

Learning strategies and academic self-efficacy in university students: a correlational study

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Abstract

The purpose of this research was to evaluate the use of learning strategies and self - efficacy beliefs among university students, to explore differences in relation to course and age, as well as to establish the relation between constructs. The instruments used were the Learning Strategies Scale for University Students (EEA-U) and the Self-efficacy Scale in Higher Education (AEFS). The participants were 109 students from Psychology, Production Engineering, Physical Education and Veterinary Medicine from a private university in the south of Minas Gerais, both sexes, with a mean age of 20 years and 6 months (SD = 3.76). The results showed a moderate correlation ($\rho = 0.59$, $p < 0.001$) between the scales of learning strategies and academic self-efficacy. According to the hypothesis, students who reported greater use of learning strategies are those that showed greater self-efficacy in the accomplishment of academic tasks pertinent to higher education.

Keywords: Self-regulation; higher education, academic performance.

Estratégias de aprendizagem e autoeficácia acadêmica em universitários ingressantes: estudo correlacional

Resumo

Esta pesquisa teve como objetivo avaliar o uso das estratégias de aprendizagem e as crenças de autoeficácia em universitários ingressantes, explorar diferenças em relação ao curso e à faixa etária, além de estabelecer a relação entre os construtos. Os instrumentos utilizados foram a Escala de Estratégias de Aprendizagem para Estudantes Universitários (EEA-U) e a Escala de Autoeficácia na Formação Superior (AEFS). Os participantes foram 109 estudantes dos cursos de Psicologia, Engenharia de Produção, Educação Física e Medicina Veterinária de uma universidade particular do sul de Minas Gerais, ambos os sexos, com idade média de 20 anos e 6 meses ($DP=3,76$). Os resultados revelaram a existência de correlação moderada ($\rho=0,59$; $p<0,001$) entre os escores das escalas de estratégias de aprendizagem e da autoeficácia acadêmica. Conforme a hipótese, alunos que relataram maior uso de estratégias de aprendizagem, são os que revelaram maior autoeficácia na realização de tarefas acadêmicas pertinentes ao ensino superior.

Palavras-chave: Autorregulação; ensino superior; desempenho acadêmico

Estrategias de aprendizaje y autoeficacia académica en universitarios ingresantes: estudio correlacional

Resumen

En esta investigación se tuvo como objetivo evaluar el uso de las estrategias de aprendizaje y las creencias de autoeficacia en universitarios ingresantes, explorar diferencias en relación al curso y a la faja de edad, además de establecer la relación entre los constructos. Los instrumentos utilizados fueron la Escala de Estrategias de Aprendizaje para Estudiantes Universitarios (EEA-U) y la Escala de Autoeficacia en la Formación Universitaria (AEFS). Los participantes fueron 109 estudiantes de los cursos de Psicología, Ingeniería de Producción, Educación Física y Medicina Veterinaria de una universidad privada del sur de Minas Gerais, ambos sexos, con un promedio de edad de 20 años y 6 meses ($DP=3,76$). Los resultados apuntaron la existencia de correlación moderada ($\rho=0,59$; $p<0,001$) entre los escores de las escalas de estrategias de aprendizaje y de la autoeficacia académica. Conforme la hipótesis, alumnos que relataron mayor uso de estrategias de aprendizaje, son los que revelaron mayor autoeficacia en la realización de tareas académicas pertinentes a la enseñanza universitaria.

Palabras clave: Autorregulación; enseñanza superior; rendimiento académico

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Introduction

In recent decades, scholars in the area of Educational Psychology have questioned the claim that academic performance is related only to students' cognitive abilities, warning that several factors may be related to difficulties experienced in higher education (Almeida & Soares, 2003; Dias, Franco, Almeida, & Joly, 2011; Schleich, Polydoro & Santos, 2006). In addition to the previous academic *background*, which often reveals the lack of previous knowledge, aspects related to self-regulation of learning, ignorance and inappropriate selection of strategies for learning and low academic self-efficacy have been considered relevant, which is why they were investigated in the present study. Knowing the variables involved in the process of adaptation of the student that impact on their academic performance could provide elements that can minimize the impacts of the new challenges, reduce failure rates and prevent evasion (Gomes & Soares, 2013).

It is important to emphasize that the use of learning strategies depends on their ability to self-regulate, considered as a proactive activity in which students learn with the implementation of strategies, discarding eventual passive posture before the learning process (Zimmerman & Labuhn, 2012). Self-regulated students plan, monitor their understanding, evaluate themselves in their study process, take responsibility for their achievements, they are aware of their abilities and limitations, and use diverse and appropriate learning strategies for each situation (Joly, Dias, Almeida, & Franco, 2012). Thus, the use of learning strategies is part of the process of self-regulation and are procedures used to facilitate the acquisition, storage and use of information, aiding in academic performance (Almeida & Soares, 2003; Bortoletto & Boruchovitch, 1996; Taveira et al., 2000).

