Article

Self-Regulated Learning in Students of Pedagogy[1]

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Abstract: Self-regulated learning is the process by which students plan, monitor and regulate their own learning. The aim of this study was to investigate relationships between motivation to learn, implicit theories of intelligence and self-handicapping strategies, and to examine the association of these variables in the prediction of the use of learning strategies in students of Pedagogy. The sample consisted of 107 Pedagogy students of two private universities of a city of São Paulo state. Data were collected using four Likert-type scales. Multivariate linear regression analyses revealed that participants with higher scores in the Learning Strategies Scale also presented significantly higher scores in intrinsic motivation and fewer reports of use of self-handicapping strategies. Higher scores in metacognitive strategies were significantly associated with both intrinsic an extrinsic motivation and with fewer reports of use of self-handicapping strategies. Results are discussed in terms of the contribution of Psychology to teacher education.

Keywords: self regulation, learning, pedagogy, metacognition, motivation

Autorregulação da Aprendizagem em Estudantes de Pedagogia

Resumo: A autorregulação da aprendizagem é o processo pelo qual os estudantes planejam, monitoram e regulam o próprio aprendizado. Este estudo teve por objetivo pesquisar relações entre a motivação para aprender, as teorias implícitas de inteligência e as estratégias autoprejudiciais em estudantes de Pedagogia e examinar a associação dessas variáveis no emprego das estratégias de aprendizagem. Participaram 107 estudantes de duas instituições de ensino superior privadas de São Paulo. Os dados foram coletados por meio de quatro escalas do tipo Likert. A análise de regressão linear multivariada revelou que os participantes com maiores escores na Escala de Estratégias de Aprendizagem tiveram maior pontuação na motivação intrínseca e relataram menor uso de estratégias autoprejudiciais. Maior escore nas estratégias de aprendizagem metacognitivas associou-se significativamente às variáveis motivação intrínseca, extrínseca e para aprender, e com menor uso de estratégias autoprejudiciais. Os resultados são discutidos em termos das contribuições da Psicologia à formação de professores.

Palavras-chave: autorregulação, aprendizagem, pedagogia, metacognição, motivação

La Autorregulación del Aprendizaje en Estudiantes de Pedagogía

Resumen: La autorregulación del aprendizaje es el proceso mediante el cual los estudiantes planifican, controlan y regulan su propio aprendizaje. El presente estudio tuvo como objetivo investigar relaciones entre la motivación para aprender, las teorías implícitas de la inteligencia y las estrategias autoperjudiciales en estudiantes de Pedagogía y examinar la asociación de esas variables en el uso de estrategias de aprendizaje. Participaron 107 estudiantes de instituciones privadas de enseñanza superior de São Paulo. El análisis de regresión lineal multivariado reveló que los participantes con las puntuaciones más altas en la Escala de Estrategias de Aprendizaje puntuaron más alto en la motivación intrínseca y reportaron menor uso de estrategias autoperjudiciales. Las puntuaciones más altas en las estrategias metacognitivas fueron asociadas significativamente con las variables intrínsecas, extrínsecas y motivación para aprender, y menor uso de estrategias autoperjudiciales. Se discuten los resultados en términos de los aportes de la psicología a la formación del profesorado.

Palabras clave: regulacion, aprendizaje, pedagogia, metacognición, motivación

Self-regulated learning is the process by which students plan, monitor and regulate their own learning. It refers to thoughts, feelings and actions that are planned and adjusted to improve motivation and learning (Zimmerman, 2008). It involves three main phases: planning, performance, and self-evaluation. Planning encompasses the processes, the prior knowledge and the initial beliefs that influence the learning of the subject, as well as the moment in which the student sets the goals and outlines the strategic plan to achieve them. Performance is related to what occurs during the learning. It involves the processes that stimulate the execution of the task, with emphasis on attention and self-monitoring. These processes help the student to better focus on the activities and improve their achievement. Finally, self-evaluation is linked to actions that occur after the completion of the task, giving the student the opportunity to review the directions taken and choices made.

