Impact of "mindfulness" or full awareness meditation on learning abilities

Giovanni Lucero-Romero

UISEK Business School, Universidad Internacional SEK, Quito, Ecuador, and

Leopoldo G. Arias-Bolzmann

*Grupo Iberoamericano de Marketing,
Instituto de Investigación Científica, Universidad de Lima, Lima, Peru*

Abstract

Purpose – This study experimentally aims to determine the degree of influence that mindfulness training exerts on learning capacity at the university level and contrasts it with previous observational or relational studies that have shown contradictory results.

Design/methodology/approach – A quasi-experiment was carried out to measure the variation of six academic learning abilities – a) self-efficacy, b) organization of and attention to studies, c) stress control due to time pressure and the environment, d) involvement with college activity, e) emotional satisfaction, and f) class communication – which together comprise the research questionnaire called the college learning effectiveness inventory (CLEI). The CLEI questionnaire was administered before and after the participants were trained in the mindfulness technique. The study was conducted in Ecuador, and the participants were selected from among the graduate students of a local university.

Findings – The learning ability measured by the CLEI was improved by a statistically significant margin in the two groups.

Research limitations/implications – The treatment groups consisted of graduate students who did not have opportunities for full-time activities on campus, as they were limited to attending regular classes at specific times, usually at night. The dropout rate was 14% due to inconveniences caused by the pandemic. These conditions could have affected the study results both positively and negatively. In addition, the pandemic limited academic interactions, which are required to evaluate the learning results after applying the research instrument. This limitation was especially critical for people who had experienced online classes only.

Practical implications – Offering graduate students the opportunity to learn about and adopt a mindfulness practice helps to improve their academic outcomes, as reflected through the statistical measurement of the CLEI indicator.

Social implications – This study is especially relevant within the context of sanitary conditions due to the pandemic and the intensive use of technology for managing academic interactions, both of which have replaced physical contact between participants.

Originality/value – The main contributions of this study are related to the determination of the practical effects of mindfulness training in postgraduate university settings and the identification of the mechanisms involving participants' reflecting upon, learning and understanding the importance of perfecting their soft skills to facilitate their learning processes and face today's uncertain environments.

Keywords Mindfulness, Teaching–learning, Soft skills, Quasi-experiment, CLEI

Paper type Research paper

Introduction

The world is enduring economic, political, social and environmental issues as well as crises in the application of life principles and values. COVID-19 has highlighted social differences, marked by significant gaps in variables such as income; health; life expectancy; food and, particularly, education.

According to the World Health Organization (WHO), 12.5% of the world's population, approximately one billion people, suffer from a mental disorder; three million die each year from alcohol consumption; and one person commits suicide every 40 s. Mental illness increased in recent years because of the pandemic, caused by conditions derived from it, such as isolation; the treatment of infected persons; the unforeseen death of loved ones; and the use of technological means to carry out different activities, including education, replacing traditional physical contact (El Universo Newspaper, 2020).

El Universo Newspaper (2020) also noted that the United Nations Children's Fund (UNICEF) and the Ministry of Education of Ecuador conducted a survey in which parents were consulted about the effects of the pandemic on their children. The survey of 4,500 people in different parts of Ecuador concluded that 40% of students below 18 years felt affected by severe anguish or tension.

In another study carried out in 2020 by the American Council on Education (ACE), a survey was applied to 268 university presidents in the United States. Of those surveyed, 68% recognized that one of their most critical institutional problems was the deterioration of graduate student mental health. These students had dropout rates between 43 and 68%, becoming a conflict factor, altering academic effectiveness and varying the financial balance of these institutions. The study concluded that mental health is a serious problem that requires immediate reestablishing actions for both graduates and research personnel (Delgado, 2021).

Notwithstanding, educational efforts have focused on promoting and developing intellectual aspects such as reflection, logic and analysis. Meanwhile, very little has been done to stimulate the power of consciousness and the affective – emotional potential that both permit the implementation of new, scientific models of teaching – learning. Such models allow people to be instructed in a pleasant and motivating environment that facilitates learning and contributes to strengthening their human qualities and values.

Furthermore, university understanding has been under examined worldwide regarding the contribution of soft skills in preparing postgraduate students as a complement to professional training programs. This deficiency has been highlighted by company recruiters and firms specializing in hiring human capital (Succi and Wieandt, 2019). Given these conditions, the present study seeks to contribute by filling this gap while offering universities and students options, such as *mindfulness* practice, to reinforce regular education programs and face the current globally uncertain environments.

Therefore, this study assesses the influence level that the practice of the "*mindfulness*" method exerts on students' learning abilities. The following main research question was developed: How much can the mindfulness technique improve the learning ability of graduate students? To answer this question, the following central research hypothesis was proposed: The learning ability of graduate students increases after they are trained in the "*mindfulness*" technique. Figure 1 shows the conceptual research model that relates the study variables to the central hypothesis and five auxiliary hypotheses, presented later.

Figure 1.
Relationship between study variables and research hypotheses
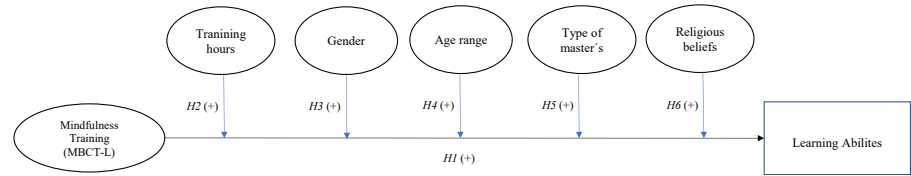
In addition to the general objective, the following secondary objectives were developed for this study: (a) Help improve teaching–learning techniques by incorporating an emotional–affective approach that complements intellectual efforts. (b) Encourage a state of full awareness in all student activities, both autonomously and in collaboration with teachers and other participants in professional training courses. (c) Help to create mechanisms to control and reduce the levels of stress and anguish resulting from the intensive use of digital media that have replaced personal contact. (d) Develop a set of andragogic resources for professors and students to strengthen knowledge-sharing. (e) Provide specific recommendations to strengthen teaching–learning capabilities.

Specifically, our paper contributions are as follows. First, given that the previous research has been mostly observational or relational in nature; a quasi-experimental methodology was applied here to establish possible causal relationships between the mindfulness application and the studied effect. Second, various practical consequences were identified within postgraduate university environments that guided students, teachers and administrative staff to optimize their performance within training programs and academic interactions. Third, participant involvement is promoted in reflecting upon, learning and understanding the importance of perfecting soft skills to facilitate the teaching–learning processes and facing the uncertain conditions of life in the present century. Overall, the application of an unconventional mechanism such as mindfulness to improve learning will result in important benefits to society. This result is because students will be better prepared to assume and fully comply with their personal, family and professional responsibilities by consciously acquiring knowledge and actively using all their intellectual and emotional capacities. Finally, this study addresses the labor, economic and environmental crises that have been exacerbated over the last three years.

This article is organized as follows. First, the theoretical support and related previous research are presented. Second, the methodology is described. Third, the results are analyzed. Fourth, a brief discussion of the findings is included as well as their implications and recommendations for future studies.

Conceptual framework
Key concepts
Mindfulness. First, the word "*mindfulness*" is important to understand. The word describes a series of meditation techniques based on breath control and the practice of simple physical exercises inspired by the spiritual practices developed by Asian cultures of Buddhist, Taoist and Zen origin. These techniques were systematized, structured and adapted to Western needs and culture by Kabat-Zinn (1990), Professor Emeritus at the University of Massachusetts Medical School, who founded the *Stress Reduction Clinic* and the *Center for Mindfulness in Medicine, Health Care and Society*. He created the mindfulness-based stress reduction (MBSR) method, which integrates deep breathing exercises, yoga and meditation. The results have been scientifically proven beneficial for health and the body in general and particularly for counteracting the influence of stress factors in daily personal and work life. The *mindfulness* technique has been scientifically validated by researchers through 16,581 worldwide publications from 1966–2021 (Baminiwatta and Solangaarachchi, 2021).

