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ORIGINAL ARTICLE

Training in self-regulated learning based on a neuropsychological approach to academic stress in university students

Capacitación en aprendizaje autorregulado desde un enfoque neuropsicológico del estrés académico en estudiantes universitarios

Treinamento em aprendizagem autorregulada a partir de uma abordagem neuropsicológica do estresse acadêmico em estudantes universitários

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ABSTRACT

Introduction: academic stress is a common challenge among university students and can have negative effects on their performance and well-being, as well as hinder conscious learning regulation. This article presents a training program designed to address this problem from a neuropsychological approach and promote self-regulated learning. **Objective:** to evaluate the effectiveness of the self-regulated learning training strategy in reducing stress associated with the academic context. **Method:** a mixed research design was employed, involving eight second-year undergraduate students. The training program consisted of five sessions, each addressing specific aspects of self-regulated learning and academic stress management. Quantitative data were collected, and semi-structured interviews were conducted to gain a deeper understanding of the phenomenon. **Results:** the program had a positive impact on reducing stress associated with the academic context and improving performance in the sample. Participants reported increased awareness of their own learning strategies and improved ability to manage stress in the academic environment. **Conclusions:** this study demonstrates that a training program in self-regulated learning, based on a neuropsychological approach, can be effective in reducing stress associated with the academic context and increasing the performance of university students. These findings support the importance of providing students with strategies to manage stress and promote self-regulated learning.

Keywords: training program; academic stress; self-regulated learning; university students

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RESUMEN

Introducción: el estrés académico es un desafío común entre los estudiantes universitarios y puede tener efectos negativos en su rendimiento y bienestar, así como dificultar la regulación consciente del aprendizaje. **Objetivo:** evaluar la eficacia de la estrategia de capacitación en aprendizaje autorregulado para la disminución del estrés asociado al contexto académico. **Método:** se empleó un diseño mixto de investigación en el que participaron ocho estudiantes que cursan el segundo año de licenciatura. El programa de capacitación constó de cinco sesiones, cada una de ellas abordando aspectos específicos del aprendizaje autorregulado y la gestión del estrés académico. Se recolectaron datos de naturaleza cuantitativa y se llevaron a cabo entrevistas semiestructuradas con el objetivo de obtener una comprensión más profunda del fenómeno. **Resultados:** el programa tuvo un impacto positivo en la reducción del estrés asociado al contexto académico y la mejora del rendimiento en la muestra. Los participantes informaron una mayor conciencia de sus propias estrategias de aprendizaje y una mejor capacidad para gestionar el estrés en el entorno académico. **Conclusiones:** este estudio demuestra que un programa de capacitación en aprendizaje autorregulado, basado en un enfoque neuropsicológico, puede ser efectivo para disminuir el estrés asociado al contexto académico y aumentar el rendimiento de los estudiantes universitarios. Estos hallazgos respaldan la importancia de proporcionar a los estudiantes estrategias para gestionar el estrés y promover la autorregulación del aprendizaje.

Palabras clave: programa de capacitación; estrés académico; autorregulación del aprendizaje; estudiantes universitarios

RESUMO

Introdução: o estresse acadêmico é um desafio comum entre estudantes universitários e pode ter efeitos negativos no seu desempenho e bem-estar, além de dificultar a regulação consciente da aprendizagem. **Objetivo:** avaliar a eficácia da estratégia de formação de aprendizagem autorregulada para reduzir o stress associado ao contexto académico. **Método:** foi utilizado um desenho de pesquisa misto no qual participaram oito estudantes do segundo ano do bacharelado. O programa de formação consistiu em cinco sessões, cada uma abordando aspectos específicos da aprendizagem autorregulada e da gestão do stress académico. Foram coletados dados de natureza quantitativa e realizadas entrevistas semiestruturadas com o objetivo de obter uma compreensão mais aprofundada do fenômeno. **Resultados:** o programa teve um impacto positivo na redução do estresse associado ao contexto acadêmico e na melhoria do desempenho da amostra. Os participantes relataram maior consciência de suas próprias estratégias de aprendizagem e uma melhor capacidade de gerenciar o estresse no ambiente acadêmico. **Conclusões:** este estudo demonstra que um programa de formação em aprendizagem autorregulada, baseado numa abordagem neuropsicológica, pode ser eficaz na redução do stress associado ao contexto académico e no aumento do desempenho dos estudantes universitários. Estas descobertas apoiam a importância de fornecer aos alunos estratégias para gerir o stress e promover a aprendizagem autorregulada.

