Paper

Learning strategies and sociodemographic variables of undergraduate teachers

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Abstract
This paper is based on the Cognitive Psychology/Information Processing Theory, with emphasis on the study of learning strategies used by university teachers to learn. It analyzes the frequency of the use of teacher learning strategies from a university in the North of Paraná, as a function of socio-demographic variables. A total of 56 professors participated in the survey, being 57.14% female and 42.46% male. The data collection was done online, by means of Google Drive forms. The results showed that most of the professors use more frequently Cognitive and Metacognitive Self-Regulation strategies than Internal/Contextual and Social Self-Regulation Strategies. Female participants and teachers from the Department of Vernacular Letters (Portuguese teaching Course) were the most strategic. It is important to highlight the need of including in the undergraduate courses contents about learning strategies, in order to enable professors the access to knowledge of new models of teaching how to learn.

Keywords: Cognitive psychology, Learning strategies, Teacher training.

Introduction

This study is based on the Cognitive Psychology/Information Processing Theory, and presents as its theme the use of learning strategies by university professors and their relation with socio-demographic variables.

According to Sternberg (2016), the Cognitive Psychology is a science that studies how people perceive, learn, remember and think information; the research object is cognition, understood as the action of acquiring knowledge, in other words, a set of conscious mental processes based on sensorial experiences, thoughts, representations and memories. (SCHULTZ; SCHULTZ, 2015; STERNBERG, 2016).

Mental processes, also presented by Eysenck and Keane (2007) are internal processes involved in extracting meaning from the environment and deciding which action must be appropriate, as explains the Information Processing Theory (IPT). This theory expresses the cognitive development, conceiving the mind as a complex

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system, composed of short-term and long-term sensory memory. The sensory memory receives the environmental stimuli from the sense organs, and the short-term memory executes the processing which involves several stages so that the information can be carried to the long-term memory. In this one is stored the information to be retrieved when necessary (ATKINSON; SHIFFRIN, 1971).

Mental processes, internationally studied by Weinstein and Mayer (1983), Zimmerman and Martinez-Ponz (1986), Veiga Simão (2002), Weinstein, Acee and Jung (2011) and Dembo and Seli (2016) and, in Brazil, mainly by Boruchovitch (1999) and Cunha and Boruchovitch (2016), among others, aim to understand how learning takes place. Although there is no consensus, due to the different theoretical views, such authors agree that, in order to learn, some processes are necessary and they can be understood as learning strategies.

Learning strategies were defined by Weinstein and Mayer (1983) as behaviors and thoughts during the process of learning. Pintrich e Groot (1990), in turn, defined them as a general term referring the cognitive and metacognitive use of learning strategies. Dembo (1994) alludes to the strategies as methods and techniques that students use in order to acquire information. Also, for Monereo et al. (2007), they are conscious and intentional decision-making processes, where the learner selects, retrieves, in an organized way, the knowledge to perform a task, depending on the situation in which it happens.

Boruchovitch and Santos (2015) state that, currently, there is a consensus among researchers regarding learning strategies. They may be considered as a set of procedures allowing and reinforcing self-regulated learning, involving the use of cognition, meta-cognition, motivation, emotion and student behavior.

For the mentioned authors, the taxonomy of learning strategies should be as follows: Strategies for Cognitive and Metacognitive Self-Regulation, Strategies for Internal and Contextual Resources, Self-Regulation, and Strategies for Social Self-Regulation. Recalling the concept of strategies, in which those are mental processes demanding conscious actions from the learner/subject for their implementation, the mental processes and/or physical actions for their execution will be explained.

Cognitive Self-Regulation Strategies use mental processes such as rehearsal, elaboration and organization, conditioned to the learner's actions. The action of the learner in the rehearsal demands oral or written repetition of the material to be learned. In the elaboration process there is a need of connecting the information being learned with the learner's previous knowledge by means of summaries, rewriting material, analogies, elaboration of questionnaires and answers; finally, in the organization process, the material should be structured in parts, identifying the subordinated and/or super-ordinate relations, by creating hierarchies, diagrams and chain of concepts (BORUCHOVITCH; SANTOS, 2015).

In the use of Metacognitive Self-regulatory Strategies, on the other hand, mental planning, monitoring and regulation processes are employed. These demand from the subject the following actions: for planning it is necessary to establish goals, for monitoring the learner needs to be aware of its own understanding and attention to be able to self-question and monitor the learning process so that regulation would be the action of behavior change, with the change of actions/strategies when necessary (BORUCHOVITCH; SANTOS, 2015). In this sense, according to Davis Nunes and Nunes (2005, p.211), when considering the definition proposed by Flavell (1976) that "metacognition refers to knowledge about one's cognitive processes" the authors complement that, "By making use of metacognition, the subject becomes a bystander of its own ways of thinking and of the strategies employed to solve

problems, seeking to identify how to improve them" (DAVIS; NUNES; NUNES, 2005, p.211).

In the Self-regulation Strategies of Internal Resources are included the motivation and emotion controls, among which is anxiety. For its implementation of actions, it is necessary: to remain calm when facing challenging tasks, not giving up of performing the task even if it is tedious or difficult (BORUCHOVITCH; SANTOS, 2015).

Factors such as expectations and affective components are considered of great influence for motivating the Self-regulation by Pintrich e Groot (1990). Expectation is understood by the authors as the learner's belief in its ability to perform a task, and the affective component is perceived as the emotional responses that this task triggers. Regarding the Self-regulation of Contextual Resources, this strategy is also related to self-control, since actions involve management and planning of study time, organizing the environment for the learning activity, separating the material needed, avoiding procrastination.

The Social Self-Regulation Strategy involves inter-personal relations. Schunk and Zimmerman (1994) address the social source as a contributor for students to develop self-regulation in learning. These sources include the help of more experienced adults such as parents, teachers and even peers, such as friends and colleagues. The action that the learner needs to execute is to ask for help in case of doubts, studying in groups, discussing the content and asking to review the content together (BORUCHOVITCH; SANTOS, 2015).