Cognitive and metacognitive theories of learning show that self-regulation indeed influences the actions of the

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learner. Therefore, any act of regulation depends on his/her active attitude (Pintrich, 2000; Schunk & Zimmerman, 2012; Van Nuland, Taris, Boekaerts, & Martens, 2012). Self-regulated students have a systematic view of their learning and control their cognitive processes, through planning, setting goals, monitoring and evaluating their own understanding at various points throughout the study process (Boruchovitch, 2007; Weinstein, Acee, & Jung, 2011). Evidence suggests that several factors are associated with self-regulated learning, some of which have been the focus of investigation. Most recently, researchers have emphasized studies involving the variables: learning strategies (Bortoletto & Boruchovitch, 2013; Clayton, Blumberg, & Auld, 2010; Cunha & Boruchovitch, 2012; Donaciano & Almeida, 2011; Karabenick & Dembo, 2011), motivation to learn (Azevedo et al., 2012; Berger & Karabenick, 2011; Boruchovitch, 2008a; Brophy, 2010; Bzuneck, 2005), implicit theories of intelligence (Boruchovitch, 2001; Dweck, 2006; King, 2012) and self-handicapping strategies (Ganda & Boruchovitch, in press; Rhodewalt, 2008), among others.

Learning strategies, according to Nisbett and Shucksmith (1987), are conscious processes that can be used by students to achieve the learning objectives. They are sequences of procedures adopted to support the three basic stages of information processing: the acquisition, storage, and use of the information. Specialists of the area divide and organize the learning strategies in different ways, with the distinction between cognitive and metacognitive strategies being more recurrent in the literature. Dembo (1994) Karabenick and Dembo (2011) and Weinstein et al. (2011) state that the cognitive strategies operate directly on the material to be learned, helping the student to better process the information. The metacognitive strategies are procedures that the learner uses to plan, monitor and regulate their own thoughts and actions.

According to Zimmerman (1989, 2008), motivation is an essential variable of self-regulated learning. Students will only employ learning strategies, if they are motivated to do so. Brophy (2010) states that motivation is a theoretical construct that arises from the interaction between many factors, such as success, values, gratification, interests, and self-esteem, among others. These aspects explain, according to the theory, the initiation, direction, intensity, and persistence of behavior oriented toward a goal.

Among the various socio-cognitive theories of motivation, the Self Determination Theory (SDT), proposed by the Americans Deci and Ryan, has gained relevance, having been described as a macro-theory of human motivation. The theory presents a motivational continuum that is valuable for understanding what happens in the educational settings. The continuum begins in the lack of motivation, passes through different forms of extrinsic motivation, and culminates with the intrinsic motivation at its end. According to Deci and Ryan (2008, 2012) and Ryan and Deci (2009) intrinsically motivated students become involved and remain in the task

for their own pleasure, the challenge, the curiosity, and the interest that the activity awakens in them, while extrinsically motivated students fulfill the tasks to obtain external rewards and/or to demonstrate their competences and capacities to other people. Similar results have been reported in the literature (Azevedo et al., 2012; Boruchovitch, 2008a; Reeve, Ryan, Deci, & Jang, 2007).

Although there is a consensus among researchers that motivated students are more involved in their learning process, it is common to find students who make frequent use of dysfunctional strategies that are detrimental to learning. To procrastinate, abuse alcohol and drugs, become involved in tasks that are not really needed, and do work at the last minute, are some examples of behaviors that reveal the involvement of the student in other activities in the days just before of an important examination or the deadline for an important task. (Ganda & Boruchovitch, in press; McCrea & Flamm, 2012; McCrea, Myers, & Hirt, 2009). Underlying these behaviors is a belief in the subject's own inability. By unconsciously believing he/she can fail, the student employs strategies which can undermine the achievement of their academic goals (Gadbois & Sturgeon, 2011; McCrea & Flamm, 2012; Pattal, Awad, & Cestone, 2014). Thus, they increase the chances of failing, however, these self-handicapping behaviors function as excuses that protect their self-image, with the failure being attributed to external causes over which they have no control or through which they attempt to deny responsibility (Jones & Berglas, 1978). According to Rhodewalt (2008), those who employ self-handicapping strategies probably have a set of socialization experiences that contribute to the construction of a belief that competence or intelligence is fixed, and can not be improved. Such beliefs are best explained by Implicit Theories of Intelligence framework, also highly associated with self-regulated learning (Dweck, 1999; Yeager, Miu, Powers, & Dweck, 2013).