The other construct addressed, and related to academic achievement, refers to the beliefs of self-efficacy. According to Bandura (1993), academic self-efficacy concerns the student's belief in his or her ability to organize and execute actions pertaining to academic activities and requirements. The students, who presents high self-efficacy, are more cognitively engaged, persistent in the face of academic challenges, and are readily available for study activities. High rates of academic self-efficacy has been related to the ability to learn to learn, since students who perceive themselves to be self-efficacious learn to persist in more challenging tasks and self-regulate the learning process itself. In this way, the students select and use different learning strategies, seeking the most appropriate ones to deal with different types of tasks, presenting better academic performance (Bandura, 1997; Guerreiro-Casanova & Polydoro, 2011; Zimmerman & Martinez-Ponz, 1986).

In summary, the strategies of learning and academic self-efficacy constructs have related to one another. Whereas a high level of self-efficacy may be a predictor of academic achievement, students who self-regulate their learning and use different strategies are more likely to achieve better results. Consequently, he or she will perceive himself or her-

self more effective in the face of academic tasks (Schunk & Ertmer, 2000; Zimmerman & Cleary, 2006).

In order to identify the level of self-efficacy and self-regulatory strategies, it is imperative that the evaluation of these constructs performed. By using appropriate measuring instruments, valuable information has obtained that will serve not only the student himself, but also the teachers and the coordination of the courses. Considering the aspects pointed out, the present study will verify beyond the relationship between the constructs, the possible differences in the frequency of the use of the learning strategies in relation to the course and the age range of the students.

Method

Participants

The study participants were 109 students from the 1st period of the Psychology, Production Engineering, and Physical Education and Veterinary Medicine courses of a private university in the south of Minas Gerais. Of the total number of students, 58 (53.2%) were males and 51 (46.8%) were female. The majority of the participants were younger students, since 80 (73.4%) were aged up to 21 years, 15 (13.8%) were between 22 and 25 years old and 14 (12.6%) were 26 years old or more.

Scale of Learning Strategies for University Students - EEA - U (Boruchovitch & Santos, 2015).

The scale is composed of 35 items, organized in the form of a Likert type scale, referring to the way students usually study or prepare themselves for evaluation. The questions have four options of answer, namely always (3 points), sometimes (2 points), rarely (1 point) and never (0 points). It was applied in a sample of 1490 university students, presenting high internal consistency with Cronbach's alpha ($\alpha = 0.87$). The factor analysis showed the existence of three factors. Factor 1, named Cognitive and Metacognitive Self-Regulation, is composed of 23 items and evaluates a set of cognitive and metacognitive strategies, examples of items in this factor being "*repeating information orally as you read the text*" and "*summarizing the texts indicated for the study*". Factor 2, entitled Self-Regulation of Internal and Contextual Resources, refers to the set of strategies focused on the control and management of internal states and contextual variables that interfere in the self-regulation of learning. Statements such as "*controlling your anxiety in assessment situations*" and "*managing your study time*" are examples of items in this factor.

Finally, Factor 3, named Social Self-Regulation, related to the strategies aimed to the ways of learning that involve interaction with the other. The examples of items that evaluate this factor are "*ask for help to colleagues in case of doubts*" and "*study in group*". Consistency of subscales verified by Cronbach's alpha. In Factor 1, $\alpha = 0.86$, in Factor 2, $\alpha = 0.71$ and in Factor 3 $\alpha = 0.65$. Besides the three factors,

it is possible to verify the frequency of the use of the learning strategies as a whole by the sum of the score in all the 35 items of the scale.

Self-efficacy Scale in Higher Education - AEFS (Polydoro&Guerreiro-Casanova, 2010)

A self-report instrument aims to identify the students' self-efficacy in organizing the required activities for the academic tasks characteristic of higher education. Composed of 34 items, in a Likert scale format from one (not very capable) to 10 (very capable), distributed in five dimensions. The dimension 1, called Academic Self-Efficacy, evaluates the students' perception of their ability to learn, demonstrate and apply the course content, explaining 37.87% of the variance, with alpha 0.88. Example item: *"How much am I able to learn the contents that are necessary to my training?"* The dimension 2, which named Self-efficacy in Training Regulation, reflects the perception in confidence of the ability to set goals, make choices, plan and self-regulate actions in the process of training and career development and explains 6.15% of the variance, with alpha 0, 87. Example item: *"How much am I able to plan actions to achieve my professional goals?"*

