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Effectiveness of a Collaborative Intervention in Self-Regulation and Self-Efficacy of Higher Education Students

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Contemporary research indicates that the effective regulation of learning is beneficial to performance, but that its use by college students has been shown to be limited. The aim of this study was to examine the effectiveness of a collaborative intervention with a female professor on self-regulatory processes and self-efficacy beliefs of her higher education students. The sample consisted of 20 students from a Pedagogy class at a public Brazilian university and applied an almost experimental design containing pre-test, intervention and post-test. The collaborative intervention took place during a school semester, with individual sessions between professor and researcher, in addition to participating in classroom. In the pre-test and post-test, all students answered the learning and study strategies inventory and the self-efficacy belief scale for academic training. Overall, the results showed an improvement in the perception of academic self-efficacy, decreased anxiety, greater attitude towards studies, use of strategies to perform tests and selection of the main ideas, which showed a positive effect through the collaborative intervention. Therefore, there is evidence regarding the need of teacher training and curriculum revisions with a view to promoting the self-regulation of student learning.

Keywords: self-regulation of learning, self-efficacy belief, university education, Intervention, collaborative research

INTRODUCTION

Contemporary theories of learning and instruction emphasize the importance of students knowing how to effectively regulate their learning. Aspects such as attitude, interest, motivation, personality and way of life are considered in the teaching-learning process (Zimmerman, 2013). However, research shows that students often use study strategies that are relatively ineffective at the university level (Bjork, Dunlosky, & Kornell, 2013; blinded manuscript, 2020). Added to this, there is a notorious lack of training in learning strategies in educational curricula. In light of this situation, professors, coordinators and university administrators are concerned with promoting skills that facilitate academic

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involvement, ensuring learning and, consequently, the permanence and completion of students in the courses. The promotion of self-regulated learning, by improving the quality of learning, empowers students and, consequently, raises the educational level of a society (Andrzejewski et al., 2016). In Brazil, researchers in the field of Educational Psychology suggest that the self-regulation of university students reflects on the quality of academic performance and suggests that teachers should provide activities and reflections to promote it (Ganda & Boruchovitch, 2018; Pranke & Frison, 2015).

The self-regulation of learning refers to the processes that students use in order to activate and maintain cognitions, emotions and behaviors in order to achieve personal goals. These goals allow students to create self-guided feedback loops to monitor their effectiveness and to adapt their functioning (Zimmerman & Kitsantas, 2014). Briefly, learning to learn means self-directing metacognitive, cognitive and psychological skills around learning (Zimmerman, 2000; 2011). Self-regulated people use specific strategies in order to achieve their goals. Learning strategies are, in general terms, actions and processes aimed at acquiring information or skills by an individual agent about the learning process itself (Zimmerman, 2011). Added to these strategies the motivation to learn is a driving source for the adoption of self-regulatory behaviors which improve learning and performance. This, on its turn, reflects positively on the self-efficacy belief, which drives the individual to adopt self-regulatory strategies again. It can be thought, therefore, that a feedback loop is created between motivational and self-regulatory aspects. Generally speaking, the self-regulation of learning proves to be effective for the perception and promotion of the individual as an agent of the learning process itself, reflecting on their behavior, academic performance and motivation.

Regarding teaching, the construct of the self-regulation of learning considers it as a dynamic, planned, intentional and complex action (Zimmerman, 2000). Researchers point out the importance of the teacher to be self-regulated in order to propose activities which develop in their students the appropriate strategies for learning, since higher education students have been showing a lack of knowledge and in using assertive learning strategies. These students have a tendency of not considering the need to self-regulate processes for learning because they tend to overestimate their knowledge. The absence of these self-regulatory processes is directly related to low self-efficacy beliefs for learning and increased anxiety (Ganda & Boruchovitch, 2018; blinded manuscript, 2018; Schunk, 2008).