Palavras-chave: programa de treinamento; estresse acadêmico; autorregulação da aprendizagem; estudantes universitarios

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INTRODUCTION

In the current century, the primary objective of educational policies is to improve quality. Authorities seek to use limited resources more efficiently to achieve the goals set by society for the education system.[1]

Various research studies have identified self-regulated learning as one of the most predictive factors in terms of study effectiveness and achieving outstanding academic performance by students.[2,3] Self-regulated learning encompasses a range of cognitive and motivational processes, from organizing academic activities to persevering in the face of obstacles and adapting strategies to achieve satisfactory results.[2]

In current higher education contexts, academic stress generated by harmful study habits is increasingly common. [3] From a neuropsychological perspective, it can be understood that academic stress impacts the cognitive and emotional performance of university students, resulting in adverse consequences for their academic achievement and mental well-being.[4]

At the neurological level, potentially harmful contexts and situations activate stress responses in the body, involving a series of physiological and neurochemical changes.[5] These transformations can affect concentration, information retention, cognitive processing, and decision-making, posing obstacles to optimal learning.[3]

In this context, self-regulated learning becomes a crucial variable for addressing academic stress. Self-regulated learning is related to the executive functioning of the brain, which includes skills such as self-reflection, emotional self-regulation, planning, and decision-making.[6]

The implementation of a self-regulated learning training program based on a neuropsychological approach can be beneficial for university students by providing them with the necessary skills to manage academic stress and enhance their academic performance. By addressing self-regulated learning from a neuropsychological perspective, it is possible to consider the brain processes and neurobiological foundations involved in learning and stress regulation. As a result, more effective interventions can be developed that adapt to the specific needs of each student. This approach promotes optimal learning and better management of academic stress. Therefore, the aim of this research is to evaluate the effectiveness of the self-regulated learning training strategy in reducing stress associated with the academic context.

METHOD

This study was based on a mixed research approach[7], which combines both quantitative and qualitative data with the aim of obtaining a more comprehensive and in-depth understanding of the phenomenon under study. By integrating these two types of data, a methodological advantage is achieved, allowing for a more holistic and enriching approach to the various dimensions of the phenomenon.[7]

The mixed design used in this research involved two complementary stages. Firstly, the collection and analysis of quantitative data to examine objective and measurable aspects of the phenomenon, such as manifestations of academic stress, self-regulated learning, and observable behaviors. During the second stage, qualitative methods were used to explore students' subjective experiences, perceptions, and emotions related to academic stress, through interviews and focus groups.

This combination of quantitative and qualitative approaches allowed for data triangulation, meaning that the findings were supported and complemented by each other. This provides greater validity and reliability to the results, as a more complete and authentic picture of the studied phenomenon is obtained.[7]

Sample description

The sample selection included all students belonging to the second-year group of a university program at Universidad Central “Marta Abreu” de Las Villas, Villa Clara, Cuba. Data regarding the university program and faculty in which the students are enrolled remained anonymous at the students' request and in respect for the protection of personal data and privacy.[8]

The sample consisted of all participants who make up the target university group for the research. The eight participants have a mean age of 20.38 (range=19-21; SD=±1.06) and an average academic index of 4.44 (SD=±0.31), indicating that the group has a medium to high level of academic performance. A probabilistic sampling was employed as all participants from the group were included.

Selection of experts

The selection of experts plays a crucial role in this study, as their experience and knowledge in the area of study contribute to the validity and reliability of the results. The process of selecting the expert participants in this research is described below.

