete the instrument properly or who did not sign the ICF. The recruitment process involved sending invitations to all eligible students, and those who expressed interest and met the inclusion criteria were included in the study.

To meet the objectives of this study, the validated Brazilian Portuguese version of the Learning and Study Strategies Inventory (LASSI) was used. The instrument begins with identification data, followed by two questions: one regarding the frequency of library use and the other concerning the frequency of internet access for academic activities. Subsequently, 71 questions are presented about learning and study strategies, addressing nine subscales: (1) worry when studying, (2) anxiety, (3) selecting main ideas, (4) study aids, (5) attitude, (6) concentration, (7) time organization, (8) information processing, and (9) motivation, in addition to 11 questions concerning the use of the internet for studying^(8,9).

Each item on the instrument is rated on a 5-point Likert scale, where 1 indicates “it never happens that way” and 5

indicates “it always happens that way.” Items were reverse-scored according to whether they had positive or negative correlations within their respective domains, as recommended in the inventory manual. The analysis followed the procedures described in the literature: to obtain the final scores, the points for each subscale were summed and then divided by the number of items^(8,9).

Interpretation of the subscales is as follows: (1) Worry when studying — higher scores indicate greater concern during study; (2) Anxiety — measures the student’s level of concern about university life and personal performance, with lower scores indicating higher tension levels; (3) Selecting main ideas — refers to the student’s ability to identify what is most important during readings and lectures, with low scores reflecting difficulty in this skill; (4) Study aids — assess the use of material support techniques to facilitate learning and recall of new information; low scores indicate insufficient use of such aids;(5) Attitude — expresses the value the student attributes to university life and their interest in academic success; low scores suggest that the student places little importance on their course; (6) Concentration — refers to the ability to direct and maintain attention during academic tasks; lower scores indicate difficulties or lack of focus; (7) tme organization — refers to the principles used by the student to organize time across various activities; low scores reveal difficulties in managing this strategy; (8) Information processing — evaluates how the student uses imagery and verbal elaboration, monitors comprehension and reasoning, demonstrates their proximal zone of development, and acquires, retains, and applies acquired knowledge; in this subscale, lower scores reflect poorer performance; (9) Motivation — measures the student’s diligence, self-discipline, willingness to work hard, and readiness to meet academic demands. The 11 questions related to internet use aim to understand the learning and study strategies that students adopt when using online materials (Chart 1).

The results regarding gender, paid employment, and university scholarship/financial aid were analyzed using absolute and relative frequencies. Quantitative data (participant age,

learning and study strategy domains, frequency of library use, and internet use) were described using measures of position (quartiles), measures of central tendency (mean and median), and measures of dispersion (standard deviation).

To verify whether the frequency of library use and internet use differed according to the teaching methodology in which the students were enrolled, the nonparametric Mann–Whitney test was applied. To assess the presence of correlations between LASSI results and the frequency of library and internet use, Spearman’s bivariate correlation test was used. All inferential analyses were performed using SPSS statistical software, version 20.0 (IBM Corp., Armonk, NY, USA), with a significance level of 5%.

RESULTS

Table 1 presents the measures of position for age in the two study groups (ALM Group and TM Group). There was no statistically significant difference in age between the groups ($p > 0.05$).

Table 2 shows the descriptive analysis of the study groups. In both groups, the majority of participants were female and did not have paid employment. Regarding research scholarships or financial aid, a higher frequency of scholarship holders was observed in the TM Group.

Table 3 describes the measures of position for the dependent variables, showing that students in the Active Learning Methodology program made more Table 4 presents the correlations between the frequency of library and internet access and learning and study strategies. In the TM Group, significant positive correlations were observed between the frequency of library access and information processing (weak degree, $r = 0.291$; $p < 0.01$), time organization (moderate degree, $r = 0.314$; $p < 0.01$), and the use of study aids (weak degree, $r = 0.287$; $p < 0.01$). In contrast, in the ALM Group, a significant negative correlation was found between the frequency of internet access and information processing (weak degree, $r = -0.216$; $p = 0.031$).