It is extremely important that university professors develop actions in the classroom that favor the use of strategies aimed at the self-regulation of learning. University professors rarely demand from their students, systematic self-judgments from their students about their academic production and, as a result, students are not encouraged or stimulated to use self-regulating sub-processes such as self-observation, self-judgment, and self-reactions (Dörrenbächer & Perels, 2016; Sirazieva et al; 2017). These actions together result in learning difficulties and, therefore, in the quality of professional training. Research shows that self-regulation processes must be taught, and that this practice nurtures motivation for learning (Ganda & Boruchovitch, 2018; Zimmerman, 2013). Although there are several intervention researches on the self-regulation of learning with

students in higher education (eg, Bellhäuser et al., 2016; Dörrenbächer & Perels, 2016; Bernacki; Vosicka; Utz, 2020; Tristanti & Nusantara, 2022), there is a dearth of intervention research aimed at teachers, especially under the collaboration bias.

When proposing an intervention with teachers, it is important to consider and to respect their knowledge and classroom experience. An interventional process that is inflexible in its procedures may fail to develop important areas of the research object due to the lack of autonomy to create according to the specificities of the discipline and needs observed. The collaborative research model proposed by Ibiapina (2008) is considered as a type of intervention that assumes the contribution of in-service teachers in defining the researcher's object, becoming "co-builders" of the knowledge that will be produced in relation to the investigated object. In this sense, the collaborative research procedures are built together in light of the reality presented. Collaborative research does not see interventional work as super active, but rather as creative.

Thus, in this work, an intervention based on collaborative research was adopted. Ibiapina (2008) points out three minimum and necessary conditions for collaborative action research in the academic context: collaboration, reflective circles and the co-production of knowledge between researchers and professors. Collaboration implies jointly finding ways to overcome what has already been learned, since according to the author, it favors democratic decisions, common action and communication between the actors in the process. In relation to reflexive circles, Ibiapina (2008) states that they contribute to the construction of co-shared thoughts and practices in a way that enables an articulation between theory and practice. The third basic condition refers to the involvement of participants in research activities, considering them as creative, interactive and theoretical social agents. In this sense, the participants are considered as co-producers of the research. For this research, these three basic conditions were considered. Participating researcher and professor sought, based on the Self-Regulated Learning construct, to reflect, plan and develop actions that stimulate the self-regulation of student learning. This process will be detailed below.

In relation to self-regulation of learning, the model of Zimmerman (2000, 2002, 2013) was used as a theoretical framework to support the reflections, as well as the contributions of Bandura (1977; 1986) and Schunk (2008) for academic self-efficacy beliefs. For Zimmerman (2013), self-regulated learning refers to the level at which students are meta-cognitively, motivationally and behaviorally active and participants in their own learning processes. This author, in line with the Social Cognitive Theory, describes that self-regulation is seen in a triadic way through the recognition of the cyclical and reciprocal influence of personal (internal), behavioral and environmental factors in human functioning under a given situation. Zimmerman (2000, 2002, 2013) proposes a cyclical model of self-regulation of learning composed by three stages that must be activated in an integrated way: anticipation, execution and self-reflection. This model is considered cyclical because it understands that the balance of one phase is used to improve the next phase, establishing a continuous improvement that includes raising goals and challenges. Each stage encompasses processes and sub-processes that are consciously and voluntarily activated by the individual in interaction with the

environment to determine their behavior. Motivational beliefs are strictly related to the quality of the strategic planning to be adopted, as well as by the effort made towards learning. In this sense, it is observed that there is a personal investment by the student regarding their decisions related to learning, considered as an intrinsically motivational dimension in self-regulated learning. Among the motivational beliefs analyzed in relation to self-regulation, self-efficacy plays an especially important role. (Bandura, 1977, 1986; Mahasneh & Alwan, 2018). Zimmerman (2000) confirms that self-efficacy provides students with a sense of agency with which they are motivated to employ self-regulatory processes such as goal setting, self-monitoring, self-assessment and use of strategies. Teachers need to know and be sensitive to perceive their students' sense of effectiveness: their presence, level, fluctuations and eventual absence (Morris, Usher & Chen, 2017). Furthermore, promoting positive self-efficacy beliefs favors the use of better learning strategies and, as a result, the intellectual growth that is one of the goals of formal education. To assess university students' awareness of the use of studies and learning, we chose the LASSI in the version for university students of Weinstein; Palmer & Acee, 2016. The choice of this instrument was due to the level of depth and assessment of the components that involve the self-regulation of strategic learning.

Therefore, this study was guided by the following question: what are the effects of a collaborative intervention on self-regulation processes and self-efficacy beliefs of higher education students? The objective was to verify and compare, in pre-test and post-test situations, the self-efficacy beliefs for academic learning of the students of the participating professor in the collaborative intervention.