1. *Selection criteria:* specific criteria were established to identify the most suitable experts to participate in the study. These criteria were based on relevant experience and knowledge in the field of study. Aspects such as academic background, work experience, previous contributions in the research area, and recognition in the scientific community were considered. The selection criteria were defined clearly and transparently to ensure objectivity in the selection process.

2. *Search and recruitment:* to identify potential experts, an exhaustive search was conducted in academic databases, professional records, and other relevant sources. Candidates were contacted through emails or personal communications, explaining the purpose of the study and the importance of their participation. The confidentiality of information and its exclusive use for research purposes were emphasized.

3. *Informed consent:* selected experts were provided with detailed information about the study, including its objectives, methodology, and any other relevant aspect. Their informed consent was requested to participate in the study, ensuring that they fully understood the requirements and implications of their participation.

4. *Sample size:* the sample size of experts was determined considering the diversity of perspectives and the representativeness of the field of study. A balance was struck between having a sufficient number of experts to obtain a wide range of opinions and limiting the sample to a manageable size to ensure the quality and comprehensiveness of the evaluations.

5. *Confidentiality and anonymity:* experts were assured of the confidentiality of their responses, and they were informed that their contributions would be treated anonymously. The collected data were used solely for research purposes, and necessary measures were taken to protect the participants' privacy and confidentiality.

The selection of experts was carried out rigorously and transparently, following the aforementioned steps. Finally, five experts were selected who provided their knowledge and expertise to evaluate and validate the proposed study, thereby ensuring the quality and relevance of the obtained results.

It is important to note that the participation of the experts was voluntary, and their valuable contribution to the study was acknowledged. Their experience and knowledge in the field of study provided an enriching perspective that helped strengthen the validity and reliability of the results.

Stages of the program

Stage 1. Needs assessment

It was structured in two diagnostic sessions with the aim of exploring the resources and practical self-regulated learning skills, as well as identifying the presence of stress associated with academic demands in students. This allowed for an initial approach to the educational and student context of the sample.

This approach allowed for the evaluation of levels of self-regulated learning and identification of the most affected dimensions. Subsequently, the existing levels of academic stress in the sample, its main manifestations, and associated protective factors were assessed.

Diagnostic techniques such as semi-structured interviews were used with the Head Teacher of the Year as a key informant to understand the group characteristics of the participants from the perspective of the teachers. Additionally, the variables of interest were evaluated using the Self-Regulated Learning Scale in University Students[9] and the SISCO Inventory of Academic Stress.[10]

The administration of both surveys was accompanied by a group discussion addressing aspects related to experiences in the university context, most frequent study strategies, interpersonal relationships, and perception of the academic curriculum. The results obtained in the diagnostic process laid the foundation for the development of the training program.

Stage 2. Program design

The training strategy consisted of 5 one-hour working sessions, with the main purpose of strengthening self-regulated learning as a factor affected by academic stress from a neuropsychological perspective. A detailed description of the objectives for each session is provided in Figure 1.