Chart 1. Characteristics of the Learning and Study Strategies Inventory (LASSI) Subscales

Subscale	Description	Score Interpretation
Worry when studying	Degree of concern while studying	High scores = greater worry
Anxiety	Concern about performance	Low scores = higher tension
Selecting main ideas	Ability to identify the most important information	Low scores = difficulty in selection
Study aids	Use of tools to remember information	Low scores = insufficient use
Attitude	Importance attributed to the academic program	Low scores = lower valuation
Concentration	Maintenance of attention	Low scores = difficulty concentrating
Time organization	Management of academic time	Low scores = difficulty managing time
Information processing	Elaboration and retention of knowledge	Low scores = poorer performance
Motivation	Self-discipline and effort	Low scores = lower commitment

Source: Authors

Table 1. Measures of Central Tendency and Position for Age Between Study Groups

Variable	Group	N	Mean	SD	Minimum	Maximum	Q25	Median	Q75
Age	TMG	100	22.26	6.13	16.00	52.00	9.00	21.00	3.00
	ALMG	100	21.15	3.45	17.00	44.00	9.00	20.00	2.00

Subtitle: TMG = Traditional Methodology Group; ALMG = Active Learning Methodology Group; N = Number of participants; SD = Standard deviation; Q25 = First quartile; Q75 = Third quartile

Table 2. Descriptive Analysis of the Study Groups

			Groups		Total
			TMG	ALMG	
Gender	Male	n	23	24	47
		%	23.0%	24.0%	23.5%
	Female	n	77	76	153
		%	77.0%	76.0%	76.5%
Paid employment	No	n	88	94	182
		%	88.0%	94.0%	91.0%
	Yes	n	12	6	18
		%	12.0%	6.0%	9.0%
University scholarship/financial aid	No	n	49	61	110
		%	49.0%	61.0%	55.0%
	Yes	n	51	39	90
		%	51.0%	39.0%	45.0%

Subtitle: TMG = Traditional Methodology Group; ALMG = Active Learning Methodology Group; n = Number of participants; % = Percentage

Table 3. Description of Position Measures for Frequency of Library and Internet Access

Variable	Group	Mean	SD	Minimum	Maximum	Q25	Median	Q75	p-value
Frequency of library access	TMG	1.68	0.75	0.00	4.00	1.00	2.00	2.00	0.014*
	ALMG	1.99	0.89	0.00	4.00	1.00	2.00	3.00	
Frequency of internet access	TMG	3.64	0.75	1.00	4.00	4.00	4.00	4.00	0.816
	ALMG	3.72	0.57	1.00	4.00	4.00	4.00	4.00	

*Statistically significant values according to the Mann-Whitney test;

Subtitle: TMG = Traditional Methodology Group; ALMG = Active Learning Methodology Group; SD = Standard deviation; Q25 = First quartile; Q75 = Third quartile

Table 4. Correlation Between Frequency of Library and Internet Access and Learning and Study Strategies in the Study Groups

Variable		Library access (TMG)	Library access (ALMG)	Internet access (TMG)	Internet access (ALMG)
Information processing	r	0.291	0.084	0.105	-0.216
	p-value	0.003*	0.408	0.297	0.031*
Anxiety	r	-0.194	-0.131	-0.181	-0.104
	p-value	0.053	0.194	0.071	0.303
Time organization	r	0.314	-0.146	-0.083	0.040
	p-value	0.001*	0.147	0.412	0.695
Concentration	r	0.158	-0.020	-0.136	0.035
	p-value	0.116	0.845	0.179	0.730
Attitude	r	0.360	-0.009	-0.027	0.097
	p-value	<0.001*	0.927	0.787	0.339
Worry when studying	r	0.074	0.096	0.061	0.107
	p-value	0.466	0.340	0.545	0.291
Selecting main ideas	r	-0.034	-0.156	0.042	-0.062
	p-value	0.741	0.122	0.681	0.540
Study aids	r	0.287	0.081	0.120	-0.143
	p-value	0.004*	0.421	0.233	0.157
Motivation	r	0.076	-0.163	-0.109	-0.002
	p-value	0.451	0.105	0.282	0.986

*Statistically significant values according to Spearman's bivariate correlation test;

Subtitle: TMG = Traditional Methodology Group; ALMG = Active Learning Methodology Group; r = correlation coefficient

DISCUSSION

This study aimed to investigate how undergraduate Speech-Language Pathology students utilize libraries and the internet for self-directed learning, as well as the relationship between these resources and learning and study strategies across various teaching methodologies.