METHOD

Sample Characterization

One participating teacher, female, fifty-four years old, graduated in Psychology, Master in Special Education and PhD in Education. At the time, she already had thirty years of teaching in higher education in undergraduate courses, and especially in Pedagogy.

26 (86.66%) of the thirty students who signed the Consent Form, only 20 (66.66%) were included in the final sample, as they were present in the pre- and post-test phases of data collection. As for the age of participants, 14 (70%) were between 20 and 29 years old and 6 (30%) were over 30 years old. From the 20 students, 19 (95%) were female and 1 (5%) male. All participants studied at night.

Instruments

For data collection in the pre- and post-test phases, the following instruments were applied: Learning and Study Strategies Inventory – LASSI, Higher Education versions (3rd edition) developed by Weinstein, Palmer and Acee (2016) to assess awareness and the use of learning and study strategies related to skills, willingness and self-regulation components of learning, and the Higher Education Self-Efficacy Scale (Polydoro & Guerreiro-Casanova, 2010) to assess academic self-efficacy beliefs.

The Learning and Study Strategies Inventory – LASSI, versions for Higher Education (3rd edition) developed by Weinstein, Palmer and Acee (2016) is an assessment made

up of 60 Likert-type items from 1 to 5 points, on the awareness and use of learning and study strategies related to skills, willingness and self-regulation components of learning.). This version has 60 items, organized into 10 subscales: information processing, anxiety, time management, concentration, attitude, selection of main ideas, study aid, motivation, self-testing, and testing strategies. The version used in this research was adapted to the Brazilian context in a study carried out by Boruchovitch, Goés, Felicori & Acee (2019).

The Self-Efficacy Scale in Higher Education (Polydoro & Guerreiro-Casanova, 2010) is a self-report instrument composed of 34 items, in a Likert-type format ranging from 1 (not very capable) to 10 (very capable), distributed into five factors. The first factor is called Academic Self-Efficacy, consisting of nine items. The second factor, named Self-efficacy in the Regulation of Training, consisting of 7 items. The third factor refers to Self-efficacy in Social Interaction, consisting of seven items. Self-efficacy in Proactive Actions is the fourth factor, consisting of seven items and, the last factor, Self-efficacy in Academic Management, consisting of 4 items.

Data collection procedure

The project was submitted to the Ethics Committee for Research Involving Human Beings of the Brazilian public institution and approved, according to Opinion CEP/UEL: (number omitted). The research consisted in pre-test, intervention and post-test, with a professor participating in the research and students enrolled in their discipline in a Pedagogy course. Frame 1 represents the general scheme of the research.

Frame 1
Times of application of the tests, groups, number of intervention sessions between researcher and professor, in addition to the total number of weeks of monitored classes

Pre-test	Intervention	Post-test
Teacher Participant and Students	Sessions with teacher participant **1 2 3 4 5 6 7 8 9 10**	Teacher Participant and Students

Source: The Author Itself

As shown in frame 1, the pre-test was carried out first with the participating teacher and her students. Then there were ten intervention sessions between the researcher and the participating teacher, over the sixteen weeks of classes taught by the teacher. Each week refers to four classes After completing the course, the post-test was carried out with the teacher and her students.

In more detail, to apply the pre-test, the researcher requested permission from one of the professors who taught that semester so that the instrument could be applied in the classroom. The selection of this professor was for convenience. Having received

authorization from the professor, the researcher took the printed instruments, handed them to the students, read the instructions and they answered the scale items in printed format, in person. This happened on the last day of class of the semester prior to the intervention, to ensure that there was no prior contact with the teacher and with the contents of the discipline.

In this work, an intervention based on collaborative research was adopted. Ibiapina (2008) points out three minimum and necessary conditions for collaborative action research in the academic context: collaboration, reflective circles and the co-production of knowledge between researchers and professors. Collaboration implies jointly finding ways to overcome what has already been learned, since, according to the author, it favors democratic decisions, common action and communication between the actors in the process. In relation to reflective circles, Ibiapina (2008) states that they contribute to the construction of shared thoughts and practices in a way that allows for an articulation between theory and practice. The third basic condition refers to the involvement of participants in research activities, considering them as creative, interactive and theoretical social agents. In this sense, the participants are considered as co-producers of the research. For this research, these three basic conditions were considered. Researcher and participating professor sought, based on the construct of Self-Regulated Learning, to reflect, plan and develop actions that stimulated the self-regulation of student learning. This process will be detailed below.