Mindfulness is a secular, nonreligious technique whose purpose is to develop the ability to be fully aware of what is happening to us at all times. It is an invitation to approach with kindness our own bodies, minds, hearts and lives, leading to attention given systematically and kindly to discovering new facets of our lives that for various reasons have remained hidden or ignored by us. Kabat-Zinn and Kabat-Zinn (2021, p. 267) stated the following:

> The practice of mindfulness does not require us to be different from who we are. Quite the contrary. It invites us to be fully who we are in any and every moment, to be as large and authentic as we actually are in the only moment we ever have.

First applied in medicine, this practice has extended its influence to many disciplines, such as education, law, business, technology, sports and even politics and government (Kabat-Zinn, 2013).

Quasi-experiments. According to Reichardt (2019), the comparisons used to estimate the treatment effects can be classified into two types: randomized experiments and quasi-experiments. In randomized experiments, the study units are randomly assigned to treatment conditions, while in quasi-experiments, the assignment occurs nonrandomly, by applying administrative decisions, self-selection, legal mandates or any other similar nonrandom process.

Literature review

Several studies have been conducted worldwide to discover possible relationships between *mindfulness* and learning improvements. The research in *mindfulness* is emerging, and a vast body of ongoing research is generating promising results. However, many years will elapse before we have sufficient peer-reviewed material, including active controls and long timeframes, to establish firm evidence of the benefits (Mindful Staff, 2020). With this caveat, some outstanding studies are discussed below that relate *mindfulness* to the improvement of learning abilities published in the last decade.

Ching *et al.* (2015) conducted experimental work in Taiwan, a pioneer in the Asian continent, to evaluate the impact on the cognitive improvement of college students after *mindfulness implementations*. They used the Chinese version of the College Learning Effectiveness Inventory (CLEI) for this work. Likewise, they included software designed to evaluate the responses of various cognitive activities. No significant differences were found in the results obtained through the application of the CLEI measurement scale between the intervention and control groups. This work showed that after one semester of studying the *mindfulness* technique, college students learned more effectively in terms of the cognitive performance of attention and memory. This study is considered seminal for this research.

In 2016, Palomero and Valero conducted a study on *mindfulness* in which they highlighted its applicability in various fields, such as education. The methodology consisted of reviewing the concept and analyzing the transitional mechanisms between theory and practice in education, evaluating its advantages and disadvantages, and presenting some recommendations. They concluded that a broad knowledge base supports the capacity and potential for application in this area. However, further research is needed to facilitate its practical application.

Karunananda *et al.* (2016) highlighted the existence of various learning opportunities with a wide range of possibilities ranging from physical contact between participants to technology-based virtual learning systems. They identified several scientific pieces of evidence about the contributions that the development of *mindfulness* skills provides to students in terms of improving their cognitive abilities – such as retention, reflection, problem-solving – and their affective–emotional balance. The results reflected a very low relationship between the intention to apply this meditative technique and cognitive improvements. For this reason, they concluded that further research is needed and insisted on the importance of providing appropriate training to apply this technique before making any determination on its suitability.

Modrego *et al.* (2016) determined that significant scientific evidence is available about how *mindfulness* can expand its influence and advantages to other activities, including education. Students need to learn to manage their thoughts and regulate their feelings and emotions. Therefore, for this effort to succeed, training programs need to be developed for both groups.

Wang and Liu (2016) conducted a case study to understand how the application of *mindfulness* affects college students' learning of the English language. The study found that

the practice of *mindfulness* helps motivate students to take responsibility for their learning, generate new thoughts and be aware of them, which resulted in improvements in the students' skills, memory, creativity and positive mood. It also allowed them to awaken their awareness, learn from their own and others' experiences, and think critically.

Tobin (2018) reported various mechanisms on how understanding the advantages of meditation and *mindfulness* could be used to transform teaching and learning while strengthening democratic lifestyles for the benefit of those who practice it and the community as a whole.

In Ecuador, the country where this research was conducted, three published scientific papers by researchers from the Escuela Politécnica del Litoral (ESPOL) stand out. The first, conducted by Méndez and Rosado (2018), was related to the incorporation of *mindfulness* practice into the academic curriculum of the Faculty of Social and Humanistic Sciences at ESPOL. No significant relationships were found between the practice and the results. The evaluations were carried out using the Five Facet Mindfulness Questionnaire (FFMQ) and the Mindful Attention Awareness Scale (MAAS) instruments. The authors concluded that for their generalization, both instruments should be adapted for application within specific student groups in physical sciences or engineering.

In a second study, Méndez and Rosado (2019) explored the possible success of a *mindfulness* intervention in higher education using statistical techniques such as regression and a logarithmic analysis. The results indicated certain factors had significant effects on *mindfulness* practice: age, gender, school, school location, number of *mindfulness* training sessions, admission scores, type of courses passed, passing scores, family members with whom they live, birth order among siblings, type of education, musical instrument practice, sports practice and the use of corrective lenses. They concluded that this behavior could be unique to students who pursue majors in social sciences and humanities. Thus, they suggested that new studies should be conducted including students from other majors to identify whether the majors differ significantly.

The third study was carried out by Karl *et al.* (2020), jointly with researchers from 18 other institutions in several countries located in the regions of America, Europe, Asia and Oceania. The purpose was to evaluate the FFMQ and MAAS instruments and to analyze the strength of their variables and their intervention generalization related to the influence of *mindfulness* in educational activities. The main result of this globally shared study was that the FFMQ scale presented several conceptual and measurement problems in its cross-cultural application. Adjusting the FFMQ was more significant in the case of Western cultures, characterized by individualism, than it was in Asian cultures with a collective orientation. This adjustment would permit new validations of the instrument so it could be generalized and applied for educational purposes.

Austin and Loprinzi (2019) conducted an experimental study to evaluate the potential of the combined effects of high-intensity aerobic exercise and *mindfulness* meditation on episodic memory. The experiment provided evidence that *mindfulness* practice can encourage learning. Additionally, when combined with high-intensity exercise, long-term memory could be strengthened.

Dutta (2019) examined how *mindfulness* can help accomplish the fundamental purpose of education, which is comprehensive human development, based on a personal approach to *mindfulness* during the teaching–learning process. He emphasized that learners need opportunities to develop and internalize new knowledge. In this sense, producing only numerical evaluations of what has been learned is not enough, for either individuals or society. In his conclusions, he confirmed that *mindfulness* practice can generate notable physiological and psychological changes by reducing stress levels in both professors and students at different ages and with different training levels.

Hamman (2019) recognized that adult education and learning is a field of study aimed at individual and society-wide transformations. In practice, educational efforts have tended to prefer the rational cognitive approach, omitting the holistic approach. The research results suggest that this type of mindfulness-based learning should be considered in adult learning programs to complement cognitive and rational knowledge acquisition mechanisms.

Wamsler (2019) emphasized current ways of approaching the study of social science and education, which privilege the attention to and evaluation of external ecosystems, broader socioeconomic structures, technology, and management and governance dynamics. The study examines the connections between sustainability and inner transformation in education while sharing insights about contemplative and meditative interventions to provide the sustainability that education requires. The results showed that appealing to students' inner dimensions and transforming knowledge assimilation are critical to practically improving education in the long term.

Corti and Gelati (2020) conducted a case study in which they investigated the effects of a training program called mindful effective learning (MEL), which included *mindfulness*, coaching and study skills training, to improve college student learning skills. The study used two instruments: abilities and motivation to study (AMOS) and the Italian version of the MAAS. The results showed that after the intervention, students improved several cognitive skills and gained self-awareness and self-esteem.