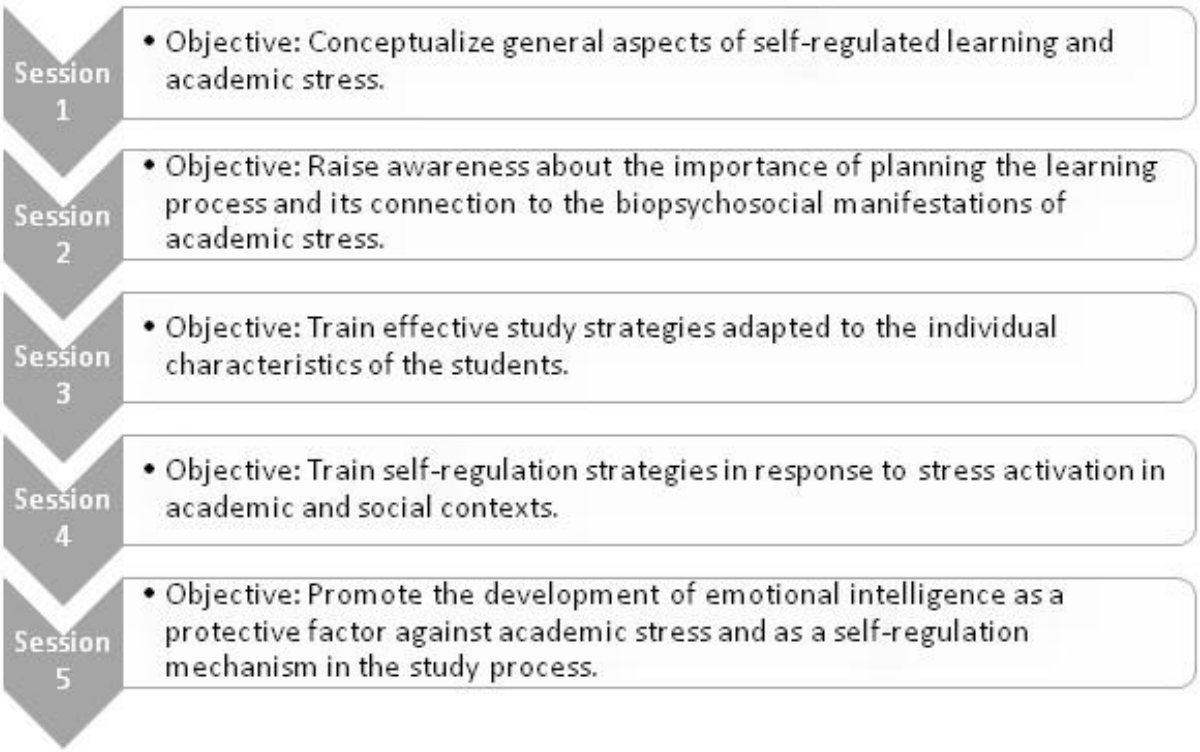

Fig. 1. Working sessions and proposed objectives.
Source: Self-created

Stage 3. Program implementation

The focus of the work was to promote understanding of the importance of proper self-regulated learning to achieve efficient academic performance. To accomplish this, it was necessary to develop knowledge and practical skills in students, aiming to empower them to effectively self-regulate their learning process and adopt a conscious and voluntary attitude towards studying. Additionally, efforts were made to strengthen adaptive coping strategies for stressful situations, especially in the academic domain.

Throughout the process, the acquisition and strengthening of protective elements for mental health were emphasized. Furthermore, training in coping strategies from a neuropsychological perspective was provided to achieve regulation in psychophysiological activation responses to stress.

Stage 4. Results evaluation

To evaluate the results, a working session was conducted with the group, with the objective of presenting the findings obtained during the program and gathering feedback from the group regarding those results. For this purpose, a situation involving self-regulated learning strategies and stress coping mechanisms was proposed, and the participants were asked to comment on how they would have approached it before and after receiving the content covered in the program. In a second phase, an infographic summarizing the main topics addressed throughout the process was presented, followed by participants offering their considerations regarding the topics discussed and how they felt before, during, and after the intervention.

General procedures

Participants were informed about the voluntary nature of their participation and the lack of negative consequences in case of withdrawal. Anonymity of responses and confidentiality of results were guaranteed. Informed consent was obtained from all participants involved in the study. All procedures adhered to the ethical principles established in the 1964 Helsinki Declaration and its comparable standards. For the analysis of quantitative information, SPSS software v.25.0 was used, conducting descriptive analyses of the variables. Qualitative information was processed through content analysis.

RESULTS

The diagnostic analysis reveals considerable levels of academic stress in the students, which manifest physically, psychologically, and behaviorally, negatively impacting self-regulated learning, particularly in study disposition. This generates feelings of displeasure among students, low academic performance, and an inability to implement adaptive stress management and learning regulation strategies due to their lack of knowledge about these phenomena and their consequences.