The collaborative intervention of this work included ten sessions between the researcher and the participating teacher, each one lasting an average of 70 minutes, and with an average frequency of one weekly meeting, with two weeks apart on two occasions. Each session with the participating teacher had its specific objectives and the development of reflections on how to position oneself in front of students and provide activities that stimulate self-regulation of learning. Thus, all sessions consisted of moments of socialization, discussion of self-regulation of learning and learning strategies, class planning and from the second session onwards, moments of recapitulation and reflection of the given class.

The socialization moment had the objective of promoting the bond between the researcher and the teacher. Different subjects were discussed and then the objectives thought by the researcher for that session were presented. At that moment, the audio recording, consented by the teacher, began. From the second session onwards, a recap of the class taught by the teacher in her subject was carried out, highlighting both the points that favored the self-regulation of students to learn and some attitudes that were not favorable to self-regulated learning, for example, immediately solving doubts without allowing the student himself sought to reflect on the issue. These issues were reflected and discussed, including the perception of the researcher and the participating teacher regarding the participation of students throughout the class. Once that was done, the class for the week was planned thinking about the contents, activities and posture to be adopted by the teacher in order to develop the learning and active participation of students. It should be noted that based on the collaborative model of Collaborative Research, the sessions and plans developed were carried out jointly between the

researcher and the participating teacher. In the penultimate class, the same pre-test instruments were reapplied with the students who had agreed to participate in the research.

Data Analysis Procedure

The data collected from the students were analyzed quantitatively through descriptive statistics (calculation of frequency, percentage, mean and standard deviation) and inferential, with the analysis of internal consistency through Cronbach's Alpha. Due to the absence of normal distribution of the variables, the Wilcoxon test was used in order to compare the scores between the pre-test and post-test. The level of statistical significance considered was 5%.

FINDINGS

The main hypothesis of this study was that the collaborative intervention developed with the participating teacher would be effective in increasing the self-regulation and self-efficacy belief of their students. Comparative and longitudinal analyzes of the quantitative scores of the scales were carried out in the pre-test and post-test stages. These results are presented below: first, referring to the belief in academic self-efficacy and then, to study and learning strategies and self-regulation of learning through the Study and Learning Strategies Inventory (LASSI).

Comparative analysis of the scores from the auto-efficacy scale in upper studies (AEFS)

Initially, the consistency of the instrument on the items included in the factors was verified, extracting an acceptable coefficient from Cronbach's Alpha, showing high reliability. Then, a comparative analysis of the numerical variables between the pre-test and post-test stages was performed using the Wilcoxon test, considering a p-value less than 0.05 as significant. The Wilcoxon test was chosen for related samples due to the absence of normal distribution of the variables. Information on Cronbach's alpha, mean values, standard deviation, minimum and maximum, significance value in the two stages of the research can be seen in Table 1.

Table 1
Comparative analysis of the averages from the scale of Self-efficacy in Higher Education between pre-test (n=20) and post-test (n=20) of students

Subscales of Self-efficacy (AE)	Cronbach's Alpha		Average (SD)		Minimum		Maximum			
	Pre-test	Post-test	Pre	Post	Pre	Post	Pre	Post	Z	Value-p*
Academic	0.94	0.92	6.89 (1.68)	7.9 (1.25)	3.22	4.78	9.44	9.78	3.481	0.0001
Training Regulation	0.93	0.94	6.42 (1.90)	7.33 (1.78)	2.29	2.86	9.57	9.43	3.115	0.002
Social Interaction	0.85	0.86	6.37 (2.01)	7.07 (1.97)	1	1	9.43	9.43	2.872	0.004
Pro-active actions	0.93	0.91	5.79 (2.07)	6.76 (1.73)	1.14	2.57	8.86	8.86	2.680	0.007
Academic Management	0.9	0.91	6.86 (2.01)	7.09 (2.17)	2.5	2.5	10	10	1.11	0.265
Self-efficacy Total scale	0.98	0.97	6.46 (1.76)	7.31 (1.47)	2.29	2.88	9.05	9.05	3.092	0.002

p* values regarding Wilcoxon's test for samples used for comparison between the two stages of the research.
Source: The Author Itself

The analysis showed statistically significant differences between the pre- and post-test phases. This suggests that, according to the students' self-report, the perception of academic self-efficacy improved after the collaborative intervention process with the participating teacher. Students reported feeling more effective in developing actions for their own learning, especially in relation to believing in their own ability to learn and take advantage of academic training opportunities.