Franco *et al*. (2020) worked on an experimental study in which they applied a psychoeducational mindfulness program to evaluate the achievement and learning motivations of Latin American students living in Spain. The study highlighted the benefits of implementing a mindfulness training program within the academic curriculum.

As a corollary to this literature review, Lytras *et al*. (2022) concluded that the COVID-19 pandemic has changed traditional educational models, creating the most disruptive innovations in educational systems in world history. The same authors suggested that it is the moment in which higher education should strive to design new strategies and alternative paths to respond to the rapid changes and unstable environments of the new century. In this way, the "new normal" should focus on seeking resilience, sustainability, change and the use of technology to ensure accessible and inclusive learning; as well as teaching for all, so that no one is left behind.

Method

Conceptual research model and hypotheses

Based on the literature review and the conclusions reported in previous investigations, a knowledge gap was detected between the intention to apply the *mindfulness* meditative technique and the cognitive improvements that could be achieved in educational environments at a higher level. In particular, there is a need to consider the effects of the pandemic and the limitations that exist in the educational environments of a developing country such as Ecuador.

This research was developed to deepen the understanding of this phenomenology. The previous studies have mainly been theoretical–conceptual, qualitative–explanatory and quantitative–relational. In particular, the research carried out in Ecuador by the ESPOL has been quantitative–relational.

At an international level, this study helps to close the current gap in understanding the importance of perfecting soft skills within postgraduate programs, such as the application of mindfulness for the personal self-management of thoughts and emotions. Chief Executive Officer (CEOs) and managers complain that job applicants who hold bachelor's and even master's degrees cannot write coherent paragraphs, clearly explain complex problems, or work effectively with people who differ from them. For this reason, professional human capital

recruiters are including these characteristics in their selection profiles as they have been in great demand among companies (Succi and Wieandt, 2019). In the new technological era of the 21st century, the competitive advantage of human beings over technological devices and artificial intelligence lies in skills such as empathy, resilience, critical thinking and assertive communication. Additionally, humans can adapt to changing contexts, take advantage of their creativity, and observe and reflect, among other abilities (Manes and Niro, 2021).

A quasi-experimental test was carried out to determine the extent to which the implementation and practice of a mindfulness program facilitate the teaching–learning process and improve academic skills measured through the CLEI instrument. According to Newton *et al.* (2008), the application of this instrument generates an individual profile of academic behavioral style, which can be positively modified through various specific interventions aimed at modeling said behavior.

The quasi-experiment was developed based on the conceptual research model shown in Figure 1, which includes mindfulness training as an independent variable, learning abilities as a dependent variable, and the following moderating variables: training hours, gender, age range, type of master's program and religious beliefs. These moderating variables were chosen to control the possible confirmation biases related to age, gender or religious beliefs as well as the different perceptions that the students of the different postgraduate programs could have of the impacts of mindfulness training. Regarding the training schedule, experienced meditators always recommend performing meditative activities in the early morning hours (Coulter, 2011). The possibility of including the health condition variable was ruled out because it is personal information of a sensitive nature that participants do not always want to reveal.

To evaluate the possible relationship between the application of the mindfulness technique and learning ability enhancement, the following six hypotheses were proposed:

Central hypothesis.

H1. The learning ability of graduate students increases after receiving training in the mindfulness technique.

Auxiliary hypotheses.

H2. Training hours positively influence learning abilities.

H3. Gender positively influences learning abilities.

H4. Age range positively influences learning abilities.

H5. Type of master's program positively influences learning abilities.

H6. Religious beliefs positively influence learning abilities.

Information sources
The review process included papers published in indexed academic journals mainly during the last five years worldwide. For this purpose, the multidisciplinary databases ProQuest, JSTOR, Scopus and EBSCO were used. Preference was given to original papers published by the mindfulness creator, Kabat-Zinn (1990, 2013) and for researchers who developed academic studies and experimental and quasi-experimental evidence on its application for educational purposes or for improving teaching–learning abilities and skills.

Research instrument
This research used the CLEI instrument, developed by Newton *et al.* (2008) at the University of Kansas. This tool includes the following variables: (a) self-efficacy, (b) organization of and attention to studies, (c) control of stress due to time pressure and the environment, (d) involvement with college activity, (e) emotional satisfaction, and (f) class communication.

Newton *et al.* successfully used it to measure college student academic performance and to support the efforts of institutional advising and mentoring departments. The variables that comprise this instrument have undergone several comparative and validation studies (Akbarov and Hadžimehmedagić, 2015; Ching *et al.*, 2015; Yeager, 2009).

Based on the CLEI, the authors of this study prepared a questionnaire in Spanish measured using a five-point Likert-type scale. The CLEI elements were subjected to the double translation method to verify the consistency of the questionnaire when compared to the English version. The questionnaire was distributed digitally over the internet. Before administering the questionnaires and the quasi-experimental tests, informed consent was obtained from all participants. A detailed description of this instrument is included in the Appendix.

Research design
The SEK International University (UISEK) Business School at Universidad Internacional SEK, located in Quito, Ecuador, acted as the basis for the study sample. In the study, 129 graduate students registered, 120 of whom were selected and conveniently assigned to the research groups, two for treatment and two for control, after checking the completed questionnaire responses. A quasi-experimental method was used to apply a nonrandom procedure to select study participants. Former students and second-level students in the postgraduate programs of UISEK Business School were invited to participate in this study. This condition is important since the participants were required to have previous social and academic interactions within the university facilities. Information was collected between May 16 and June 6, 2021. During this time, in-person participation was suspended due to sanitary conditions.

The study used the guide for quasi-experimental design and analysis proposed by Reichardt (2019), based on the original work developed by Campbell and Stanley (1963). Quasi-experimental design No. 13 was selected, "Separate-Sample Pretest-Posttest Control Group Design". In addition, Supino and Borer (2012) suggested working with two different control and treatment groups. Thus, the sources can be controlled of both internal (historical sources, maturity, test, instrumentation, regression, selection and mortality) and external invalidity (interaction of the test with the treatment, interaction of the selection with the treatment and reactive arrangements).

Two independent control groups were formed. The first (second) group of 30 (29) people acted as the pretreatment (post-treatment) control group. Two groups were formed for the treatment application, consisting of 23 and 21 people. Additionally, the instrument was calibrated with the remaining 17 people, following Newton *et al.* (2008), to recognize the sample particularities and to generate behavioral profiles in the learning process.

The quasi-experiment was organized into three stages: pretreatment, treatment and post-treatment. The pretreatment stage included the administration of the CLEI instrument to Control Group 1 and Treatment Groups 1 and 2. To implement the treatment stage, the selected groups were invited to a training workshop called mindfulness-based cognitive therapy for life (MBCT-L): How to feel good when everything seems to go wrong. For this purpose, a company was hired that was authorized and certified in the application of the methodology known as *MBCT-L*. The course was developed at Oxford University (Oxford Mindfulness Foundation, 2021). This research applied a four-week version oriented to facing life's challenges in a general way. The course was offered in four, two-hour sessions on Sundays. At the post-treatment stage, the CLEI was applied to Control Group 2, Treatment Groups 1 and 2 and to the calibration group to adjust the CLEI to local conditions. Table 1 shows the details of the tests performed.

Data analysis and results
The questions were answered on a five-point Likert-type scale. The scoring was (1) "strongly disagree", (2) "disagree", (3) "neither agree nor disagree", (4) "agree" and (5) "strongly agree".