The Self-Regulated Learning Scale reflects that study disposition is usually observed in the majority (33.3%) and self-efficacy for study disposition is also usually reported (32.8%). Performance in studying, in terms of monitoring and cognitive strategies, mostly occurs always (30.8%), and seeking help also happens consistently (31.3%). Causal attributions for failure, considering external factors, mostly do not occur (37.5 %), while attributions to internal factors range from never (22.5%) to regularly (22.5%). Lastly, the self-assessment of study planning and learning occurs almost always (39.8%).

The Academic Stress Inventory yielded results indicating that 87.5% of the sample has experienced moments of worry or nervousness during the course of this semester. Participants' worry or nervousness during the semester occurred sometimes (37.5%) and regularly (37.5%).

Regarding the frequency of academic environment demands as stressors, the following stand out: overload of tasks and schoolwork (62.5%; almost always), evaluations by teachers (37.5%; always), not understanding the topics covered in class (62.5%; sometimes), and limited time to complete work (62.2%; sometimes). The majority of coping strategies used by the participants are assertive skills (50.0%; sometimes), and it is worth noting that most participants do not use psychotropic medications (87.5%).

The most frequent physical reactions to stressful stimuli are sleep disorders (50.0 %; sometimes) and chronic fatigue (50.0%; sometimes). The most common psychological reactions include conflicts or a tendency to argue (50.0%; rarely), lack of enthusiasm for school tasks (25.0%; always), and increased or decreased food consumption (62.5%; sometimes).

The program design was evaluated by specialists based on pre-established criteria (Figure 2). The ratings and criteria provided revealed that the consulted experts consider the intervention proposal to be highly sufficient. All analysis criteria scored between 4.5/5 and 5/5. According to their opinion, the objectives established in the sessions and the system of activities enable the achievement of the program's overall goal, and the order in which the workshops are conducted facilitates the progressive fulfillment of these objectives.

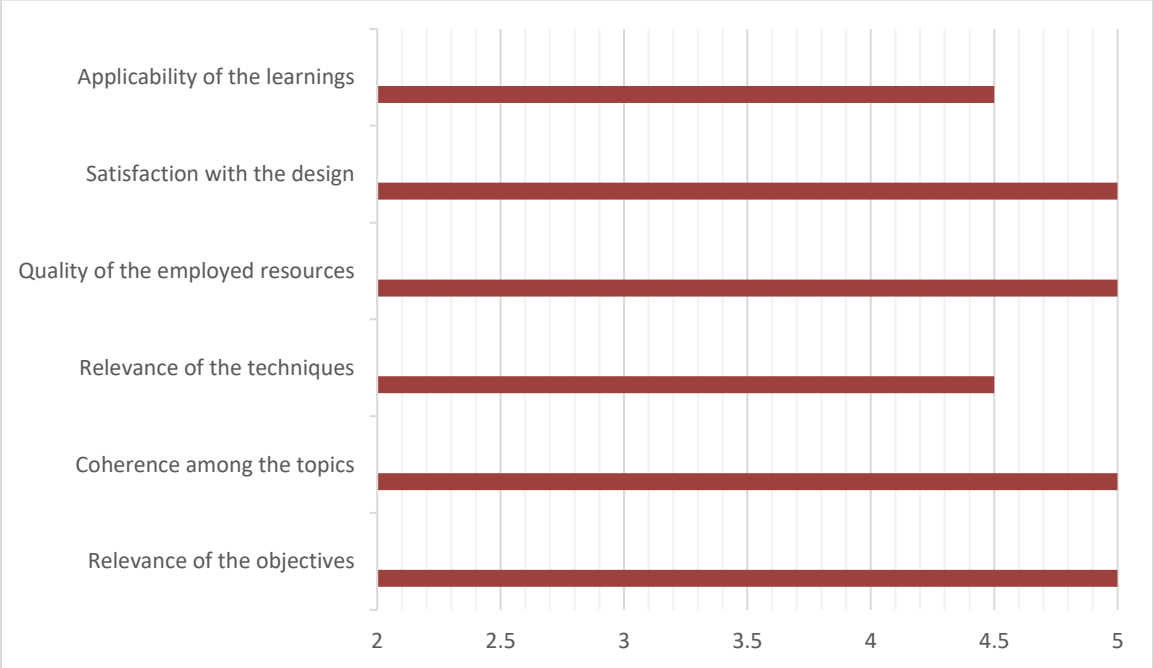

Fig. 2. Evaluation by specialized experts.
Source: Self-created.