Comparative Analysis of LASSI Scale Scores

Initially, the consistency of the instrument on the items included in the factors was verified, extracting an acceptable coefficient from Cronbach's Alpha. As in the previous scale, the Wilcoxon test was used for this inventory for comparative analysis of the numerical variables between the pre-test and post-test stages, considering a p-value lower than 0.05 as significant. Information on Cronbach's alpha, mean values, standard deviation, minimum and maximum, significance value in the two stages of the research can be seen in Table 2.

Table 2
Comparative analysis of LASSI scale between pre-test (n=20) and post-test (n=20) of students

Subescales	Cronbach's Alpha		Average (SD)		Minimum		Maximum			
	Pre-test	Post-test	Pre	Post	Pre	Post	Pre	Post	Z	Value-p*
Anxiety	0.8	0.86	2.80 (0.97)	3.30 (1.04)	1.00	1.33	4.00	5.00	2.29	0.022
Attitudes	0.64	0.57	3.50 (0.62)	3.97 (0.51)	2.33	2.83	3.50	3.97	3.12	0.002
Concentration	0.87	0.84	2.85 (0.89)	3.13 (3.73)	1.33	1.50	4.50	3.13	1.36	0.172
Information processing	0.57	0.38	2.69 (0.75)	3.55 (0.59)	1.00	2.83	4.00	3.73	1.59	0.112
Motivation	0.74	0.60	3.37 (0.72)	3.67 (0.57)	1.83	2.17	4.67	3.55	1.79	0.073
Selection of main ideas	0.79	0.67	3.15 (0.72)	3.70 (0.72)	1.50	2.83	3.15	3.67	2.77	0.006
Selfie testing	0.62	0.65	2.80 (0.72)	3.02 (0.57)	1.33	2.00	4.00	3.02	1.49	0.135
Strategies for taking tests	0.80	0.75	3.20 (0.72)	3.70 (0.72)	1.83	2.67	4.50	3.70	3.04	0.002
Time management	0.75	0.82	2.69 (0.75)	2.89 (0.85)	1.00	1.33	4.00	2.89	1.15	0.247
Use of academic resources	0.43	0.67	2.73 (0.62)	2.90 (0.76)	1.33	1.67	3.50	4.50	1.34	0.178
LASSI scale total	0.93	0.94	3.06 (0.50)	3.39 (0.49)	1.93	2.61	3.86	4.43	2.913	0.004

General notes: SD – standard deviation, Bold = significant p* values.
*p-value referring to the Wilcoxon test for related samples for comparison between the two stages of the research.
Source: The author herself

Although all subscales showed an increase in mean scores when comparing the pre-test with the post-test, only four subscales showed significant differences, in addition to the total analysis of the instrument. They are: “Anxiety”, “Attitude”, “Selection of Main Ideas”, “Strategies for Taking Tests” and “Scale LASSI Total”. The other subscales did not present a p value lower than 0.05.

In summary, the results showed an increase in self-efficacy beliefs for learning, decreased anxiety, higher attitude toward studying, higher report of strategic use for taking tests and selecting main ideals when comparing the data obtained in the pre- and post-test.

DISCUSSION

The aim of this study was to verify and compare, in a pre-test and post-test situation, the effectiveness of self-regulatory processes and self-efficacy beliefs for academic learning of the participating faculty's students. To assess the students' academic self-efficacy belief, the Higher Education Self-Efficacy Scale (Polydoro & Guerreiro-Casanova, 2010) was used before and after the intervention process.

The use of effective strategies is directly related to the quality of self-efficacy belief in promoting academic success experiences (Zimmerman, 2011). The analyzes showed that there was an advance in the students' self-report when compared with the results of the pre- and post-test, suggesting that the intervention carried out with the teacher had positive effects on the students' self-efficacy belief for the study. Similar results were obtained by Bellhäuser et al. (2016), Ganda and Boruchovitch (2018), Fabriz et al. (2014), in which intervention programs demonstrated that regulatory processes were positively related to self-efficacy beliefs.