In short, the learner who self-regulates its learning has a tendency of using diversified strategies while doing tasks, becoming autonomous in its learning process, having better academic success and greater desire regarding the school activity. For this to happen, the teacher needs to teach, besides the contents, the use of learning strategies (VEIGA SIMÃO, 2002).

A study developed by Santos (2008) when investigating the teacher as a learner and its knowledge about the use of learning strategies, pointed out that many teachers confused the concept of learning strategies and of learning to learn, since a considerable parcel associated learning strategies with teaching strategies.

Under this perspective, Monereo et al. (2007), reflects on the importance of thinking the teacher as a learner, selecting, elaborating and organizing the information that it has to learn, as well as an instructor, planning its teaching action in order to offer for the student a model and a guide on how to use, strategically, the learning strategies, emphasizing the transformation in the formation of the teacher so that they become good learners. Thus, Lopes da Silva, Veiga Simão and Sá (2004) evidence that, even when teachers recognize the importance of teaching other competencies besides the curricular ones, so that students may become more active and autonomous in the treatment of information during school and classroom tasks, they frequently do not know how to teach them.

Santos e Boruchovich (2011), reinforcing the importance of knowing learning strategies of teachers and future teachers, quoting Monereo (2007) et al. and Veiga Simão (2002), highlight that, for students to become strategic, at first, it is expected that their teachers are strategic, by means of the combination of content, techniques and procedures applied in real situations of the daily life. Oliveira et al. (2012) suggests that teachers should become strategic teachers, demonstrating their regulatory skills to plan, guide, and evaluate their own cognitive processes, learning the content to teach, and then relating it to their teaching performance.

In this case, according to Veiga Simão (2002), based on the studies of Fisher (1990), the teacher should abandon the model of ideas and information transmission and move to the model of teaching how to think, combining reflection and practice, in order to promote the cognitive discovery that occurs in students. In this case, teachers teach students to learn how to think about themselves, requiring a reflective professor that thinks about, in and for the action.

When investigating the influence of experiences lived by elementary school teachers on the teaching process and on the development of learning strategies in students, Barabási (2013) verified that the methods and learning techniques used by teachers as students, determine the process of teaching how to learn, because they indicate the need to teach strategies ever since elementary school so that, during the development of the subject, they are only modified.

In studies of Krawec and Montague (2014), regarding an intervention program in cognitive and metacognitive strategies with seventh and eighth grade teachers, results showed that students had improved self-efficacy, as well as problem solving. However, teachers had difficulties in incorporating problem solving as part of the school program, requiring further training for them. Both in studies from Barabási (2013) as well as in the ones from Krawec and Montague (2014) it is perceived the need of investing in the formation of teachers, so that teaching can be modified, giving the current need for autonomous and self-regulated students.

Bortoletto and Boruchovitch (2013) investigated the relationship between learning strategies and the emotional regulation of Pedagogy students from two universities, one public and the other private. Data showed that students of the first years use less dysfunctional strategies and have greater control of emotions like sadness. Participants in their thirties and older, however, stated that they made a greater use of learning strategies, and had greater emotional control (anger). The authors suggest that learning strategies allow the control of emotions and help in the integral development of the learner.

Studies by Marini and Boruchovitch (2014), Santos and Boruchovitch (2011) and Cunha and Boruchovitch (2016), when investigating, respectively, whether they had heard about learning strategies in students of pedagogy and/or mathematics from different colleges, found out that participants confuse teaching strategies with learning strategies. These results indicate a possible lack of contents regarding learning and self-regulation strategies during the formation of teachers.

Marini and Boruchovitch (2014) also verified that Pedagogy students make more use of cognitive and metacognitive strategies, with predominance of the superficial cognitive ones. The most widely used strategy was researching; and the strategy of asking for help was more used than the strategy of reading. In this study, people over thirty years of age also showed greater use of metacognitive strategies. In this study, the authors also investigated if students had already heard about learning strategies and the data evidenced that 80.37% claimed to have heard about it; 54.2% when conceptualizing the meaning confused it with teaching strategies; only 39.39% approached the right definition. Similar results were also found by Santos (2008) when investigating the teacher as a learner, as previously pointed out. Therefore, both students as well as teachers have indications regarding the lack of knowledge about what learning strategies are.

In the study from Cunha and Boruchovitch (2016), the authors verified that 70% of the students of Pedagogy and Mathematics courses of a Public University use cognitive strategies to learning, performing readings and researching, and that

the strategy of seeking information with colleagues was little used. There was no use by any participant regarding the strategy of organization.

Given the relevance of this theme, the present study aimed to analyze the frequency of using learning strategies by undergraduate teachers of a public university in the North of Paraná (Brazil) and its relation with the sociodemographic variables.

Method

Participants

Fifty-six teachers from a Public University from the North of Paraná (Brazil) participated in the research, distributed respecting the departments to which they were linked as follows. Education (n=11), Vernacular Letters (n=10), Geosciences (n=10), Social Sciences (n=6), Mathematics (n=6), Visual Arts (n=3), Biology (n=3), Physics (n=3), Music (n=2), Modern Languages (n=1) and History (n=1); 57.4% female and 42.86% male.

Regarding the age range, 46.43% of the teachers were between 41 and 50 years old, 26.79% over 51 years old, 23.64% between 31 and 40 years old and 3.64% between 20 and 30 years old. Among the teachers, 82.14% where PhDs and 17.86% Masters. Regarding the work regime, 89.29% were full time and exclusive dedication (TIDE), 7.14% had 40 working hours contract, and 3.57% had 20 working hours contract. Regarding the institutional bond, 83.93% were permanent teachers and 16.07% temporary ones. Time of experience in teaching was: 33.93% between 11 and 20 years, 23.21% between 21 and 30 years, 17.86% between 6 and 10 years and 16.07% between 1 and 5 years.