In the first session, cards with concepts about academic stress and self-regulated learning were used. There were difficulties in matching the concepts, but they were successfully synthesized through joint elaboration. Coping strategies such as experiential avoidance, physical exercise, and talking to friends were highlighted. In terms of study strategies, a superficial and rote approach was observed, with excessive use of repetition and summarization. The main difficulties were the lack of adaptive coping strategies and poor learning approaches. The students mentioned stress due to upcoming exams and difficulty in studying and concentrating. Emphasizing the importance of learning planning was proposed for the next session. In conclusion, the students appreciated the interesting dynamics but expressed a desire for fewer tasks to reduce stress.

The second session emphasized the need to plan study and the learning process to reduce the biopsychosocial manifestations of academic stress. A video debate on study strategies and planning was conducted, where the students showed interest in implementing new techniques such as organization and the use of positive reinforcements. The retrospective look technique was applied to consolidate the acquired knowledge, and it was suggested to delve into individual learning strategies in future sessions. Overall, a favorable working environment was observed, with committed and interested students in the content and the intervention as a whole.

During the third session, knowledge about planning and evaluating the learning process was complemented with personalized study strategies. The efficient reading technique was applied to offer different study strategies, allowing each student to choose the one that best suited their individual characteristics. Significant verbalizations showed the students' interest in trying new learning methods, such as studying in the morning or studying with a partner they enjoy listening to. The students rated the level of acquired learning as 4/5 and expressed a high level of satisfaction with the session (5/5).

The fourth session aimed to develop adaptive coping strategies for academic and social stress in the students. The living story technique was used to explore the predominant coping styles among the participants. The story focused on a university student facing problems due to an authoritarian teaching style of a professor, which caused her stress. The identified strategies were support from loved ones, experiential avoidance, and considering a career change. The lack of adaptive coping resources in the students was evident. The thematic content technique was used to represent stressful situations and develop joint strategies. Assertive communication strategies were offered, and work was done to acquire adaptive coping methods. The students evaluated the experience as satisfactory and committed to facing their stressful situation adaptively with the help of the Head Year Teacher.

The fifth session focused on developing emotional intelligence in the students as a protective factor against academic stress. A brainstorming activity was conducted to consolidate knowledge about emotional intelligence, and a collective synthesis was created. The components of attention, clarity, and emotional regulation were identified. An instructional video was presented, and a discussion on the importance of emotional intelligence was promoted. The opinions were positive, highlighting its role in becoming better individuals, expressing oneself without harming others, and its relationship with academic stress. The involvement of emotional intelligence in learning was valued, and the importance of empathetic and Dynamic teachers was emphasized. Its protective role was highlighted,

and the lack of courses or workshops to teach emotional intelligence to teachers and students was mentioned as a negative aspect.

Throughout the sessions, it was observed that the students were able to develop efficient study skills in a planned and tailored manner to their individual characteristics. These skills were characterized by conscious and voluntary motivation to deeply understand the received information due to its importance for their future professional performance. Regarding coping strategies for academic stress, it was found that the students acquired and applied these strategies. However, the students emphasized that academic stress is not solely dependent on their own maladaptive coping methods but also on the teaching styles of their professors and the pedagogical decisions made, which sometimes do not align with their interests or are not perceived as favorable and beneficial by them. Although the PPA acknowledges this situation, it considers it necessary to respect the teaching styles of the faculty and the particularities of the curriculum.

DISCUSSION

This self-regulated learning training program from a neuropsychological approach to academic stress in university students contributes to the existing body of knowledge on the subject. By contrasting the results with other related research, some important similarities and differences can be highlighted.