For Blackwell, Trzesniewski and Dweck (2007) and Dweck (1999) Implicit Theories of Intelligence are different beliefs and concepts about the nature of the intellectual ability, around which achievement goals and patterns of behavior, cognition and affect are organized. According to this perspective, people tend to have two opposing concepts of intelligence: a theory of intelligence as a fixed and stable trait, independent of the effort, and a theory of dynamic, incremental and flexible intelligence, which can be modified, augmented and controlled by personal effort and by mediated intervention (King, 2012; Rattan, Savani, Naidu, & Dweck, 2012).

The relevance of constructs such as learning strategies, the motivation to learn, the implicit theories of intelligence, and the self-handicapping strategies for the comprehension of self-regulated learning in educational settings is undeniable. To investigate the variables associated with the self-regulated learning of potential future teachers is a promising way to improve the quality of teaching (Schunk & Zimmerman, 2012; Van Nuland et al., 2012). Accordingly,

the present study aimed to investigate relationships between learning strategies, the motivation to learn, implicit theories of intelligence, and self-handicapping strategies in Pedagogy students. Furthermore, as the use of learning strategies is a key variable of self-regulated learning (Karabenick & Dembo, 2011; Weinstein et al., 2011), the study also sought to examine the association of the variables of interest (motivation to learn, implicit theories of intelligence, and self-handicapping strategies) in predicting the use of these strategies by the students.

Method

Participants

The sample consisted of 107 Pedagogy students of two higher education institutions in a city of the state of São Paulo, aged between 18 and 46 years, the majority of whom were women (99.1%). Regarding marital status, 69.2% (*n* = 74) were single. In relation to the academic semester, 30.8% (*n* = 33) were in the second semester, 37.4% (*n* = 40) in the fourth semester, and 31.8% (*n* = 34) in the sixth semester. Of all the participants 19.6% (*n* = 21) reported not working.

Pedagogy students were chosen to be investigated in the present study due to the belief that understanding the variables associated with the learning process of students who may become teachers can be a promising first step to improve the quality of Brazilian education.

Instruments

Learning Strategies Assessment Scale for University Students - EEA-U (Santos & Boruchovitch, 2008). The scale consists of 49 closed items, in the form of a four-point Likert scale and is organized in three subscales: Cognitive Learning Strategies, Metacognitive Learning Strategies and Dysfunctional Metacognitive Learning Strategies. Cognitive learning strategies are measured by 19 items. An example of an item of the subscale is: "Do you analyze the graphs and tables that you find in the texts?". Metacognitive learning strategies form another subscale, consisting of 23 items. The following item exemplifies this subscale: "Do you realize when you do not understand what you are reading?". There are also 9 items measuring the absence of dysfunctional metacognitive learning strategies. "Do you study or work while watching television?" may be mentioned as an example of an item from the last subscale.

The score of the EEA-U is calculated as follows: in the items that measure positive cognitive and metacognitive learning strategies, 4 points are attributed to the response option *always*, 3 to *rarely*, 2 to *sometimes*, and 1 point to *never*. These values are reversed in the items that correspond to negative or dysfunctional metacognitive strategies. The score ranges between 49 and 196, so that the higher the scores achieved, the more strategic the student is. As described by Bortoletto and Boruchovitch

(2013) and Cunha and Boruchovitch (2012), analyses of the psychometric properties of the scale performed with 1,490 university students revealed high internal consistency, estimated through the Cronbach's alpha (α = .85), Guttman Split-half (α = .74) and Spearman Brown (α = .74) coefficients. For the sample of the present study, the Cronbach's alpha was .83.