Sequence	Stage	Group	N	Intervention	Objective
1	Pretest	Calibration	17	CLEI Administration	Standardize CLEI
1	Pretest	Treatment 1	23	CLEI Administration	Register CLEI baseline
1	Pretest	Treatment 2	21	CLEI Administration	Register CLEI baseline
1	Pretest	Control 1	30	CLEI Administration	Register CLEI baseline
2	Test	Treatment 1	23	Mindfulness Training (4 sessions of 8:00–10:00 h)	Run quasi-experiment
2	Test	Treatment 2	21	Mindfulness Training (4 sessions of 10:00–12:00 h)	Run quasi-experiment
3	Post-test	Treatment 1	13	CLEI Administration	Check CLEI changes
3	Post-test	Treatment 2	14	CLEI Administration	Check CLEI changes
3	Post-test	Control 2	29	CLEI Administration	Check CLEI changes

Source(s): Table by authors

Table 1.
Quasi-experimental
design of the study

Each variable element was processed using the statistical package for social sciences (SPSS) software, version 22 for Windows 10. A two-way analysis of variance (ANOVA) and a least squares regression analysis of the Microsoft (MS)-Excel 2019 program were also applied.

The next step included a descriptive analysis of each question of the questionnaire in which the main statistics were determined: (a) mean, (b) median, (c) mode, (d) standard deviation, (e) variance, (f) skewness, and (g) kurtosis. The responses presented a negative skewness, that is, the respondents tended to respond in high conformity with the scale. On the other hand, the responses presented a kurtosis greater than plus/minus 1.0. According to Lind *et al*. (2012), data following a perfectly normal distribution should reflect a kurtosis equal to zero.

To determine the normality of the data, Shapiro–Wilk and Kolmogorov–Smirnov goodness-of-fit tests were run. According to Razali and Wah (2011), the Shapiro-Wilk (SW) test is the best for determining normality in small samples. Furthermore, according to the same authors, the results of the Shapiro–Wilk goodness-of-fit test should vary between zero and one. Thus, low values indicate that the hypothesis of data normality should be rejected, while values close to one indicate that the data behaved normally. In this case, the average value of this indicator reached 0.708. However, the SW test also presented a *p value* lower than 0.05 for all elements. Therefore, the data were not normally distributed, so a normalization process was carried out.

Based on this result and as a step prior to data normalization, the negative scales to the inverted indicators were changed. Thus, in all cases, the answers reflected positive results that could be compared, so the scores were changed from 1 to 5, 2 to 4, 4 to 2 and 5 to 1. These changes were made to 22 questions on the questionnaire. The average values and standard deviations were then calculated for each of the CLEI scales. The results are shown in Table 2.

As recommended by Newton *et al*. (2008), t scores or normalized scores were calculated. The scores were expressed on a statistically comparable basis and allowed the study group results to be evaluated. The following formula was applied:

$$\text{t score} = 10 * [(Xmi - Xn)/SDn] + 50$$

where t score is the normalized value for each scale of the CLEI reported, Xmi is the individual measurement value, Xn is the normative average value (from the calibration group), and SDn is the normative standard deviation (from the calibration group).

CLEI scale	n	Calibration (N = 17)		Control 1 (N = 30)		Control 2 (N = 29)		Treatment 1a (N = 23)		Treatment 1b (N = 13)		Treatment 2a (N = 21)		Treatment 2b (N = 14)	
		M	DE	M	DE	M	DE	M	DE	M	DE	M	DE	M	DE
Academic self-efficacy	14	3.53	1.79	4.69	0.64	4.40	0.93	4.39	0.86	4.60	0.47	4.52	0.69	4.61	0.61
Organization and attention to study	8	3.19	1.32	4.19	0.99	3.89	1.15	3.76	1.19	4.06	1.00	3.76	1.10	4.39	0.88
Control of stress due to time pressure	6	3.21	1.50	3.14	1.25	2.74	1.18	2.78	1.26	2.99	1.35	2.47	1.17	3.17	1.06
Involvement with college activity	9	3.07	1.58	3.20	1.23	3.23	1.21	3.63	1.08	3.85	1.01	3.66	1.14	3.90	1.09
Emotional satisfaction	7	2.86	1.06	4.46	0.89	4.12	1.05	4.25	0.99	4.13	0.65	4.43	0.86	4.73	0.56
Class communication	6	2.29	1.12	4.12	1.23	3.84	1.29	3.84	1.46	4.26	1.09	4.07	1.22	4.42	1.01

Note(s): Subscript "a" indicates before the treatment and subscript "b" indicates after the treatment
Source(s): Table by authors

Table 2.
Average values and
standard deviations of
each CLEI scale

This formula was applied to generate the average values of the t scores, and deltas were calculated for the analysis group. These results are presented in Table 3.

To analyze these data, the following hypotheses were formulated:

H0-a: The deltas of the treatment means are equal.

H1-a: The deltas of the treatment means are not equal.

H0-b: The deltas of the means of the blocks are equal.

H1-b: The means of the blocks are not equal.

Subsequently, a two-factor ANOVA was applied to the control and treatment groups after verifying compliance with the conditions that, according to Lind *et al*. (2012), should be considered in these cases, using F (Fisher's distribution) as the test statistic. The results are shown in Table 4.

Table 4 shows that the F statistic of the CLEI blocks or scales reached a value of 0.859, which was less than its critical value of 3.326. Therefore, the null hypothesis was supported, and the alternative was rejected. That is, the deltas of the block means were very similar. On the other hand, the F statistic of the treatment or comparison groups was 15.94, which was greater than its critical value of 4.1. That is, the null hypothesis was rejected, and the alternative was supported. The deltas of the means of the treatments were not equal. To conclude, a complementary test was carried out by calculating the confidence intervals and confirming that the study groups exhibited significant differences. The results are shown in Table 5.

Groups 1 and 2, compared with the control group, had upper and lower confidence intervals with the same sign. Therefore, the means differed significantly between the treatment and control groups. In contrast, the upper and lower confidence intervals in the treatment groups did not have the same sign. Therefore, these treatment means did not differ. That is, the treatment effect generated similar effects in Treatment Groups 1 and 2.

Moreover, a least squares regression analysis was conducted to determine the possible correlations between the descriptive variables training schedule, age range, gender, master's program, religious beliefs and t scores. For this purpose, the databases of Treatment Groups 1 and 2 were integrated. The descriptive variables and each scale of the t score exhibited differentiated correlations. The most significant correlations, based on the multiple correlation coefficient and the F statistic, were emotional satisfaction and academic self-efficacy. On the other hand, the organization of and attention to studies, control of stress due to time pressure and involvement with college activities maintained an intermediate relationship. The least significant was class communication. The results are shown in Table 6.

Additionally, the possible correlations were studied between each descriptive variable and the average t score. The variables training hours, age range and master's program were correlated and exhibited statistical significance, while gender and religious beliefs were not relevant. These results are presented in Table 7.

Finally, the results obtained in each CLEI scale were used to prepare the individual behavior profiles of each participant in the treatment groups. Figures 2 and 3 show two examples of behavior profiles obtained from the study. They are associated with an excerpt from the comments obtained by each student at the end of the *mindfulness* training workshop.