Tools

For data collection was used a socio-demographic questionnaire containing nine questions, which included information on: name, gender, age, undergraduate degree, graduate studies, work load, type of contract, experience time and course where they teach.

The Learning Strategy Scale for University Students (LSS-U) was also used. It was tested and validated by Boruchovitch and Santos (2015), aiming to verify the frequency of using learning strategies. The scale is composed by 35 items divided by three factors: Factor 1 – Self-Regulation Strategies for Cognitive and Metacognitive (CMSR), containing twenty-three items (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 20, 24, 25, 27, 29, 30, 31, 34, 35), having as an example the item “reads the texts indicated by the teacher”. Factor 2 –Self-Regulation Strategies for Internal and Contextual Resources (SRSIC), composed by eight items (11, 17, 18, 19, 21, 22, 23, 26). One example would be “manages study time”. Factor 3 – Self-regulation Strategy for Social (EAS) with four items (16, 28, 32, 33), having as an example the item “studies in group”. The alternatives of answers are arranged on a three points *Likert’s* Scale: “always”, “sometimes” and “never”. Option “always” is worth 4 points, option “sometimes” is worth 3 points, option “rarely” is worth 2 points, and option “never” is worth1 point. Item (26) had this score reversed, due to the content of its wording. The minimum score proposed by the scale is 35 and the maximum is 140 points. According to the scale, the higher the score is, the more self-regulated the participant also is, being able to use the strategies autonomously when needed. Next

are examples of items that make up each factor: Cognitive and Metacognitive Self-regulation (repeating information orally as the text is being read; selecting the main ideas of the text); Self-regulation for Internal and Contextual Resources (organizing their study environment and getting distracted or thinking about other things while reading, studying or doing the tasks) and Social Self-Regulation (asking colleagues for help in case of doubts and studying in a group).

Procedure of Data Collection and Analysis

The research was submitted and approved by the Committee of Ethics in Research involving Human Beings (Consubstantiate Opinion Number 1.270.294/2015). The questionnaire and the scale were applied using the *Google Drive Forms* tool which is considered as an easy to handle, free program, delivering the data organized in an Excel spreadsheet. The research was made online, with the link of the research being sent by email to the teachers, during the period of January to March 2016. When opening the email, they received a letter explaining about the research and, accessing the link it was presented the Informed Consent Form (ICF). If they signed the agreement for taking part on the research, the socio-demographic questionnaire was displayed and, in sequence, the Learning Strategy Scale for University Students (EEA-U). Considering that the scale was proposed to Undergraduate Students while accessing the instrument, the teachers were instructed to answer the scale as learners. At the end, the answers from participants were automatically sent to an Excel spreadsheet.

The answers of the participants were submitted to the *Statistic software*, extracting the components for the descriptive and inferential statistical analysis. Initially, *Cronbach's Alpha* values were extracted in order to verify the internal consistency of the items regarding each factor. After analysis, the *Saphiro-Wilk* normality test was applied if the probability distribution associated with the data was well modeled by a normal distribution, or not. As they had a normal distribution ($p<0.0001$), the Variance Analysis and *Tukey's* test was applied in order to confirm the possible differences between the means of the participant's estimations, according to responses from the EEA-U, considering the three factors which comprise it and the socio-demographic variables.

Results

Cronbach's Alpha values revealed good reliability of the scale, according to the following values obtained: Factor 1 – Cognitive and Metacognitive Self-Regulation Strategy ($\alpha = 0.78$); Factor 2 – Strategies of Self-Regulation for Internal and Contextual Resources ($\alpha = 0.72$) and Factor 3 – Strategy of Social Self-regulation ($\alpha = 0.79$), obtaining the general mean ($\alpha = 0.76$). These coefficients are acceptable, indicating a satisfactory internal consistency and that the use of the scale produces reliable interpretations.

Subsequently, the mean, minimum and maximum values, and standard-deviations were calculated by applying the Learning Strategy Scale for University Students (EEA-U), according to what is presented in Table 1.

Table 1 – Mean, minimum and maximum values, Standard Deviation (SD) of Strategies Scale EEA-U

Strategies	N	Mea	Minimu	Maximu	*SD*

		n	m	m	
Cognitive and Metacognitive Self-Regulation (EACM)	56	3.39	2.57	3.96	0.31
Self-Regulation for Internal and Contextual Resources (EARIC)	56	3.31	2.38	4.00	0.40
Social Self-Regulation (EAS)	56	2.65	1.25	4.00	0.62

Source: Authors (2018).

Observing Table 1, it can be seen that professors had a higher mean regarding the use of Cognitive and Metacognitive Self-Regulation Learning Strategies (EACM) (3.39), followed by the use Self-Regulation for Internal and Contextual Resources (EARIC) (3.31) and of Social Self-Regulation (EAS) (2.65).

Among the Cognitive and Metacognitive Self-Regulation Learning Strategies (EACM), teachers had a higher frequency of using the "*Making notes in the text or in a side sheet*" and "*Checking your errors after receiving a test grade*" strategies, both with the mean (3.84) and the smaller frequency obtained was regarding the use of strategies "*Elaborates questions and answers regarding the studied subject*" (2.32), followed by strategy of "*Creating questions about the subject being studied and trying to answer them*" (2.84).

Regarding the Self-Regulation for Internal and Contextual Resources Strategies (EARIC), results indicate that teachers use more frequently strategies of "*Organizing their study environment*" (3.57) and "*Planning their study activities*" (3.57), and, less frequently, strategies of: "*Controlling anxiety under an evaluation situation*" (3.29), "*Keeping calm in face of difficult tasks*" (3.43) and "*Managing your time of study*" (3.43).