Motivation to Learn Assessment Scale for University Students (Boruchovitch & Neves, 2005; 2008b). This scale consists of 32 items in the form of a Likert scale, with 16 odd numbered questions that assess intrinsic motivation and 16 even numbered questions that measure the extrinsic motivation. An example of the intrinsic content is "I try to learn more about the subjects that I like without my teachers even asking" and of the extrinsic, "I only study the academic content that will be in the test". In the questions related to intrinsic motivation, the options are worth 4 points for the response alternative *agree totally*, 3 points for *agree partially*, 2 points for *disagree partially* and 1 point for *disagree totally*. This score has its value inverted for the items related to extrinsic motivation. The score ranges from 32 to 128; so that the higher the total score, the greater the intrinsic motivational orientation. In the validation studies, the scale revealed a two-factor structure, however, with a moderate and significant correlation between them (*r* = .47; *p* = .00). The variance explained was 29.55%. The Cronbach's alpha of the total scale was .86, .82 for Factor 1 - Intrinsic Motivation, and .77 for Factor 2 - Extrinsic Motivation (Boruchovitch, 2008). Identical alpha values were found for the sample of the present study.

Self-handicapping Strategies Scale (Boruchovitch & Ganda, 2009). This scale is in a Likert-type format, consisting of 22 items related to the use of self-handicapping strategies in academic situations. The following items can be mentioned as examples: "Some students do not study for an important test and, before performing it, they feel 'discomfort' such as dizziness, cold sweat, diarrhea and nausea. If they do not get a good score, they say they were not physically well" and "Some students intentionally engage in many activities. If they do not do well in university, they say they were too busy with other things". The response options are divided into four possibilities, ranging from 1 (*has nothing to do with me*) to 4 (*describes me really well*). The minimum score of the scale is 22 points and the maximum 88 points. The higher the score, the more frequent the use of self-handicapping strategies by students in the academic context. None of the items have a reversed score; the Cronbach's alpha of the scale, for this sample was .85. This result is identical to that found by Ganda and Boruchovitch (in press) in a study conducted with 164 Pedagogy students of Brazilian public universities.

Implicit Theories of Intelligence Scale - EATII (Dweck, 2006). After permission from the author, the Implicit Theories of Intelligence Scale was translated into Portuguese for use in this study, through a translation and back translation procedure, performed by two

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professionals with fluency in English. One performed the translation into Portuguese and the other translated this version of the instrument back into English. The translated instrument was pre-tested in a pilot study with 18 in service teachers. After responding to the scale, the teachers were asked about the intelligibility of each item. There was no need for revision of the items. The instrument consists of 8 Likert-type items – four relating to the fixed concept, and four to the incremental concept – with response options ranging from 1 (*agree strongly*) to 5 (*disagree strongly*) which evaluate the students' concept of intelligence. An example of an item of the fixed intelligence concept is: "You have a certain amount of intelligence and you can't really do much to change it"; and an example to illustrate the incremental concept is: "No matter who you are, you can change your level of intelligence". The total score can range from 8 to 35 points, with the highest score corresponding to the concept of incremental intelligence. In this sample, after excluding Item 7, "No matter how much intelligence you have, you can always modify it a little", the Cronbach's alpha rose from .68 to .77. Similar results were obtained in a study with the original version of the instrument, conducted by Blackwell et al. (2007), in which the Cronbach's alpha was .78, and .77 in the retest with 52 participants two weeks after the first application.

Procedure

Data collection. Data were collected in two sessions with an interval of 20 days between the first and second collection. In the first session, the Learning Strategies Assessment Scale and the Motivation to Learn Assessment Scale for University Students were applied. In the second, the Self-handicapping Strategies Scale and the Implicit Theories of Intelligence Scale were applied.

Data analysis. The Spearman correlation coefficient was used for the analysis of the interrelationships between the variables of interest, due to the non-normal distribution of the variables in the sample detected by the Shapiro-Wilk test. The classification proposed by Dancey and Reidy (2006) was used to examine and interpret the magnitude of the correlations, as follows: weak ($r \leq .390$),

moderate ($r \geq .400 \leq .700$), and strong ($r \geq .701$). Linear regression analysis, with univariate and multivariate models, and Stepwise variable selection criterion, was used to evaluate the association of demographic variables and the EMA-U, EATII and self-handicapping strategies scale scores with the learning strategies scores. The significance level adopted for the statistical tests was 5%, i.e., $p < .05$. The linear regression analysis for the scores of the learning strategies scale and its the subscales included the following variables: age, age group by group, marital status, university and academic semester, professional practice, and use of self-handicapping strategies. Significant data were, in turn, subjected to multivariate analysis.