Student A made the following comment at the end of the treatment:

I consider that being carried away by routine is what does not motivate us to be conscious or have a focused state of attention because we are used to carrying out our activities in a conventional way,

CLEI scale	Control 1	Control 2	Delta	%	Treat 1a	Treat 1b	Delta	%	Treat 2a	Treat 2b	Delta	%
						Original values						
Academic self-efficacy	4.69	4.40	−0.28	−6%	4.39	4.60	0.22	5%	4.52	4.61	0.09	2%
Organization and attention to study	4.19	3.89	−0.30	−7%	3.76	4.06	0.30	8%	3.76	4.39	0.63	17%
Control of stress due to time pressure	3.14	2.74	−0.40	−13%	2.78	2.99	0.20	7%	2.47	3.17	0.70	28%
Involvement with college activity	3.20	3.23	0.03	1%	3.63	3.85	0.21	6%	3.66	3.90	0.24	6%
Emotional satisfaction	4.46	4.12	−0.34	−8%	4.25	4.13	−0.12	−3%	4.43	4.73	0.31	7%
Class communication	4.12	3.84	−0.28	−7%	3.84	4.26	0.42	11%	4.07	4.42	0.35	8%
Average			−0.26	−7%			0.20	6%			0.38	11%
						T-scores						
Academic self-efficacy	56.46	54.89	−1.57	−3%	54.80	56.01	1.21	2%	55.56	56.05	0.49	1%
Organization and attention to study	57.60	55.32	−2.27	−4%	54.28	56.58	2.29	4%	54.33	59.12	4.79	9%
Control of stress due to time pressure	49.55	46.87	−2.68	−5%	47.19	48.55	1.36	3%	45.10	49.74	4.64	10%
Involvement with college activity	50.84	51.00	0.17	0%	53.56	54.91	1.35	3%	53.74	55.23	1.49	3%
Emotional satisfaction	65.14	61.94	−3.21	−5%	63.23	62.06	−1.16	−2%	64.87	67.77	2.90	4%
Class communication	66.26	63.79	−2.48	−4%	63.80	67.51	3.71	6%	65.86	68.94	3.08	5%
Average			−2.01	−3%			1.46	3%			2.90	5%

Source(s): Table by authors

Table 3.
Comparison of average values between original scores and T-scores

Summary	Count	Sum	Average	Variance
Academic self-efficacy	3	0.127709438876899	0.0425698129589 66	2.08791290345781
Organization and attention to study	3	4.81152129421565	1.60384043140522	12.83003286504 31
Control of stress due to time pressure	3	3.32224441299368	1.10741480433123	13.45821540936 45
Involvement with college activity	3	3.01085384256822	1.00361794752274	0.531159518169479
Emotional satisfaction	3	−1.47252256406379	−0.490840854687929	9.65561407221752
Class communication	3	4.31460924473092	1.4382030815769 7	11.5969200815 3
Control	6	−12.047164896132 2	−2.0078608160220 3	1.41935338207 42
Treatment 1	6	8.76351068913482	1.4605851148558	2.54479065368501
Treatment 2	6	17.398069876319	2.89967831271983	2.88251142252777

Analysis of variance

Source of variation	Sum of squares	Degree of freedom	Mean squares	F	p-value	Critical value for F
Rows (blocks)	10.2836610072 58	5	2.05673220145159	0.858774594568 53	0.540078971344614	3.32583453041301
Columns (treatments)	76.3700934153879	2	38.18504670769 4	15.9439075159305	0.0007754633684668	4.102821015130 4
Error	23.9496162841769	10	2.39496162841769			
Total	110.60337070682 3	17				

Source(s): Table by authors

Table 4.
Two-factor analysis of
variance with a single
sample per group
(significance
level = 0.05)

without realizing the reality or benefits that each of our activities brings to our personal and professional development.

Student B made the following comment at the end of the treatment: *"What motivates me the most is that you can easily suppress negative ideas or thoughts and 'clear' your mind. This undoubtedly allows us to take advantage of it in many aspects, including the learning process, of course".*

Discussion

Graduate student learning abilities can be encouraged through the management of processes, strategies, pedagogical mechanisms and specific teaching models, which have been traditionally applied by professors over time. Parra (2003) carried out a study that

	Treatment 1 vs. Control	Treatment 2 vs. Control	Treatment 1 vs. Treatment 2
Upper Confidence Intervals (UCI)	5.46	6.90	3.43
Lower Confidence Intervals (LCI)	1.48	2.92	−0.55
Source(s): Table by authors			

Table 5.
Confidence intervals for differences between treatment deltas

Regression statistics	Academic self-efficacy	Organization and attention to study	Control of stress due to time pressure	Involvement with college activity	Emotional satisfaction	Class communication
Multiple R	0.53	0.44	0.42	0.44	0.68	0.37
R Square	0.28	0.20	0.18	0.19	0.47	0.14
Adjusted R Square	0.11	0.01	−0.02	0.00	0.34	−0.07
Standard Error	1.33	3.53	4.09	3.49	2.27	4.38
Observations	27	27	27	27	27	27
F	1.65	1.03	0.92	0.98	3.68	0.66
Critical value for F	0.19	0.43	0.49	0.45	0.02	0.65
Source(s): Table by authors						

Table 6.
Regression statistics between descriptive variables and T-score scales

Regression statistics	Training hours	Age range	Gender	Master's program	Religious beliefs
Multiple R	0.30	0.28	0.06	0.15	0.07
R Square	0.09	0.08	0.00	0.02	0.00
Adjusted R Square	0.05	0.04	−0.04	−0.02	−0.04
Standard Error	2.06	2.07	2.15	2.13	2.15
Observations	27.00	27.00	27.00	27.00	27.00
F	2.46	2.13	0.08	0.58	0.11
Critical value for F	0.13	0.16	0.78	0.46	0.74
Source(s): Table by authors					
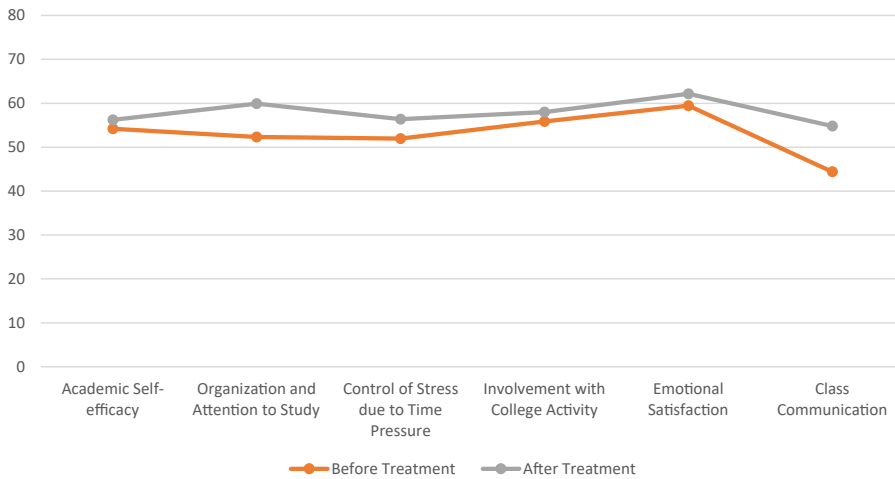
Table 7.
regression statistics between descriptive variables and T-score average
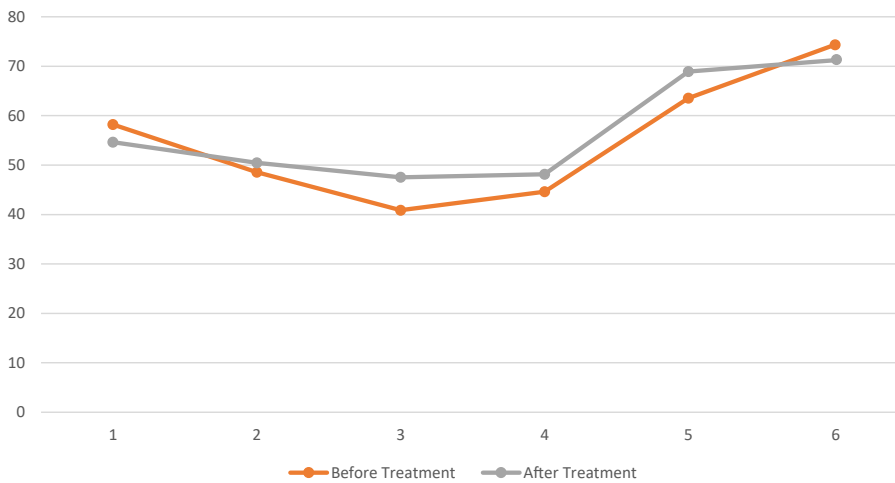
Source(s): Based on Newton *et al*. (2008)

Source(s): Based on Newton *et al*. (2008)

integrates, describes and shows the characteristics and benefits of these processes. In his manual, he designs these approaches for flexible and adaptive use, but their approach and deployment in academic environments remain, fundamentally, exogenous.