When specifically analyzing the five factors that make up the scale, it was noted that the factor "Academic Self-Efficacy" was the one that stood out most positively, with all items in this subscale showing improvements. The item referring to the belief in the student's ability to establish conditions for the development of the work requested by the course was the one that stood out the most. This indicates that students reported improvements in the perception of effectiveness to fulfill the requested work.

One of the actions developed with the participating teacher was to promote activities or works with the application of learning strategies throughout the course. These were low-complexity works, but they guaranteed the completion of the task and the quality study for each content taught. These developed actions are in line with the indications of Bzuneck and Boruchovitch (2016) who explain that dividing a larger task into successive, specific and appropriate level of challenge goals tends to provide successive experiences of success, fueling self-efficacy and even the academic motivation.

Right at the beginning of the discipline, reflective discussions were held about the academic life of students, their difficulties and facilities throughout their school career. Throughout the course, the teacher brought reports of her own school trajectory and, at various times, encouraged students to maintain a favorable attitude towards the study. Recovering self-efficacy by evoking past successes is one of the useful strategies to foster self-regulation of motivation. Furthermore, Bandura (1977, 1986, 2007) explains that actions such as social persuasion, modeling and successful experiences nurture a sense of academic self-efficacy.

Regarding Self-efficacy for Regulation of Training and Self-Efficacy in Social Interaction, there were also improvements, according to the students' self-reports, when comparing the post-test with the pre-test. These factors assess the student's perceived confidence in their ability to set goals, make choices, plan and self-regulate their actions in the career formation and development process, in addition to the ability to know how to express their thoughts in pairs. It is important to highlight that throughout the intervention process, many activities were carried out in groups, providing opportunities

for dialogue and then socialization with the rest of the class. This suggests that creating opportunities for a more collaborative study environment and actions can develop the perceived confidence in the ability to relate to colleagues and professors for academic and social purposes, as the academic literature has pointed out (Ibiapina, 2008).

In short, data from the self-report of this research suggest that the perception of academic auto- self-efficacy of students improved after the interventionist process with the participating teacher. This indicates that the teacher possibly was able to develop with the students, actions favoring, mainly, existing exit experiences by means of strategies focused on the self-regulation of learning. It must be salient that the self-efficacy beliefs are important in motivating, influencing the way as the subject is prepared for action. In the case of high school students, those will be the ones investing in tasks and use more levels of efforts and persistence, supplanting difficulties faster that they face (Polydoro & Azzi, 2009; Santos, Zanon & Ilha, 2019).

The second specific objective of this study was to evaluate and compare, in pre-test and post-test situations, the learning and study strategies related to skills, willingness and self-regulation components of student learning adopted as an apprentice. These processes constitute the LASSI subscales as described in the "Instruments" section.

The results presented through the application of LASSI showed significant differences, with a relevant increase in scores when compared with the post-test with the pre-test with students. This information suggests that, from the beginning to the end of the semester, they started to use, more frequently, study and learning strategies related to skill, will and components of self-regulation of learning. Similar data are found in Arcoverde et al. (2020) in which experimental groups that underwent instructions on the self-regulation of learning had an increase in their self-reported use of learning and study strategies and in their self-efficacy to learn.

When analyzing the LASSI subscales, all showed an increase in means, however only four had significant values for interpretation (Anxiety, Attitude, Selection of Main Ideas and Strategies for Taking Tests). Zimmerman (2002, 2013) and Schunck (2008) emphasize that the teaching of learning strategies must be linked to the teaching of affective support strategies that improve learning by regulating undesirable sensations such as excessive anxiety and low self-efficacy perception. During the course taught by the professor, who was going through the intervention process, it was possible to notice important differences in her actions that, possibly, explain part of the results now found. The time management performed by the teacher in all classes, explaining the activities organized for the day, as well as the encouragement and modeling performed by the teacher and, at times, by the researcher, may have contributed to making students feel more secure to participate in classes, and thus, present less anxiety. Häfner, Stock and Oberst (2015) also reported less perceived stress and more time control after training with time management.