Ethical Considerations

The research project was submitted to the Human Research Ethics Committee of the Universidade Estadual de Campinas and it was approved under Process No. 690/2009. The study included only the students who agreed and signed the informed consent form.

Results

The results presented in Table 1 indicate that the higher the student's score in the learning strategies scale, the greater his/her scores in the intrinsic motivation subscale and in the total motivation to learn scale. A moderate, negative correlation between learning strategies and self-handicapping strategies was also observed (*rho* = -.461; $p < .05$; $N = 107$).

The correlation between intrinsic motivation and the reported use of self-handicapping strategies (Table 2) was moderate, negative and significant (*rho* = -.488; $p < .05$; $N = 107$). A similar result occurred with the total motivation to learn scale (*rho* = -.572; $p < .05$; $N = 107$), indicating that the higher the score in the intrinsic motivation subscale and in the total motivation to learn scale, the lower the reported use of self-handicapping strategies. A weak, though positive and significant correlation was also found between the motivation to learn scale scores (total) and the concept of incremental intelligence (*rho* = .284; $p < .05$; $N = 107$).

Table 1
Correlations Between the Learning Strategies Scale and the Other Scales in Pedagogy Students (N = 107)

	Intrinsic Motivation		Extrinsic Motivation		Motivation to Learn		Implicit Theories of Intelligence		Self-Handicapping Strategies	
	rho	*p*	*rho*	*p*	*rho*	*p*	*rho*	*p*	*rho*	*p*
E. A. C.[a]	.412	.0001	-.109	.2621	.294	.0023	.029	.7660	-.0335	.0004
E. A. M.[b]	.447	.0001	-.282	.0032	.416	.0001	.054	.5777	-.431	.0001
E. A. M. D.[c]	.392	.0001	-.284	.0001	.391	.0001	-.478	.6245	-.416	.0001
E. E. A.[d]	.511	.0001	-.254	.008	.434	.0001	.027	.7862	-.461	.0001

Note. rho = Spearman's correlation coefficient; [a]Cognitive learning strategies subscale; [b]Metacognitive learning strategies subscale; [c]Dysfunctional metacognitive learning strategies subscale; [d]Learning strategies scale.
$p < .05$.

Table 2
Correlation Between the Motivation Scale and the Implicit Theories of Intelligence and Self-handicapping Strategies Scales in Pedagogy Students (N = 107)

	Implicit Theories of Intelligence Scale		Self-Handicapping Strategies Scale	
	rho	*p*	*rho*	*p*
Intrinsic Motivation	.220	.0227	-.488	< .0001
Extrinsic Motivation	-.279	.0036	.477	< .0001
Total Motivation	.280	.0030	-.572	< .0001

Note. rho = Spearman's correlation coefficient.
$p < .05$.

As presented in Table 3, results from the multivariate analysis regarding the cognitive learning strategies subscale indicate that the variables: intrinsic and extrinsic motivation, motivation to learn, and the use of self-handicapping strategies were statistically significant ($p < .05$). Furthermore, intrinsic motivation was selected as a factor significantly related to the cognitive learning strategies scores. Participants with higher scores in cognitive learning strategies also presented higher scores in intrinsic motivation.

Univariate linear regression for the use of metacognitive learning strategies revealed statistical significance ($p < .05$) with the variables: motivation to learn, intrinsic and extrinsic motivation, and the use of self-handicapping strategies. Multivariate analysis showed that the participants with higher scores in the use of metacognitive learning strategies also reported greater intrinsic motivation and less use of self-handicapping strategies. Table 3 also shows that, in the multivariate analysis, the motivation to learn (EMA-U), self-handicapping strategies, and age variables were factors significantly related to the absence of dysfunctional metacognitive learning strategies scores, indicating that these variables can be predictors of the low adoption of dysfunctional metacognitive strategies.

Univariate linear regression to study the relationship between the variables of interest and the overall learning strategies score provided a statistically significant result ($p < .05$), for the institution and academic semester, and for the intrinsic motivation to learn and self-handicapping strategies. These data, when subjected to multivariate analysis (Table 3) indicated that the variables: intrinsic motivation, self-handicapping strategies and the semester stood out as statistically significant factors for the use of learning strategies. It appears that the participants with higher scores in the reported use of learning strategies also presented greater intrinsic motivation and less use of self-handicapping strategies ($\beta = -.63$). It is interesting to note that the students of the second semester reported greater use of total learning strategies than those of the sixth semester.