This study demonstrated that applying an endogenous emotional–affective orientation mechanism based on the *mindfulness* technique can help to improve students' learning dispositions. For this purpose, a quasi-experiment was designed, following the guidelines of their predecessors Campbell and Stanley (1963) and the updates provided by Reichardt (2019)

regarding intervention groups with different numbers of participants and independent control groups as benchmarks to compare the results.

The design adopted for the execution of this quasi-experiment, integrating independent control groups with two treatment groups, generated positive and similar increases in the CLEI results. Thus, the design helped to strengthen the external validity of the study.

For Treatment Groups 1 and 2, on average, the different CLEI scales increased their original values by 6 and 11%, respectively. Similarly, the t scores corresponding to the normalization of the original CLEI values increased in each case by 3 and 5%. On the other hand, the comparative measure of the control groups decreased by 7% compared to the original values and 3% compared to the t scores. These changes were subjected to ANOVA testing and control interval testing. The results indicated that the treatment effect (training in the *mindfulness* technique) was not due to chance or to possible historical or circumstantial biases.

Although the changes in the 3 and 5% treatment groups could be considered low, they were consistent and based on the application of the CLEI instrument, which has been validated and refined for use by its developers, Newton *et al.* (2008).

The changes obtained supported the central hypothesis (H1) and auxiliary hypotheses H2, H4 and H5. Graduate student learning abilities increased after receiving training in mindfulness practice. Additionally, the CLEI scales were correlated with the descriptive variables training hours, age range and master's program. The results were better in Treatment Group 2, which received training between 10:00 a.m. and 12:00 p.m. Since this training was administered on Sundays, these people might have been more receptive and better rested than were those who received the training earlier, from 8:00 a.m. to 10:00 p.m. In addition, individuals at younger ages exhibited greater impacts on the CLEI. In other words, younger individuals reflected a greater openness to assimilating *mindfulness*, while older individuals were more skeptical. Regarding the master's program variable, the participants in the blended courses (face-to-face and online) were more receptive and reflected a greater adaptability than did those who were enrolled in only either the face-to-face or online programs.

Hypotheses H3 and H6 were rejected; that is, the influence of gender and religious beliefs on CLEI, and thus on learning abilities, was statistically insignificant.

These results are consistent with those found by Ching *et al.* (2015). However, they contradict the results obtained in Ecuador by Méndez and Rosado (2019). The fundamental difference between the two is the instrument type applied. In the first case, the instrument used was the CLEI created by Newton *et al.* (2008), while in the second case, the FFMQ and MAAS instruments were used. The negative result in the second case might have been caused by a lack of adaptation to the local environment, which was reported by the researchers.

The difference could also be related to the information sources used in each study. In the case of Méndez and Rosado (2019), the participants were undergraduate students between 18 and 24 years old. That is, they were postadolescent young people. Meanwhile, the participants in this study were more mature individuals whose age exceeded 30 years on average. In adolescents, the prefrontal cortex or neocortex is not fully developed. This is the place in the brain where logical thinking is generated along with the practice of the most developed characteristics of the intellect, such as reflection, critical thinking, and conscious decision-making based on facts and information. In adolescence, people act preferentially, guided by basic impulses derived from the amygdala. These young adults are very susceptible to external influences from friends and society. Their personalities are not fully formed; they are very impressionable (Manes and Niro, 2017). Therefore, for adolescents and postadolescents, mindfulness application is not recommended.

As a complement to the above, Montero-Marin *et al.* (2022) reported on the limited impact of mindfulness training in controlling depression and mental problems for adolescents. However, the authors concluded that even though this technique is not recommended in early adolescence, more studies are required to explore the impacts of mental health improvement programs adapted to the needs of specific groups of young people. Similar recommendations have been made by Palomero and Valero (2016), Karunananda *et al.* (2016), and Wimmer *et al.* (2020), who have reported that further research is needed to facilitate its practical application to the teaching–learning process.

Therefore, this article contributes additional elements to the research and knowledge. For example, the results suggest that a window of opportunity occurs between 25 and 35 years old, during which the application of the mindfulness technique would be the most appropriate to maximize its influence on the teaching–learning processes. Individuals below this range are unprepared because their cognitive abilities are only partially developed (Manes and Niro, 2017), while individuals above this range are more pragmatic about or skeptical toward the potential of meditative activities.

Conclusions

Below are the study conclusions based on the initial objectives.

First, the statistical evidence obtained by this study indicates that offering graduate students the opportunity to learn about and adopt mindfulness practice and helps to improve their academic outcomes, as reflected through the measurement of the CLEI indicator. Accordingly, *mindfulness* facilitates self-regulation or affective–emotional balance and awareness of learning experiences, but its impact is even more important in aspects related to the psychological and emotional well-being of its practitioners.

Second, the participants in the treatment groups, who completed mindfulness training, improved their cognitive and emotional abilities, as measured by the CLEI, which reflects a better disposition or attitude to assume and fulfill their academic responsibilities in the future. Through the comments, observations, and lessons learned by all the participants, a general conviction was evident that mindfulness training contributed to facilitating communication, interrelation, and fear elimination when facing the challenges that life presents. This new mental disposition must be taken advantage of so it can be extended to other learning areas. This program type is recommended not only for students but also for academic and administrative staff at universities.

Third, the results and the feedback showed an eagerness to acquire knowledge on complementary techniques—such as models, techniques, or processes—to facilitate business management and improve human behavior and interaction. This circumstance was intensified during this research due to limitations caused by sanitary conditions as well as by the new professional demands and technological challenges that accelerated during the sanitary crisis. To address this situation, the application of behavior profiles based on the determination of t scores is proposed to the student counseling departments of universities, which becomes an additional benefit of the present investigation, whose results could be used to provide individualized advice to students who are willing to take the CLEI independently.

Fourth, the way training is delivered is relevant. Therefore, not only for mindfulness training but also in the case of regular courses, it is important to consider a comfortable schedule that is free of interruptions to achieve better assimilation. It is better to concentrate on a single subject than to teach several subjects simultaneously. Also advisable is to enable outdoor spaces beyond the classroom, where users can enjoy greater freedom and fewer restrictions than those found in academic settings. In particular, spaces such as gardens and meditation rooms should be implemented that are specially designed to facilitate meditative practices.

Finally, the age range that best suits the application of mindfulness is between 25 and 35 years old. Additionally, students received it better who participated in blended master's programs (face-to-face and online), as people with these characteristics are more flexible and more open to assimilating alternative learning techniques. Consequently, elective courses including mindfulness should be integrated into this study modality to improve human skills. Mindfulness not only facilitates learning but also promotes resilience and motivates personal growth, mental health, and the will to achieve conscious development.

Implications for graduate educational institutions

This study highlights the importance of including courses to improve skills related to managing the emotional intelligence and human skills of students within academic programs. Academic institutions should consider the use of individual behavioral profiles that can be obtained from the CLEI application. These profiles constitute a valid mechanism for measuring the evolution of student responses to efforts to improve technical and soft skills. In addition, they must encourage students to take responsibility for managing their mental health and the impact it has on their peers and the university community.

Similarly, *mindfulness* should be considered a new discipline of behavior and personal interaction, whose benefits are applicable to any area of professional training. Additionally, faculty should be prepared to acquire the capacity and motivation to help apply mindfulness in the teaching–learning context.