The sample was substantially homogeneous, composed chiefly of young female students who were not engaged in paid employment, with a slightly higher percentage of students in the Traditional Methodology course receiving university scholarships or financial aid. The predominance of female participants aligns with another study on Speech-Language Pathology undergraduates⁽¹⁰⁾, which also identified a prevalence of women

in this field. This phenomenon, historically linked to social roles associated with caregiving, is also discussed by the author⁽¹¹⁾, who highlights the significant growth of women's participation in higher education, challenging the traditional perception of the university as a predominantly male environment. In this context, the strong presence of women in Speech-Language Pathology programs represents a form of social empowerment and progress toward gender equity in Brazilian higher education, which still faces structural challenges.

The findings of this research are consistent with broader evidence, reinforcing the importance of democratizing higher education. Beyond gender issues, the socioeconomic profile of students also deserves special attention. In health-related fields such as Speech-Language Pathology, several studies have shown that students often face additional challenges due to their social and financial conditions. These factors directly affect how they adapt to academic life and develop their study strategies. According to authors^(10,12) and the Fifth National Survey on the Socioeconomic and Cultural Profile of Students at Federal Institutions of Higher Education⁽¹³⁾, most university students do not have paid employment and rely on public policies, such as student assistance programs, to support their college attendance. Financial hardship, the need to balance study and work, and the lack of institutional support can indeed compromise academic performance and persistence in higher education.

This discussion is directly connected to the National Student Assistance Program (PNAES), established by Decree No. 7234/2010⁽¹⁴⁾. The program is a fundamental component of Brazil's public higher education policy, designed to reduce the impact of social inequalities and ensure that university access is not merely formal but also translates into retention and degree completion. These findings emphasize that the democratization of higher education involves not only expanding the number of available seats but also implementing student assistance policies that provide equitable conditions for all types of learners.

Regarding library access frequency, a statistically significant difference was observed, indicating that students in the Active Learning Methodology programs visited the library more often than those in the Traditional Methodology programs. This difference can be explained by one of the main pillars of Active Learning Methodologies, their structural design, which aims to promote student autonomy in acquiring academic knowledge while fostering responsibility and awareness of contemporary social contexts^(1,15). Thus, the relationship between the university library and higher education directly supports the learning process by meeting the technical, scientific, and literary demands required for academic development⁽¹⁶⁾.

The results concerning internet access frequency among students from both teaching methodologies were similar. These findings are consistent with a previous study⁽¹⁷⁾ that characterizes this generation as digital natives. The opportunity to utilize the internet for educational purposes, combined with students' increasing comfort in handling technological devices, has encouraged the growing adoption of online scientific research by university students⁽¹⁸⁾. Despite this ease of access, internet use requires critical skills for selecting and validating sources. Furthermore, the increasing digitalization of libraries, with scientific databases accessible online, demands technical proficiency and training for the critical reading of consulted materials.

In the present study, a statistically significant difference was also identified when comparing students' frequency of library access with their frequency of internet access, the latter being the more frequently used resource. This finding can be justified by the nationwide expansion of internet connectivity, as reported by CETIC.br, which has enhanced the population's access to digital environments. Moreover, the ease of obtaining a wide range of materials—such as PDF books, scientific articles, virtual classes, and academic debates offering multiple perspectives—has reduced the distance that once existed between students and libraries to just a click on their smartphones⁽¹⁹⁾.

The analysis of the learning subscales assessed by the LASSI questionnaire, in relation to library and internet access frequency, revealed similar mean scores across most categories, except for information processing, Time organization, attitude, and use of study aids.