Although not statistically significant, results revealed a weak, negative correlation between the Implicit Theories of Intelligence Scale and the Self-handicapping Strategies Scale ($r = -.152$; $p < .05$; $N = 107$).

In summary, the results showed learning strategies positively and significantly correlated with intrinsic motivation and with the motivation to learn, and moderately, negatively and significantly correlated with self-handicapping strategies. There was also a moderate, negative and significant correlation between intrinsic motivation and the reported use of self-handicapping strategies. In the multivariate linear analysis, intrinsic motivation was shown to be related to learning strategies. Furthermore, students who reported expressive use of learning strategies scored higher in intrinsic motivation and reported less use of self-handicapping strategies.

Discussion

This study sought to investigate possible relationships between the variables associated with self-regulated learning. More specifically, the intention was to analyze

Table 3
Multivariate Linear Regression Analysis for the Scores of the Learning Strategies Subscales and Total Scale in Pedagogy Students (N = 107)

Analyzed Variable	Selected Variable	Category	B*	*p*	R^2
Cognitive Learning Strategies	Intrinsic Motivation	Continuous Variable	0.43	< .001	.1299
Metacognitive Learning Strategies	Intrinsic Motivation	Continuous Variable	0.39	.003	.1596
	Self-Handicapping Strategies	Continuous Variable	-0.30	.003	.0685
Dysfunctional Metacognitive Learning Strategies	EMA-U	Continuous Variable	0.07	.042	.1439
	Age	Continuous Variable	0.12	.019	.0451
	Self-Handicapping Strategies	Continuous Variable	-0.10	.027	.0377
Total Learning Strategies Scale	Intrinsic Motivation	Continuous Variable (Score)	0.78	.002	.2023
	Self-Handicapping Strategies	Continuous Variable (Score)	-0.63	.001	.641
	Semester	2nd Semester (ref.)	-	-	-
		4th Semester	-2.71	.429	-
		6th Semester	-7.44	.038	.0312

Note. B* = beta value of the estimate or slope in the regression line; R^2: coefficient of determination.
$p < .001$.

both the relationship between the learning strategies and the variables: motivation to learn, self-handicapping strategies, and implicit theories of intelligence, as well as the associations of these variables in predicting the use of learning strategies in Pedagogy students.

In this investigation, intrinsic motivation had a statistically significant association with the use of cognitive and metacognitive learning strategies. Similar results were found in the national literature by Boruchovitch (2008a) and also by Boruchovitch and Cunha (2012), in studies carried out with students of Pedagogy and Mathematics, as well as in the international literature with university students (Berger & Karabenick, 2011; Clayton et al., 2010; Karabenick & Dembo, 2011). The data obtained are positive, since intrinsic motivation has advantages over extrinsic motivation in the regulation of behavior. The main advantage is that, under the influence of intrinsic motivation, the engagement and proactive attitude of the student does not depend on the presence of another person, for example, the teacher, as there is satisfaction in performing the activity itself (Bzuneck, 2005; Zimmerman, 2012). Furthermore, the literature shows that the student may even know or have a vast repertoire of learning strategies, however, the effective use of these strategies requires the student to be intrinsically motivated to do so (Deci & Ryan, 2012; Zimmerman, 1989).

Another important finding of this study was that the reported use of self-handicapping strategies correlated moderately and negatively with intrinsic motivation and the motivation to learn, revealing a theoretically and empirically expected tendency in which the greater the motivation and the intrinsic motivation the less likely students will be to engage in behaviors and actions that may impair their learning (McCrea et al., 2009; Pattal et al., 2014). Pedagogy students who reported greater use of learning strategies reported less use of self-handicapping strategies. This data reinforces that both learning strategies and intrinsic motivation may, in fact, be valuable resources for academic self-regulation, as shown in the literature (Boruchovitch, 2008a; Dembo, 1994; Zimmerman, 2008).