On the other hand, a mindful collegiate body is capable of satisfying the needs and expectations of stakeholders and contributes to generating greater legitimacy for higher education institutions, together with easier and more sustained access to the resources necessary to survive. University legitimacy improves the identification and acceptance of the teaching staff and, therefore, also the sympathy and satisfaction of the students (Blanco-Gonzalez *et al.*, 2021).

Implications for students

The mindfulness technique contributes to improving not only the academic skills of the students included in the CLEI but also their levels of resilience, self-control, personal balance, empathy and perspective of their world. These skills can help them achieve their academic goals and career objectives as well as improve their quality of life.

In particular, through mindfulness practice, the development of a parallel personal development agenda could be encouraged. Such an agenda might include, among other things, daring to be different, living different roles, leaving the comfort zone, having the courage to achieve a full life, fighting for dreams, making good decisions and learning to learn and reflect on learning.

Implications for companies

Companies could benefit because complaints related to deficiencies detected in the academic training of job applicants are addressed and resolved (Pasamar *et al.*, 2019). Higher education has the opportunity, not only to train individuals with technical skills and abilities, but also with the wisdom to face global challenges and financial, economic, environmental, humanitarian, moral and health crises (Jakubik and Müürsepp, 2021). Employees who display balanced mental health and who have well-endowed cognitive and emotional skills can contribute optimally to business results and goals.

Limitations

The treatment groups consisted of graduate students who did not have opportunities for full-time activities on campus, as they were limited to attending regular classes at specific times, usually at night.

The participants were very interested in collaborating in the mindfulness workshop training, considering that it was free for them. However, not everyone was able to complete the workshop. The dropout rate was 14% due to inconveniences caused by the pandemic: some participants were infected, some had problems with their families and others lost their jobs or interest in continuing because of personal priorities. These conditions could have affected the study results both positively and negatively.

In addition, the pandemic limited academic interactions, which are required to evaluate the learning results after applying the research instrument. This limitation was especially critical for people who had experienced online classes only.

Recommendations for further research

To replicate and confirm the study results, the database should be expanded. Further studies can invite undergraduate students from several educational institutions because they interact more within their campuses, and they could take better advantage of the services that their universities offer to the academic community.

New studies on this topic should move forward by applying research designs that are more rigorous based on the development of randomized experiments and using larger samples to improve internal validity. In addition, the results could be monitored through longitudinal studies, which systematically collect actual behavioral data in various facets of academic and professional life.

Groups of professionals could also be integrated to detect the impacts of *mindfulness* in business management activities. Such impacts include their performance in the application of soft skills or competencies that contribute to effectiveness in the workplace.

References

Akbarov, A. and Hadžimehmedagić, M. (2015), "The influence of personal factors on students' college success", *The Journal of Linguistic and Intercultural Education*, Vol. 8 No. 2015, pp. 7-20.

Austin, M. and Loprinzi, P. (2019), "Acute exercise and mindfulness meditation on learning and memory: randomized controlled intervention", *Health Promotion Perspectives*, Vol. 9 No. 4, pp. 314-318, doi: 10.15171/hpp.2019.43.

Baminiwatta, A. and Solangaarachchi, I. (2021), "Trends and developments in mindfulness research over 55 Years: a bibliometric analysis of publications indexed in web of science", *Mindfulness* [published online by Springer]. doi: 10.1007/s12671-021-01681-x.

Blanco-Gonzalez, A., Del-Castillo-Feito, C. and Miotto, G. (2021), "The influence of business ethics and community outreach on faculty engagement: the mediating effect of legitimacy in higher education", *European Journal of Management and Business Economics*, Vol. 30 No. 3, pp. 281-298, doi: 10.1108/EJMBE-07-2020-0182.

Campbell, D.T. and Stanley, J.C. (1963), *Experimental and Quasi-Experimental Designs for Research (Reprinted from Handbook of Research on Teaching*, Houghton Mifflin Company, Boston, MS, pp. 171-246.

Ching, H., Koo, M., Tsai, T. and Chen, C. (2015), "Effects of a Mindfulness Meditation Course on Learning and Cognitive Performance Among University Students in Taiwan", *Hindawi Publishing Corporation Evidence-Based Complementary and Alternative Medicine*, Vol. 2015, 254358, doi: 10.1155/2015/254358.

Corti, L. and Gelati, C. (2020), "Mindfulness and coaching to improve learning abilities in university students: a pilot study", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 1935, doi: 10.3390/ijerph17061935.

Coulter, D. (2011), *Anatomía del Hatha Yoga [Anatomy of Hatha Yoga]*, Ediciones Obelisco, Barcelona, España, S.L.

Delgado, P. (2021), *The Mental Health Crisis: Graduate Students Need Help*, Observatory: Institute for the Future of Education, Tecnológico de Monterrey, available at: https://observatory.tec.mx/edu-news/the-graduate-students-mental-health-crisis

Dutta, G. (2019), "Mindfulness and contemplative educational practices for holistic education", *MERI Journal of Education*, Vol. 14 No. 1, pp. 1-12, ISSN: 0974-2085.

El Universo Newspaper (2020), "En Ecuador, alumnos y docentes se sienten muy angustiados por pandemia del COVID-19; cuatro de cada diez, tensionados. [In Ecuador, students and teachers feel very distressed by the COVID-19 pandemic; four out of ten stressed]", October 13, available at: https://www.eluniverso.com/guayaquil/2020/10/12/nota/8011690/salud-mental-covid-19-ecuador-alumnos-docentes-angustiados-unicef?&utm_source=email&utm_medium=social-media&utm_campaign=addtoany

Franco, C., Soriano, E., Amutio, A. and Mañas, I. (2020), "Mejora de la motivación en estudiantes inmigrantes latinoamericanos mediante un programa de mindfulness: un estudio aleatorizado [Improving motivation in Latin American immigrant students through a mindfulness program: a randomized study]", *Terapia Psicológica*, Vol. 38 No. 1, pp. 5-16.

Hamman, L. (2019), "Embodied learning through mindfulness: encouraging a holistic approach to adult learning", *Journal of Vocational, Adult and Continuing Education and Training*, Vol. 2 No. 1, doi: 10.14426/jovacet.v2i1.33.

Jakubik, M. and Müürsepp, P. (2021), "From knowledge to wisdom: will wisdom management replace knowledge management?", *European Journal of Management and Business Economics*, Vol. 31 No. 3, pp. 367-389, doi: 10.1108/EJMBE-07-2021-0219.

Kabat-Zinn, J. (1990), *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness*, Delta, New York, NY, USA.

Kabat-Zinn, J. (2013), *Full Catastrophe Living (Revised Edition): Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness*, Bantam Books, New York, NY, USA.

Kabat-Zinn, J. and Kabat-Zinn, M. (2021), "Mindful parenting: perspectives on the heart of the matter", *Mindfulness*, Vol. 12, pp. 266-268, doi: 10.1007/s12671-020-01564-7.

Karl, J.A., Prado, S.M.M. and Gračanin, A. (2020), "The cross-cultural validity of the five-facet mindfulness questionnaire across 16 countries", *Mindfulness*, Vol. 11, pp. 1226-1237, doi: 10.1007/s12671-020-01333-6.

Karunananda, A.S., Goldin, P.R. and Talagala, P.D. (2016), "Examining mindfulness in education. I", *Journal of Modern Education and Computer Science*, Vol. 12, pp. 23-30, doi: 10.5815/ijmecs.2016.12.04.

Lind, D., Marshal, W., Wathen, S. and México, D.F. (2012), *Estadística Aplicada a los Negocios y la Economía [Statistics applied to business and economy]*, McGraw-Hill, México, D.F..