During the curse, researcher and professor noticed the students' difficulty in reading the requested texts. A similar perception was found in a Brazilian work by Alcará and Santos (2015), which identified that the level of reading comprehension was lower than

expected for university students, indicating the need to create opportunities to enhance cognitive and metacognitive skills for reading comprehension in the university context. Thus, throughout the course, students were asked to perform previous readings with applications of the learning strategies selected and instructed by the professor and researcher. In addition, there were many moments of reading throughout the class. In practically every class, before starting a new content, the teacher carried out a survey of prior knowledge with the students and, after that, it was time for individual and shared reading. Such actions are in line with the proposed intervention in learning strategies and may have contributed to improving the levels of "Attitude" and "Selection of Main Ideas" in relation to the proposed activities." In face of the proposed activities.

In general, the results presented indicate that the collaborative intervention may have given students the opportunity to promote more adequate strategies for learning, knowledge appropriation, experience of academic success and, consequently, a better perception of academic effectiveness. Taking the collaborative research approach to implement the intervention seems to have favored the achievement of reported and discussed results. After all, instead of the researcher entering the environment just to observe and point out what is or is not adequate, the reality of her work and the difficulties encountered were discussed with the teacher, in order to offer theoretical-methodological subsidies for the implementation new practices that gave new meaning to their work. Gasparotto and Menegassi (2016) clarify that collaborative research is a research proposal in co-participation between professor and researcher, always aiming at restructuring and rebuilding work with language in a teaching situation.

Data from this work reinforce the need to expand various initiatives aimed at teacher training to promote self-regulation of learning in the university environment (Arcoverde et al., 2020; Ganda & Boruchovitch, 2018; Weinstein & Acee, 2018). Opting for collaborative research is a means of intervening, respecting all the knowledge that teachers already have in the exercise of their profession, but in order to give new meaning to it and expand it with reflections and learning about new knowledge. In the case of this research, self-regulated learning, so important for the formation of individuals who know how to manage their learning processes.

CONCLUSION

It is believed that the present work, due to its collaborative nature, provided opportunities throughout the sessions to discuss the beliefs and knowledge, both of the participating teacher and the researcher, about the object of study. This dynamic favored the opening to implement the teaching practice in favor of the self-regulated learning of its students, achieving improvements in the self-efficacy belief and in the processes that involve the self-regulation of learning. It reinforces the need to intervene to improve the explicit knowledge of teachers so that they can train students, especially those who will be future educators, on the use of cognitive and metacognitive strategies. Knowledge and practices, essential both to improve their own academic performance during their studies, and to increase the likelihood that they will promote these strategies in their classes. Research that respects teaching knowledge and practices, such as collaborative research, reveals a gain for research in education, as the knowledge of both authors,

participant and researcher, and, consequently, of scientific knowledge itself is expanded. An interventional process that is inflexible in its procedures may fail to develop important areas of the research object due to the lack of autonomy to create according to the observed needs. Thus, it is noted that the collaborative research process does not see interventional work as superlative, but rather as creative. In this sense, research on self-regulation of learning in the field of collaborative research is prominent.

Looking for student performance data would also be relevant, as it has been associated with the self-regulatory process, performance improvement and dropout reduction. Another aspect to be considered in future research concerns the amount of time to study the concepts of self-regulation of learning. The beginning of the intervention with the participating professor took place together with the beginning of the discipline, in which it was already necessary to discuss the plans and actions that would be developed. Perhaps it would be interesting to start the intervention process with the participating teacher a little earlier in order to allocate more time to the study of the concepts of self-regulation of learning.

As a suggestion, future research could propose the promotion of self-regulation of learning at the academic leadership level in order to encourage a more explicit promotion of SRL. This research showed positive results for the behavior favorable to learning made possible by the action of only one professor in a given semester. Promoting space to consider and, who knows, developing specific actions with more professors would be, in addition to being innovative, a promising field of research. Another object of study is contemporary curriculum designers. The way curricula are laid out in academia can easily overwhelm the curriculum with a lot of content, preventing a serious consideration which is: the need to help students develop effective ways to study and learn. There needs to be availability and time in a curriculum to allow teachers and students to give explicit and sustained attention to developing good quality knowledge about learning, even more so in teacher education courses. The time required for this attention should be an important feature of curriculum planning and an auspicious research objective.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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