Firstly, several previous studies have found a high prevalence of academic stress in university students.[3,11] This coincidence is reinforced by the results obtained in this research, where physical, psychological, and behavioral manifestations of academic stress were observed in the participating students.

Previous research has consistently demonstrated that high levels of academic stress can hurt student performance.[12,13] In this study, a relationship between academic stress and self-regulated learning was found, indicating that stress can influence students' ability to effectively regulate their learning process.

Regarding the intervention, previous research supports the effectiveness of training programs in reducing academic stress and improving self-regulated learning in university students. [14] The present training program was based on these recommendations and focused on adaptive coping strategies and self-regulated learning techniques, aligning with the existing literature.

However, it is important to consider some differences and limitations between our research and previous investigations. For example, the duration of the training program in our study was relatively short, which may limit the magnitude of the observed effects.[2,14]

It is important to take into account the specific characteristics of the sample used in our study. The participating students were selected from a specific university population, which means that the results may not be generalizable to other student populations. Different educational contexts, levels of stress, and individual characteristics can influence the outcomes of training programs.[15]

The findings of this study support the relevance of training programs in university students to address academic stress and improve self-regulated learning. However, further research is needed to gain a better understanding of the underlying mechanisms, evaluate the long-term effectiveness of training programs, and examine the generalizability of the results to diverse contexts and student populations. These ongoing efforts will help strengthen and expand knowledge on effectively addressing academic stress and promoting better performance and well-being in university students.

CONCLUSIONS

The findings of this study support the effectiveness of a self-regulated learning training program based on a neuropsychological approach in addressing academic stress in university students. The results demonstrate that this type of program can reduce stress and improve academic performance. Awareness of one's learning strategies and the ability to self-regulate are key aspects of managing academic stress, and this program provided students with the necessary tools to improve in these areas.

The utilization of both quantitative and qualitative approaches in the study methodology provided a comprehensive perspective of the results, supporting the validity and reliability of the findings obtained. The integration of the neuropsychological perspective in training programs can help students understand how stress affects their brains and utilize neuroscience-based strategies to effectively manage academic stress. These findings have important implications for higher education as they suggest that implementing similar programs in other educational institutions can enhance students' academic experience and overall well-being.

REFERENCES

1. Pérez-Gamboa AJ, Rodríguez-Torres E, Camejo-Pérez Y. Fundamentals of psycho-pedagogical care for the configuration of the life project in university students. Educación y Sociedad [Internet]. 2023 [cited 10 Mar 2024]; 21(2):67-89. DOI: https://doi.org/10.5281/zenodo.7979972
2. Theobald M. Self-regulated learning training programs enhance university students' academic performance, self-regulated learning strategies, and motivation: A meta-analysis. Contemporary Educational Psychology [Internet]. 2021 [cited 12 Mar 2024]; 66:101976. DOI: https://doi.org/10.1016/j.cedpsych.2021.101976
3. Karaman MA, Lerma E, Cavazos-Vela J, Watson JC. Predictors of Academic Stress Among College Students. Journal of College Counseling [Internet]. 2019 [cited 9 Mar 2024]; 22(1):41-55. DOI: https://doi.org/10.1002/jocc.12113
4. Beltrán-Velasco AI, Ruisoto-Palomera P, Bellido-Esteban A, García-Mateos M, Clemente-Suárez VJ. Analysis of Psychophysiological Stress Response in Higher Education Students Undergoing Clinical Practice Evaluation. J Med Syst [Internet]. 2019 [cited 11 Mar 2024]; 43(68). DOI: https://doi.org/10.1007/s10916-019-1187-7