Lytras, M.D., Serban, A.C., Ruiz, M.J.T., Ntanos, S. and Sarirete, A. (2022), "Translating knowledge into innovation capability: an exploratory study investigating the perceptions on distance learning in higher education during the COVID-19 pandemic-the case of Mexico", *Journal of Innovation and Knowledge*, Vol. 7 No. 4, doi: 10.1016/j.jik.2022.100258.

Manes, F. and Niro, M. (2017), *Usar el cerebro: Conocer nuestra mente para vivir mejor [Using the brain: Knowing our mind to live better]*, Grupo Editorial Planeta S.A.I.C, Bogotá, Colombia.

Manes, F. and Niro, M. (2021), *Ser Humanos: De dónde venimos. Quiénes somos. Hacia dónde vamos [Being Human: Where We Come from? Who Are We? Where Are We Going?*, Grupo Editorial Planeta S.A.I.C, Buenos Aires, Argentina.

Méndez, S.M. and Rosado, J.A. (2018), "An assessment of mindfulness intervention as a regular subject in Ecuadorian higher education", *International Journal of Adolescence and Youth*, Vol. 23 No. 4, pp. 520-529.

Méndez, S.M. and Rosado, J.A. (2019), "The explanatory determinants of a successful mindfulness intervention in an Ecuadorian university: a logit analysis", *International Journal of Adolescence and Youth*, Vol. 24 No. 2, pp. 252-263.

Mindful Staff (2020), "The science of mindfulness", *Mindful*, September 20, available at: https://www.mindful.org/the-science-of-mindfulness/

Modrego, M., Martínez-Val, L., López-Montoyo, A., Borao, L., Margolles, R. and García-Campayo, J. (2016), "Mindfulness en contextos educativos: profesores que aprenden y profesores que enseñan mindfulness [Mindfulness in educational contexts: teachers who learn and teachers who teach mindfulness]", *Revista Interuniversitaria de Formación del Profesorado*, Vol. 87 No. 30.3, pp. 31-46.

Montero-Marin, J., Allwood, M., Ball, S., Crane, C., De Wilde, K., Hinze, V., Kuyken, W. (2022), "School-based mindfulness training in early adolescence: what works, for whom, and how in the MYRIAD trial?", *Evidence-Based Mental Health*, Vol. 25, pp. 117-124, doi: 10.1136/ebmental-2022-300439.

Newton, F.B., Kim, E. and Wilcox, D. (2008), *Administration and Scoring Manual for the College Learning Effectiveness Inventory (CLEI)*, Kansas State University, Manhattan, Unpublished manuscript.

Oxford Mindfulness Foundation (2021), "Mindfulness-based cognitive therapy for life (MBCT-L)", available at: https://www.oxfordmindfulness.org/mindfulness-based-cognitive-therapy-for-life-mbct-l/

Palomero, P. and Valero, D. (2016), "Mindfulness y educación: posibilidades y límites [Mindfulness and education: possibilities and limits]", *Revista Interuniversitaria de Formación del Profesorado*, Vol. 87 No. 30.3, pp. 17-29.

Parra, D.M. (2003), *Manual de estrategias de enseñanza-aprendizaje [Manual of teaching-learning strategies]*, Medellín, Colombia: SENA.

Pasamar, S., Diaz-Fernandez, M. and De la Rosa-Navarro, M. (2019), "Human capital: the link between leadership and organizational learning", *European Journal of Management and Business Economics*, Vol. 28 No. 1, pp. 25-51, doi: 10.1108/EJMBE-08-2017-0003.

Razali, N.M. and Wah, Y.B. (2011), "Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors, and Anderson-Darling tests", *Journal of Statistical Modeling and Analytics*, Vol. 2 No. 1, pp. 21-33.

Reichardt, C.S. (2019), *Quasi-Experimentation: A Guide to Design and Analysis*, Guilford Press, New York, NY.

Succi, C. and Wieandt, M. (2019), "Walk the talk: soft skills' assessment of graduates", *European Journal of Management and Business Economics*, Vol. 28 No. 2, pp. 114-125, doi: 10.1108/EJMBE-01-2019-0011.

Supino, P.G. and Borer, J.S. (2012), *Principles of Research Methodology*, Springer, New York, NY.

Tobin, K. (2018), "Mindfulness in education", *Learning: Research and Practice*, Vol. 4 No. 1, pp. 1-9, doi: 10.1080/23735082.2018.1433623.

Wamsler, C. (2019), "Education for sustainability: fostering a more conscious society and transformation towards sustainability", *International Journal of Sustainability in Higher Education*, Vol. 21 No. 1, pp. 112-130, doi: 10.1108/IJSHE-04-2019-0152.

Wang, Y. and Liu, C. (2016), "Cultivate mindfulness: a case study of mindful learning in an English as a foreign language classroom", *The IAFOR Journal of Education*, Vol. 4 No. 2, pp. 141-155, Summer 2016.

Wimmer, L., Bellingrath, S. and von Stockhausen, L. (2020), "Mindfulness training for improving attention regulation in university students: is it effective? And do yoga and homework matter?", *Frontiers in Psychology*, Vol. 11 No. 719, doi: 10.3389/fpsyg.2020.00719.

Yeager, M.E.B. (2009), *A Cross-Validation Study of the College Learning Effectiveness Inventory (CLEI) [Doctoral thesis]*, Kansas State University, Manhattan, KS.

(The Appendix follows overleaf)

Appendix

CLEI scale	Item	Description
Academic self-efficacy	1	I believe I have the ability to complete the college studies
	2	I have goals that I want to achieve while I'm in college
	3	I have high academic expectations of myself
	4	I think it is possible for me to get good grades
	5	I hand in only partially completed assignments
	6	I don't think I can make the effort to finish the college studies
	7	I am determined to do whatever it takes to achieve my goals
	8	I do not hand in my assignments
	9	My family cares about my academic performance
	10	Family members criticize me because I am not a great student
	11	I am aware of the assignments due next week
	12	Acquiring knowledge is important to me
	13	I wonder why I need a degree for the career I want to pursue
	14	People in my community value a college education
Organization and attention to study	15	I organize my time so that I have enough time to study
	16	I set study goals and keep them up to date
	17	I only study the night before the exam
	18	I divide large assignments into manageable chunks
	19	I can't start studying even if there is nothing else to do
	20	I find myself daydreaming when I study
	21	I realize that my attention wanders in class
	22	I organize class information in a way that helps me retain and apply it later
Control of stress due to time pressure	23	I feel like there are so many things to do each week that I feel stressed out
	24	I have symptoms of stress for all the pressure I've had since I started college
	25	I think I don't have time to do everything I need to do
	26	I think I'm catching up
	27	My current situation distracts me from my studies
	28	I plan ahead to avoid getting overwhelmed with tasks at the last minute
Involvement with college activity	29	I participate in social activities on campus
	30	I belong to a club organized on campus
	31	I attend events such as concerts, plays, oratory events or sports contests as part of the college experience
	32	I know someone I can study with
	33	I have friends here at the college
	34	I belong to a study group
	35	I consider college is a great stage in my life
	36	My friends have good study habits
	37	I enjoy being a student here
Emotional satisfaction	38	I like my courses
	39	My professors show interest in me
	40	I hate college, but I know I have to study
	41	I see connections between my classes and my career goals
	42	I am discouraged by the way my professors treat me
	43	I can talk to people who encourage me about what I am learning
	44	I feel overwhelmed when I think about the requirements I have to meet in the classes

Table A1.
Information of the
study instrument

(continued)

CLEI scale	Item	Description
Class communication	45	I avoid participating in class
	46	I ask questions in class
	47	I don't think I can express my ideas very well in writing
	48	I avoid classes where participation is required
	49	I dread the idea of getting test scores in certain classes
	50	I find it difficult to get the help I need for my academic success

Source(s): Newton *et al.* (2008)

Table A1.

Corresponding author
Giovanni Lucero-Romero can be contacted at: gluceror@gmail.com