It is worth to highlight that the strategy "*Getting distracted or thinking of something while reading, studying or doing tasks*", which indicates the level of distraction while performing works and tasks, understood as a dysfunctional strategy, had an mean of (2.18), being considered of high frequency for this strategy.

Regarding the Social Self-Regulation Strategies (EAS), the strategy more commonly used by the teachers was "*Asking for help from peers in case of doubt*" (3.20) and the least used one was "*Asking for someone to revise the subject*" (1.80).

In sequence are presented the data obtained as a function of socio-demographic variables. Table 2 shows the respective absolute (n) and relative (%) frequencies, mean (M), standard deviation (SD) and probability of significance (p) obtained by the factors proposed by EEA-U as a function of gender, age range, educational level, work load, type of contract and time of teaching experience.

Table 2 – Absolute (n) and Relative (%) Frequency, Mean (M) and Standard Deviation (SD) by factor of EEA-U as a function of gender, age range, educational level, work load, type of contract and time of teaching experience.

Socio-demographic Variable		Self-regulatory Strategies							
				Cognitive and Metacognitive		Internal and Contextual Resources		Social	
		n	%	M	SD	M	SD	M	SD
Gender	Female	32	57.14	3.47*	0.25	3.30	0.43	2.78	0.59
	Male	24	42.86	3.27*	0.35	3.33	0.37	2.48	0.62

Age	Between 20 and 30 year	2	3.57	3.07	0.34	2.94	0.27	2.75	0.35
	Between 31 and 40 years	13	23.21	3.29	0.35	3.29	0.40	2.56	0.70
	Between 41 and 50 years	26	46.43	3.39	0.30	3.31	0.43	2.63	0.56
	Over 51 years	15	26.79	3.50	0.24	3.38	0.37	2.75	0.69
Educational Level	PhD	46	82.14	3.39	0.31	3.31	0.43	2.66	0.66
	Masters	10	17.86	3.37	0.30	3.30	0.26	2.63	0.40
Work Load	TIDE	50	89.29	3.38	0.30	3.30	0.41	2.63	0.63
	40 h	4	7.14	3.47	0.48	3.38	0.45	2.88	0.63
	20 h	2	3.57	3.41	0.28	3.38	0.18	2.75	0.35
Type of Work Contract	Efective	47	83.93	3.40	0.31	3.30	0.42	2.65	0.64
	Temporary	9	16.07	3.32	0.28	3.35	0.29	2.63	0.53
Time of Teaching Experience	From 1 to 5 years	9	16.07	3.25	0.25	3.17	0.44	2.39	0.57
	From 6 to 10 years	10	17.86	3.40	0.38	3.44	0.31	2.83	0.53
	From 11 to 20 years	19	33.93	3.36	0.33	3.26	0.43	2.54	0.60
	From 21 to 30 years	13	23.21	3.42	0.24	3.30	0.41	2.77	0.67
	Over 31 years	5	8.93	3.62	0.26	3.53	0.34	2.90	0.76

* Statistically significant difference ($p<0.05$)
Source: Authors (2018).

As can be observed, regarding the use of Cognitive and Metacognitive Self-Regulation Strategies, the highest means obtained by the participants as a function of the socio-demographic variables were: female (3.47), age between 41 and 50 years old (3.39), PhD title (3.39), work load of 40 hours (3.47), work contract as Permanent (3.40) and, regarding the time of experience the greater mean was 3.62 for over 31 years of experience.

Regarding Self-Regulation for Internal and Contextual Resources Strategies, the greater means obtained as a function of the socio-demographic variables were: male (3.33), age over 51 years (3.38), PhD title (3.31), work load of 20 and 40 hours with the same mean (3.38), temporary work contract (3.35) and time of experience over 31 years (3.53).

Finally, the highest means obtained as a function of socio-demographic variables regarding the use of Strategies of Social Self-Regulation were: female (2.78), age between 20 and 30 years old and over 51 years old (2.57), PhD title (2.66), work load of 40 hours (2.88), work contract as Permanent (2.65), time of experience from 6 to 10 years (2.83).

Variance analysis applied as a function of socio-demographic variables evidenced a significant difference between males and females regarding the use of the Learning Cognitive and Metacognitive Self-Regulation Strategies, and there were no statistically significant differences in the other strategies proposed by the scale as a function of the other variables. These results evidenced that, regarding Cognitive and Metacognitive Self-Regulation Strategies, female participants are more strategic than male ones.

In Table 3, presented next, are evidenced the Mean (M), the Standard Deviation (SD) and the Probability of significance (p) regarding the factors of the scale as a function of the departments where participants in the research teach.

Table 3 - Mean (M), Standard Deviation (SD) and value of (p) regarding the departments of work of teachers as a function of the Self-Regulation Strategies.

Departament	Education		Vernacular Letters		Geosciences		Mathematics		Social Sciences		Physics		
Strategies	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**P**
Cognitive and Metacognitive	3.52	0.18	3.64	0.30	3.41	0.22	3.16	0.33	3.30	0.31	2.88	0.35	0.003*
Internal and Contextual Resources	3.32	0.45	3.56	0.19	4.45	0.31	2.96	0.44	3.19	0.33	3.25	0.57	0.019*
Social Regulation	2.82	0.56	2.88	0.58	2.76	0.53	2.63	0.52	2.63	0.82	2.17	0.52	0.377

Departament	Visual Arts		Biology		Music		History		Modern Languages		
Strategies	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**p**
Cognitive and Metacognitive	3.43	0.26	3.30	0.20	3.11	0.03	3.23	-	3.22	-	0.003*
Internal and Contextual Resources	3.54	0.19	2.71	0.31	3.19	0.27	3.75	-	3.25	-	0.019*
Social Regulation	2.42	0.80	2.58	0.80	1.63	0.53	2.25	-	2.50	-	0.377

* Difference statistically significant (p<0.05)
Source: Authors (2018).