5. Umematsu T, Sano A, Taylor S, Picard RW. Improving Students' Daily Life Stress Forecasting using LSTM Neural Networks. IEEE EMBS International Conference on Biomedical & Health Informatics [Internet]. Chicago, IL, USA. 2019 [cited 8 Mar 2024]:1-4. DOI: https://doi.org/10.1109/BHI.2019.8834624
6. Aghdar A, Allipour S, Shehni-Yeilagh M. The Relationship between Executive Functions and Self-Regulated Academic Learning Regarding the Mediating Role of Metacognition and Working Memory among University Students. Iranian Journal of Learning and Memory [Internet]. 2020 [cited 11 Mar 2024]; 2(8):73-82. DOI: https://doi.org/10.22034/IEPA.2020.236019.1178
7. Guetterman TC, Fetters MD, Cresswell JW. Integrating Quantitative and Qualitative Results in Health Science Mixed Methods Research Through Joint Displays. Annals of Family Medicine [Internet]. 2015 [cited 10 Mar 2024]; 13(6):554-561. DOI: https://doi.org/10.1370/afm.1865
8. Fisher CB. Decoding the Ethics Code: A Practical Guide for Psychologists [Internet]. London: SAGE Publications, Inc (2nd ed); 2023 [cited 10 Mar 2024]. Available at: https://psycnet.apa.org/record/2011-21808-000
9. Céspedes-Rodríguez HT. Aprendizaje autorregulado, rendimiento y estrés académico en estudiantes universitarios: Tesis en opción a Licenciatura en Psicología [Internet]. Universidad Central "Marta Abreu" de Las Villas; 2022 [cited 13 Mar 2024]. Available at: https://dspace.uclv.edu.cu/bitstreams/94ecfe76-08a4-4838-87e0-d9e55d25400a/download
10. Barraza-Macías A. Inventario SISCO de estrés academic. Propiedades psicométricas. Psicología Científica [Internet]. 2007 [cited 10 Mar 2024]; 9(13). Available at: https://psicologiacientifica.com/inventario-sisco-estres-academico/
11. Teixeira RJ, Brandão T, Rocha-Dores A. Academic stress, coping, emotion regulation, affect and psychosomatic symptoms in higher education. Current Psychology [Internet]. 2022 [cited 14 Mar 2024]; 41:7618-1627. DOI: https://doi.org/10.1007/s12144-020-01304-z
12. Alotaibi AD, Alosaimi FM, Alajlan AA, Bin-Abdulrahman. The relationship between sleep quality, stress, and academic performance among medical students. Journal of Family & Community Medicine [Internet]. 2020 [cited 12 Mar 2024]; 27(1):23-8. DOI: https://doi.org/10.4103/jfcm.jfcm_132_19
13. Frazier P, Gabriel A, Merians A, Lust K. Understanding stress as an impediment to academic performance. Journal of American College Health [Internet]. 2019 [cited 10 Mar 2024]; 67(6):562-70. DOI: https://doi.org/10.1080/07448481.2018.1499649
14. Hennessy EA, Johnson BT, Acabchuk RL, McCoskey K, Stewart-James J. Self-regulation mechanisms in health behavior change: a systematic meta-review of meta-analyses, 2006–2017. Health Psychology Review [Internet]. 2020 [cited 10 Mar 2024]; 14(1):6-42. DOI: https://doi.org/10.1080/17437199.2019.1679654
15. Yusofov M, Nicoloro-SantaBarbara N, Grey NE, Moyer A, Lobel M. Meta-analytic evaluation of stress reduction interventions for undergraduate and graduate students. International Journal of Stress Management [Internet]. 2019 [cited 10 Mar 2024]; 26(2):132-45. DOI: https://doi.org/10.1037/str0000099

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Conflict of Interest:
The authors declare that there is no conflict of interest.

Authors contributions:
Diego Daniel Díaz Guerra: conceptualization, data curation, investigation, methodology, project administration, software, supervision, writing - original draft, writing - review and editing.
Marena de la C. Hernández Lugo: conceptualization, data curation, formal analysis, investigation, project administration, visualization, writing - original draft, writing - review and editing.
María del Pilar Fernández Celis: data curation, project administration, writing - original draft.
Raquel Yovana Tello Flores: data curation, project administration, writing - original draft.
Esteban Rodríguez Torres: data curation, project administration, writing - original draft.

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Database of Training in self-regulated learning based on a neuropsychological approach to academic stress in university students