Regarding the implicit theories of intelligence, evidence suggests that students with an incremental view of intelligence, who believe they can increase it through effort, tend to remain more motivated, become more involved in their learning, and invest more effort in academic tasks (Bzuneck, 2005; Deci & Ryan, 2008, 2012; Dweck, 1999; Ryan & Deci, 2009). Data from the present study were consistent with the literature, since the motivation to learn was positively, although weakly, associated with the incremental concept of intelligence, among the participants. It is also worth mentioning that the Implicit Theories of Intelligence Scale was translated, adapted and used for the first time in this study. Investigations regarding this variable are scarce in Brazil, which makes deeper comparisons difficult. Therefore, as implicit theories of intelligence

are of paramount importance for a better understanding of self-regulated learning (King, 2012; Rattan et al., 2012; Yeager et al., 2013), it is recommended that future national studies address this variable, and refine the instrument translated and used for the first time in the present study.

With regard to the academic semester, students in the second semester reported using more learning strategies than those of the sixth semester, revealing, in general, a decline in the use of learning strategies over the duration of the course. Similar results were found in the study of Bortoletto and Boruchovitch (2013), in which students of the first year of a teacher education course obtained a higher mean for the reported use of learning strategies, when compared to the students of the subsequent years.

On one hand, there exists the hypothesis that it is possible that early in the course, the academic novelty and the lack of knowledge about the curricular disciplines and the methodologies of the teachers lead students to a greater use of learning strategies, with a decrease when they feel more acquainted and secure in relation to the university. On the other, it is also possible that the increased use of learning strategies by freshmen is mediated by motivational factors, throughout the course, as a decline in motivation with advancing age and education was found in the study of Cunha and Boruchovitch (2012). The entrance and involvement of the students with the labor market, during the university, may be other factors that contribute to a lower commitment and engagement in academic activities, deserving the attention of future investigations.

It appears, therefore, that the results of the present study are promising, especially considering that the sample was composed of students of a Pedagogy course. The variables that were positively correlated in this study are those that, according to the literature, definitely impact on the grades of students, on academic performance, on the quality and depth of learning, and on the educational process in general. However, as this study was based solely on self-report measures, it is necessary that studies of this nature be complemented by others that do not only involve observations of behavior, but also relate the studied variables to objective and actual measures of academic performance.

It is also suggested that this study be replicated with other groups and other major courses, as well as that the number of variables associated with self-regulated learning be increased and jointly investigated. Academic anxiety, emotional regulation strategies, learning styles, self-efficacy, and causal attributions, among others, are variables that would add new insights to the existing research. In fact, research with some variables of the present study can be found in the national literature, however, in isolation, rather than associated. Furthermore, it is also important to highlight the need for research oriented toward intervention, aiming to prevent the use of self-handicapping strategies and to promote the use of learning strategies in Brazilian students of the Pedagogy course and courses of other majors.

Final Considerations

There is agreement among the cognitive psychology researchers that teachers, in general, are unable to exercise their role with competence and quality without adequate training, as well as that there is a need for investing efforts in the teaching of self-regulated learning at all education levels, including in the university (Van Nuland et al., 2012; Zimmerman, 2008).

Identifying the characteristics of self-regulated learning among Pedagogy students can be diagnostic and useful information for developing pedagogical training projects for this course, which should be directed toward strengthening the ability of these students to learn how to learn. Additionally, the acquisition of knowledge in teacher education courses cannot be merely content oriented in nature, as for future teachers to master the content being taught is not enough. They must also develop a wide range of knowledge, competences and skills that are influenced by personal beliefs, motivation, and the ability to regulate themselves in order to perform well the tasks required in their teaching practice (Schunk & Zimmerman, 2012; Van Nuland et al., 2012).

It is hoped that this study may have contributed to the expansion of knowledge about the variables associated with self-regulated learning in students of the Pedagogy course. It is believed that the data provided here are valuable, as the studies that exist in the teacher education literature, in Psychology, as well as in other areas, in Brazil have placed more emphasis on continuing and/or in-service training. There are few studies that have focused on the initial education or on the course of Pedagogy which, in this country, is the program responsible for the formation of teachers for Kindergarten Education and for the initial five years of Elementary Education.

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