As exposed in Table 3, regarding the Cognitive and Metacognitive Self-Regulation Strategies, the analysis made as a function of the Department to which teachers are linked, the highest means were obtained by teachers of Vernacular Letters (3.64), Education (3.52) and Visual Arts (3.43) and the lowest means were for participants linked to the following departments: Physics (2.88), Music (3.11) and Mathematics (3.15), these differences being statistically significant (p=0.003).

The analysis made by the *Tukey's* test (p<0.050) evidenced that, regarding the Strategies of Cognitive and Metacognitive Self-Regulation, there were significant differences between the means obtained by teachers from the department of Physics and Vernacular Letters (p = 0.002886), Physics and Education (p = 0.018414) and Vernacular Letters and Mathematics (p = 0.030958).

Regarding Strategies of Self-Regulation of Internal and Contextual Resources, the highest means are for participants linked to the Departments of History (3.75), Vernacular Letters (3.56) and Visual Arts (3.54). The lowest means were obtained by teachers of the departments of Biology (2.71), Mathematics (2.96) and Social Sciences (3.19).

Also, regarding the Strategies of Self-Regulation of Internal and Contextual Resources, the same analysis by *Tukey's* Test was made and evidenced significant differences between the means obtained for the participants of Biology and Languages (p = 0.26873) departments.

In the case of Strategies of Social Self-regulation, the highest means were for teachers of the Department of Vernacular Letters (2.88), Geosciences (2.78) and Education (2.82). The lowest means observed were for teachers of departments of Music (1.63), Physics (2.17), History and Modern Languages, both with (2.25), not having significant differences (p=0.377) between the means obtained regarding the use of those strategies.

Data show that teachers of the departments of Vernacular Letters, Education, Visual Arts and Geosciences use more Strategies of Cognitive and Metacognitive Self-Regulation, whereas the ones of the departments of History, Vernacular Letters, Visual Arts and Geosciences use more Strategies of Self-Regulation of Internal and Contextual Resources.

Discussion and Final Considerations

By considering the relevance of the theme and using a *likert* type scale, the present study seeks to contribute to elucidate and/or offer additional information to researches conducted in Brazil, as suggested by Boruchovitch and Santos (2015).

Observing the frequency of the use of learning strategies by teachers, by applying the EEA-U Scale, it is possible to verify by the answers that, regarding the Cognitive and Metacognitive Self-Regulation Learning Strategies (EACM), there is evidence that the most commonly used Cognitive Strategy by teachers was "Taking notes in the text or in a spare page; reading the texts indicated by the teacher and selecting the main idea of the text ".

Results presented by Lemos (2016) corroborate those presented in this study, since the answers related to Cognitive Strategies of Self-Regulation were similar, as follows: "*taking notes in the text or in a spare page; reading the texts indicated by the teacher, selecting the main ideas of the text and reading its answers again*". The same with results found by Marini and Boruchovitch (2014), since the cognitive strategies of underlining, taking notes and reading were the more mentioned ones among students of Pedagogy.

Regarding the Strategies of Metacognitive Self-Regulation, the strategy of verifying errors after receiving the result of a test was the more used one. Regarding strategies more reported in this study, it was verified that they are linked to the strategies of Cognitive Self-Regulation of elaboration, in which, according to Boruchovitch (1999), Santos and Boruchovitch (2011), students use them to connect the new material with the old one, potentiating their self learning.

The Cognitive and Metacognitive Self-Regulation strategies least used by the teachers of the study were the ones of *"elaborating questions and answers about the subject studied*", "*creating questions about the subject being studied and trying to answer them*". They are also the least used ones by students of the course of Pedagogy in Distance Learning, as presented in studies of Alliprandini et al. (2014) and of Lemos (2016), evidencing that students of higher education also use those strategies with low frequency. The absence of this type of strategies implicates in less resources at the moment when the student is trying to relate new information with the one already learnt, possibly making the capture difficult and, also posteriorly, the recovery of this information. Besides, for Davis, Nunes and Nunes (2005, p.228), "*it is a central task to strive to provide, always, the cognitive effort and the development of metacognitive skills, in order to reach the intellectual independence essential to the exercise of citizenship*".

Regarding the Learning Strategies of Self-regulation of Internal and Contextual Resources, the more used strategies were the contextual strategies of "*organizing the studying environment"* and *"separating all material needed for the task to be executed*". This demonstrates that teachers sought to organize the environment and to plan their actions before starting the task, as well as they separate the whole material needed for the study activity. Such results corroborate, partially, with the ones obtained by Lemos (2016) regarding the strategies of Self-Regulation of Internal and Contextual Resources, since the strategy "*separate all the material needed for the task that you will perform"* was the most frequent one.

Regarding the Social Self-Regulation Learning Strategies, the most used strategy was "*asking colleagues for help in case of doubts*"; on the other hand, the least used one was *"asking someone to revise the content together"*. It is understood that this is not a behavior that adults use to study, indicating the need for adaptation of some items in the scale, considering that the teacher activity, *"studying in group"*, was indicated as the least used by teachers.

The data suggest that professors tend to ask help from peers, however, they prefer individual activities, such as studying alone. In the study by Ávila, Frison and Veiga Simão (2016), students from the Course of Physical Education (n=33) indicated using more frequently the strategy of "ask for help" and less frequently "study in group". The remaining verified strategies indicated that the teachers seem to try to organize the environment and plan their actions before starting the task, as well as they separate all the material needed for the study activity.

Considering the Departments to which teachers were linked, results showed as the most strategic teachers in cognitive and metacognitive self-regulation those linked to the Departments of Vernacular Letters and Education, included in the large area of Human Sciences. It is important to highlight that significant differences were evidenced between participants from the departments of Vernacular Letters and Mathematics, Vernacular Letters and Physics, as well as between Physics and Education. Therefore, it is possible to assume, regarding the departments linked to the area of Exact Sciences, differences in the initial formation, since it is not usual to offer disciplines related to the area of Educational Psychology, as well as pedagogical subjects.