In the information processing subscale, which evaluates the processes of acquiring, retaining, and applying new knowledge and information, a significant positive correlation was found among students in the Traditional Methodology group. In other words, the more frequently these students visited the library, the higher their scores on this subscale. Conversely, for students in the Active Learning Methodology group, the correlation coefficient between information processing and internet access frequency was negative; that is, greater internet use was associated with poorer performance in this category. Therefore, students with low scores in this subscale require the development of methods that provide structure and meaning to learning. Such methods may include paraphrasing and summarizing, creating analogies, taking notes and organizing outlines, and employing analytical, inferential, and synthetic reasoning⁽¹³⁾.

The time organization subscale evaluates principles related to managing academic activities and responsibilities. In this category, the correlation between library access frequency and Time organization was positive among students in the Traditional Methodology group, indicating that library use contributed positively to their time organization. Students who obtained lower scores in this subscale would benefit from programs designed to create mechanisms for time monitoring, allowing them to complete academic tasks efficiently. However, it is essential to recognize that students' time organization is also influenced by institutional structures, such as excessive workload, overlapping courses, and poorly distributed deadlines, all of which directly impact individual time organization.

The attitude subscale reflects the value students attribute to university life and their interest in academic success. Thus, the higher the score in this subscale, the greater the student's demonstrated engagement in this area. Among students in the Traditional Methodology group who frequently visited the library, statistically significant results were observed. This finding is consistent with a previous study⁽²⁰⁾ that indicates students who use the library tend to display more proactive information-seeking behaviors and, consequently, achieve better academic performance. These students utilize library spaces to develop effective study strategies, critical thinking skills, and productivity, thereby distinguishing themselves during their undergraduate training and enhancing their prospects for professional success.

However, it is crucial to consider the instructor's role in moderating and guiding self-directed learning. In Active Learning Methodologies, the instructor acts as a mediator or facilitator, organizing problems and case studies, curating

sources, proposing guiding questions, and providing formative feedback to help students progress with autonomy and metacognitive awareness^(1,2,4). In the Traditional Methodology, although teaching is more lecture-based and teacher-centered, the instructor plays a role in curating and structuring content, guiding readings, teaching study techniques, and modeling the selection of main ideas. These actions may also enhance scores in the attitude and study aids subscales^(9,21).

Therefore, the similarity in attitude results between students who frequently visited the library and those who primarily used the internet in the Active Learning programs may reflect not only differences in access to information sources but also the influence of instructional mediation typical of these approaches. Such mediation requires prior research, in-class discussions, and the explicit use of strategies (e.g., time organization, main idea selection, summarizing, and concept mapping), elements associated with higher performance across the LASSI subscales^(9, 21).

Given the above, it was observed that both the library and the internet play a relevant role in supporting academic activities. The adoption of diverse study strategies, therefore, proves essential for improving student performance. In this context, the instructor assumes a central role as a mediator and facilitator of the learning process—particularly within Active Learning Methodologies—by guiding, moderating, and directing self-directed study. The most frequently reported learning strategies in the literature include summarizing, constructing concept maps, practicing spaced review, employing mnemonic techniques, critically reading reliable sources, planning study time, and organizing outlines and analogies to promote knowledge retention and application^(1,2,9,21). When these practices are encouraged and supervised by instructors, they contribute to the development of student autonomy and the enhancement of meaningful learning.

A limitation of this study is that it was conducted within a single health-related undergraduate program, which restricts the generalizability of the results. To broaden understanding of the topic, future research should include programs from different fields of knowledge, enabling more comprehensive comparisons across distinct academic contexts.

CONCLUSION

The internet serves as the primary research source for university students engaged in self-directed learning, although students in Active Learning Methodologies tend to use libraries more frequently. Library access contributed positively to information processing, time organization, and the use of study aids, whereas internet access hurt information processing. Therefore, it is of utmost importance to develop practices that promote the integrated use of both the library and the internet, alongside learning strategies that support the training of Speech-Language Pathology students.

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