Regarding Self-Regulation Strategies of Internal and Contextual Resources, professors from the departments of History and Vernacular Letters were highlighted as being the most strategic ones, evidencing significant differences between participants linked to the Department of Vernacular Letters and Biology, indicating that professors from the Department of Biology make little use of strategies of anxiety control, remaining calm, finishing tasks, planning, managing and organizing the work environment, becoming more distracted than teachers from the Department of Vernacular Letters .

Finally, regarding strategies of Social Self-Regulation, participants linked to the Department of Vernacular Letters were the ones that reached the highest mean, although there were no significant differences regarding the other departments. However, teachers from the Department of Music were the ones that least used this strategy. Generally, among the researched participants, the ones who presented themselves as the more strategic ones were professors from the department of Vernacular Letters, Education, Geosciences and Visual Arts.

According to study by Korkmaz and Kaya (2012), conducted with 222 students from distance learning university courses, from different departments, such

as Education Sciences, Technological Instruction and Computing Education and Social Sciences in Turkey, it was verified that students from Social Sciences are the less strategic ones regarding the organization of an environment for strategic tasks, compared with the other departments investigated, differing from data found in this study. It is possible to suppose that the differences found may be related with the fact that the participants are from different realities and cultures.

Pavesi (2014), when investigating the profile of the self-regulated learning of distance learning courses from three higher education institutions, identified that students from the area of Human Sciences (Pedagogy, Letters and History) were more self-regulated than the ones from the areas of Social Sciences and Exact Sciences, corroborating the results of this research.

Regarding the socio-demographic variable of gender, the analysis evidences significant differences, being female participants more strategic than male ones regarding the cognitive and metacognitive strategies, not being differences among the other strategies. These results are in line with the ones presented by Baeten, Dochy, Struyven, Parmentier and Vanderbruggen (2016), as they evidence that women have a more strategic profile than men, besides being more diligent and attentive and by Pavesi and Alliprandini (2015), Bortoletto (2011), whose results showed a high score by college female students when compared to college male students regarding the use of cognitive and metacognitive strategies.

Besides, results also showed that: the older they are, the more they use learning strategies; PhD professors are more strategic than those with master's degrees, the ones working 40 hours use more learning strategies, as well as the Permanent ones and the ones with more than 31 years of experience.

It is worth to highlight that all professors of the respective departments were invited to participate in this research, however the percentage of participants was, respectively: Vernacular Letters (17.86%), Education (13.10%), Geosciences (24.39%) and Visual Arts (14.29%) of the teachers in these Departments.

When considering the profiles of the surveyed professors, most of them have Full Time of Exclusive Dedication (89.29%) contracts, indicating that they are involved in research and, from those, 82.14% have PhDs, most of them with 11 to 20 years of academic experience (33.93%) and at an age between 41 to 50 years (46.43%). It was expected that there would be a greater number of participants, since college professors are submerged in research and it was imagined that they understood the importance of participating in researches, as a condition for the production of knowledge. According to Almeida (2002), the production of knowledge demands effective teaching and learning, by means of autonomy and critical reflection about the subjects involved in this process, and the teacher must learn new ways of teaching, emphasizing, mainly, teaching its students to learn how to learn and, together with the school, to develop in students capabilities, attitudes and behaviors of greater autonomy regarding the regulation of their school behaviors. Given this, Santos (2008) points to the need of including the learning strategies in the teacher training curriculum, for a better teaching quality, as well as the educational system in general.

Regarding the greater participation of teachers from the Department of Geosciences, it may be related to the fact that the research was disclosed in meetings of the department, allowing all to be aware about it, thus choosing to participate or not. In this sense, it is possible to infer that this action collaborates for a greater participation of teachers, being a recommended action.

In general terms, it is possible to state that the objectives proposed by this

paper have elucidated how strategic are the undergraduate teachers of the researched Institution, highlighting the differences presented as a function of gender and department/area of knowledge to which the professor is linked.

In this sense, results demonstrate that women are more strategic than men; that professors of the department of Vernacular Letters use more strategies of Cognitive and Metacognitive Self-Regulation and Social Self-Regulation; and that, the ones from the department of History make more use of Internal and Contextual Self-Regulation strategies. Although it was oriented to participants that they should imagine themselves in the position of learners when answering the scale, it is relevant to point out that the teachers may have had difficulty in putting themselves in the place of the one who is learning. Learning, apparently, may have been related only with the student, as if the learning was not an integrating part of any human being, distancing the teacher from this relation.

According to Boruchovitch (2014), teachers must experience metacognition as an exercise, based on its sub-processes: checking, planning, selecting, inferring, questioning themselves, reflecting and interpreting. For that, it emphasizes the need of more systematic proposals, based on methods of constant activation, trying to create a space not only to learn how to learn, but, overall, to experience learning how to learn, and to teach this process.

Also, as pointed by Pianca (2016), in Education, the mediation by the awareness, carried out through the teacher's self-knowledge as a student, may help them and contribute to obtain the self-control of their processes and cognitive products, allowing them the self-reflection and planning of their teaching actions in order to, finally, learn how to teach metacognitively, mainly by means of gradually transferring the control of the learning procedures from the teacher to the student.

Thus, the participation in this research allowed teachers to perceive themselves as learning subjects, to reflect about their learning strategies, identifying how they learn, what are the most used strategies and when to use them, enabling metacognition, which comprises a set of skills related between themselves and leading to self-regulation.

Nowadays, education seeks to form self-regulated subjects and for this it is necessary the development of the learner, so that it knows the task and knows when, why and which strategy is the more effective one to learn. This will help with the initial help of the teacher and, overtime, the learner must appropriate this knowledge and perform the self-regulation with autonomy.

To this end, teachers also need to know how learning happens, which strategies may help the learning, identifying the vicissitudes of each task. It becomes essential that teachers know the theoretical framework of the Cognitive Psychology/Information Processing Theory, since this theory makes possible the understanding about how, when and why to use the learning strategies, verifying their efficacy, modifying them when needed. In other words, teachers must learn how to learn in order to achieve, by means of this learning, how to teach students not only the content, but also how to learn it, becoming subjects that use metacognition and being self-regulated.

For that, it is emphasized that teacher training courses include in their curriculum the contents of learning strategies, in order to enable the teacher to move from the model of knowledge transmission to the model of teaching how to learn, as addressed in this study.

References

ALLIPRANDINI, Paula Mariza Zedu; SCHIAVONI, Andreza; MÉLLO, Diene Eire de; SEKITANI, Juliane Tiemi**.** Estratégias de aprendizagem utilizadas por estudantes na educação a distância: implicações educacionais. **Psic. da Ed**., São Paulo, 38, 1º sem. de 2014, pp. 5-16.

ALMEIDA, L. S. Facilitar a aprendizagem: ajudar os alunos a aprender e a pensar. **Psicologia Escolar e Educacional**. Portugal, v. 6, n. 2, p. 155-165, 2002.

ATKINSON, Richard; SHIFFRIN, Richard. **The control processes of short memory**. California: Stenford University, 1971. (Technical Report, n. 173). Disponível em: <https://suppes-corpus.stanford.edu/techreports/IMSSS_173.pdf>. Acesso em: 1 dez. 2016.

ÁVILA, Luciana Toaldo Gentilini; FRISON, Lourdes Maria Bragagnolo; VEIGA SIMÃO, Ana Margarida. Estratégias de autorregulação de aprendizagem: contribuições para a formação de estudantes de Educação Física. **Revista Iberoamericana de Educación**, Madrid, v. 70, n. 1, p. 63-78, 2016. Disponível em: https://rieoei.org/RIE/article/view/7 Acesso em: 24 nov. 2016.

BARABÁSI, Tünde. Primary school teachers learning experiences in child-and adulthood and the pedagogical task of teaching to learn. **Acta Didactica Napocensia**, Cluj-Napoca, v. 6, n. 2, p. 49-60, 2013. Disponível em: <https://eric.ed.gov/?id=EJ1053638>. Acesso em: 20 dez. 2016.

BAETEN, Marlies; DOCHY, Filip; STRUYVEN, Katrien; PARMENTIER, Emmeline; VANDERBRUGGEN, Anne. Student-centred learning environments: an investigation into student teachers' instructional preferences and approaches to learning. **Learning Environments Research**, Netherlands, v. 19, n. 1, p. 43-62, Apr. 2016. Disponível em: <http://link.springer.com/article/10.1007/s10984-015-9190-5>. Acesso em: 27 nov. 2016.

BORTOLETTO, Denise. **Estratégias de aprendizagem e de regulação emocional de estudantes dos cursos de formação de professores**. 2011. 171 f. Dissertação (Mestrado em Educação) - Universidade Estadual de Campinas, Campinas, 2011.

BORTOLETTO, Denise; BORUCHOVITCH, Evely. Learning strategies and emotional regulation of pedagogy students. **Paidéia**, Ribeirão Preto, v. 23, n. 55, p. 235-242, 2013.

BORUCHOVITCH, Evely. Autorregulação da aprendizagem: contribuições da psicologia educacional para a formação de professores. **Psicologia Escolar e Educacional**, São Paulo, v. 18, n. 3, p. 401-409, 2014.

BORUCHOVITCH, Evely. Estratégias de aprendizagem e desempenho escolar: considerações para a prática educacional. **Psicologia: reflexão e crítica**, Porto Alegre, v. 12, n. 2, p. 361-376, 1999. Disponível em: <http://www.redalyc.org/articulo.ao?id=18812208>. Acesso em: 10 jul. 2015.

BORUCHOVITCH, Evely; SANTOS, Acácia Aparecida Angeli. Psychometric studies of the learning strategies scale for University Students. **Paidéia**, Ribeirão Preto, v. 25, n. 60, p. 19-27, 2015. Disponível em: <http://www.journals.usp.br/paideia/article/view/97058/96103>. Acesso em: 11 set. 2016.

CUNHA, Neide de Brito; BORUCHOVITCH, Evely. Percepção e conhecimento de futuros professores sobre seus processos de aprendizagem. **Pro-Posições**, Campinas, v. 27, n. 3,

p. 31-56, dez. 2016. Disponível em: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-73072016000300031&lng=en&nrm=iso>. Acesso em: 6 jan. 2017.

DAVIS, Claudia; NUNES, Marina M. R.; NUNES, Cesar A. A.. Metacognição e sucesso escolar: articulando teoria e prática. **Cad. Pesqui.**, São Paulo , v. 35, n. 125, p. 205-230, maio 2005 . Disponível em <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-15742005000200011&lng=pt&nrm=iso>. acessos em 09 ago. 2018. http://dx.doi.org/10.1590/S0100-15742005000200011.

DEMBO, Myron H.; SELI, Helena. **Motivation and learning strategies for college success**: a focus on self-regulated learning. 5. ed. New York: Routledge, 2016.

DEMBO, Myron. **Applying educational psychology**. 5. ed. New York: Longman, 1994.

EYSENCK, Michael W.; KEANE, Mark T**. Manual de psicologia cognitiva**. 5. ed. Porto Alegre: Artes Médicas, 2007.

FISHER, Robert. **Teaching children to think**. Oxford: Basil Backwell, 1990.

KORKMAZ, Ozgen; KAYA, Sinan. Adapting online self-regulated learning scale into turkish. **Turkish Online Journal of Distance Education-TOJDE**, Eskişehir, v. 13, n. 1, p. 1302-1308, Jan. 2012. Disponível em: <http://files.eric.ed.gov/fulltext/EJ976929.pdf>. Acesso em: 12 fev. 2017.

KRAWEC, Jennifer; MONTAGUE, Marjorie. The role of teacher training in cognitive strategy instruction to improve math problem solving. **Learning Disabilities Research & Practice**, Virgínia, n. 29, p. 126-134, 2014. Disponível em: <http://onlinelibrary.wiley.com/doi/10.1111/ldrp.12034/>. Acesso em: 20 nov. 2016.

LEMOS, Lucas Schumacher. **Estratégias de aprendizagem de estudantes de pedagogia**: relações com característica demográficas e autopercepção de desempenho. 2016. 73 f. Dissertação (Mestrado em Educação) - Universidade Estadual de Campinas, Campinas, 2016.

LOPES DA SILVA, Adelina; VEIGA SIMÃO, Ana Margarida; SÁ, Isabel. **Aprendizagem autorregulada**: Perspectivas psicológicas e educacionais. Porto: Porto Editora, 2004.

MARINI, Janete Aparecida da Silva; BORUCHOVITCH, Evely. Estratégias de aprendizagem de alunos brasileiros do Ensino Superior: considerações sobre adaptação, sucesso acadêmico e aprendizagem autorregulada. **Revista Eletrônica de Psicologia, Educação e Saúde**, [S. l.], v. 1, p. 102-126, 2014.

MONEREO, Carles Font (Coord); CASTELLÓ BADIA, Montserrat; CLARIANA I MUNTADA, Mercè; PALMA MUÑOZ, Montserrat; PÉREZ CABANÍ, M. Lluïsa. **Estrategias de enseñanza y aprendizaje**: formación del professorado y aplicación em la escuela. Barcelona: Grao, 2007.

OLIVEIRA, Hailton Barreiros de; MORO, Leandro Silva, SANTOS, Patricia Peixoto dos; SILVA, Wellington dos Reis. A Formação Pedagógica de professores na Pós-Graduação Stricto Sensu: Os casos UFU E UFMG. **Poiésis Pedagógica**, 9 vol. 2, 2012, p. 3–19. Disponível em: https://doi.org/https://doi.org/10.5216/rpp.v9i2.17299

PAVESI, Marilza Aparecida; ALLIPRANDINI, Paula Mariza Zedu. Autorregulação da aprendizagem de alunos cursos a distância em função do sexo. **Unopar Científica: ciências humanas e educação**, Londrina, v. 16, n. 2, p. 100-108, abr. 2015. Disponível em:

<http://www.pgsskroton.com.br/seer/index.php/ensino/article/viewFile/2893/2830>. Acesso em: 10 fev. 2017.

PAVESI, Marilza Aparecida. **Análise da aprendizagem autorregulada de alunos de cursos à distância em função das áreas de conhecimento, faixa etária e sexo**. 2014. Dissertação (Mestrado em Educação) - Universidade Estadual de Londrina, Londrina, 2014.

PIANCA, Humberto José Cardoso. **Estratégias de Aprendizagem utilizadas por professores da Educação Básica da Rede Pública de Ensino do Paraná.** 2016. 119 fls. Dissertação (Mestrado em Educação) – Universidade Estadual de Londrina, Londrina, 2016.

PINTRICH, Paul; GROOT, Elizabeth V. Motivational and self-regulated learning components of classroom academic performance. **Journal of Educational Psychology**, Arlington, v. 82, n. 1, p. 33-40, 1990. Disponível em: <http://rhartshorne.com/fall-2012/eme6507-rh/cdisturco/eme6507-eportfolio/documents/pintrich%20and%20degroodt%201990.pdf>. Acesso em: 24 dez. 2016.

SANTOS, Osmar José Ximenes. **O professor enquanto estudante**: suas estratégias de aprendizagem. 2008. 143 f. Dissertação (Mestrado em Educação) - Universidade Estadual de Campinas, Campinas, 2008.

SANTOS, Osmar José Ximenes; BORUCHOVITCH, Evely. Estratégias de aprendizagem e aprender a aprender: concepções e conhecimento de professores. **Psicologia: ciência e profissão**, Brasília, v. 31, n. 2, p. 284-295, 2011. Disponível em: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1414-98932011000200007&lng=en&nrm=iso>. Acesso em: 6 jun. 2015.

SCHULTZ, Duane P.; SCHULTZ, Sydney Ellen. **História da psicologia moderna**. 10. ed. São Paulo: Cengage Learning, 2015.

SCHUNK, Dale H.; ZIMMERMAN, Barry. J. **Self-regulation of learning and performance**: issues and educational applications. Hillsdale: Erlbaum, 1994.

STERNBERG, Robert J. **Psicologia cognitiva**. 5. ed. São Paulo: Cengage Learning, 2016.

VEIGA SIMÃO, Ana Margarida. **Aprendizagem estratégica**: uma proposta na autorregulação. Lisboa: Ministério da Educação, 2002.

WEINSTEIN, Claire Ellen; ACEE, Taylor W.; JUNG, JaeHak. Self-regulation and learning strategies. **New Directions for Teaching and Learning**, Medford, v. 2011, n. 126, p. 45-53, 2011.

WEINSTEIN, Clarice Ellen.; MAYER, Richard E. The teaching of learning strategies. **Inovation Abstracts**, Austin, v. 5, n. 32, Nov. 1983.

ZIMMERMAN, Barry J.; MARTINEZ-PONS, Manuel. Development of a structured interview for assessing student use of self-regulated learning strategies. **American Educational Research Journal**, Washington, n. 23, p. 614-618, Dec. 1986. Disponível em: <http://aer.sagepub.com/content/23/4/614>. Acesso em: 15 nov. 2015.

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