The dimension 3 has called Self-efficacy in Social Interaction, evaluates students' perception of their ability to relate to their colleagues and teachers for academic and social purposes, explaining 4.85% of the variance, with alpha 0.80. Example item: *"How much can I express my opinion when another roommate disagrees with me?"* Self-efficacy in Proactive Actions is the dimension 4 and it has intended to identify perceived confidence in the ability to take advantage of training opportunities, update knowledge and promote institutional improvements, and it explains 4.26% of the variance, with alpha 0.85. Example item: *"How much am I able to claim extracurricular activities relevant to my training?"*

Self-efficacy in Academic Management is the fifth dimension and aims to evaluate the perceived confidence in the ability to engage, plan and meet deadlines in relation to academic activities, explains 3.53% of the variance, with alpha 0.80. Example item: *"How much am I able to strive for in academic activities?"* Considering that the answer options can vary from one to 10 points and the number of items in each dimension, the authors opted for the average score obtained by the sum of the answers divided by the number of items in each dimension. Besides the punctuation in each dimension, it is possible to obtain the level of self-efficacy in the higher education as a whole, by means of the sum of the chosen score in each of the 34 items of the scale.

Procedures

Data collect

After the authorization of the educational institution for the accomplishment of the research and approval by the Committee of Ethics in Research, the collection of data have made through the agreement of the coordinators and the

consent of the students. The application occurred after two months of entering higher education. The instruments were applied collectively in the own classroom of each of the courses, in a different sequential order, in order to minimize the fatigue effect that could harm the answers to the instrument that was last answered.

Data analysis

The descriptive analysis included frequency tables, position and dispersion measures as mean, standard deviation, minimum and maximum values, asymmetry and kurtosis. Descriptive and inferential statistics of the results of the two scales performed using *SPSS Statistics*, version 20. The inferential analysis involved the correlation between measures of learning strategies and academic self-efficacy. The results of the two applied scales submitted to the normality test of Shapiro-Wilk, to verify the normality of the distribution of the scores. The results showed that the Learning Strategies Scale had a normal distribution ($W = 0.993$, $p = 0.878$), and the Self-efficacy Scale presented the results ($W = 0.958$, $p = 0.002$), revealing that the data were non-parametric.

After the analysis of the data, the results of the descriptive analysis of the Learning Strategies and Self-efficacy Scales in Higher Education visualized in Table 1.

The scores on the Learning Strategies Scale may range from zero to 105 points and the mean score obtained by the sample surveyed was ($M = 71.67$), with a standard deviation ($SD = 12.32$). Considering the number of items in each factor, it is observed that the strategy most commonly used by this sample was Cognitive and Metacognitive Self-Regulation ($M = 2.05$), followed by the Self-Regulation strategy of Internal and Contextual Resources ($M = 2, 03$). The dimension in which the students obtained the lowest average was Social Self-Regulation ($M = 2.02$).

Regarding the Self-efficacy Scale, the mean score was ($M = 8.02$), considering that the scoring on the scale can vary from one to 10 points. The participants scored higher on the Self-efficacy factor in Academic Management ($M = 8.48$), followed by Self-efficacy in Social Interaction ($M = 8.35$). The factor with the lowest score was the Self-efficacy in Proactive Actions ($M = 7.55$).

In order to verify the correlation between the scores of learning strategies and self-efficacy beliefs, *the Spearman* correlation coefficient has used. The aim was to verify the degree of association between the studied variables, that is, to verify if there is a greater belief in self-efficacy in the use of learning strategies. The significance level adopted for the statistical tests was 5% ($p < 0.05$). The results show in Table 2.

It is possible to observe that the correlation between the two scales was of ($\rho = 0.59$, $p < 0.001$), being considered a moderate correlation (Dancey & Reidy, 2006). Thus, the students with the highest scores in the report of the use of learning strategies were the ones that obtained the highest score in self-efficacy in the accomplishment of academic tasks.

Table 1. Descriptive statistics of the Learning Strategies and Self-efficacy scores (N = 109).

Measures	No. of items in the Factor	Minimum	Maximum	Average (average arithmetic)	DP	Asymmetry	Kurtosis
F1Metacognitive and Cognitive Self-Regulation	23	26	68	47,33 (2,05)	8,88	-0,06	-0,21
F2- Self-regulation Internal and Contextual Resources	8	7	22	16,26 (2,03)	3,59	-0,34	-0,52
F3- Social Self-Regulation	4	3	12	8,08 (2,02)	1,91	-0,20	-0,05
Total Learning Strategies	35	42	102	71,67 (2,04)	12,32	0,04	-0,25
F1- Academic Self-Efficacy	9	4,00	10	7,81	1,18	-0,87	0,81
F2- Self-efficacy in Training Regulation	7	4,86	10	8,18	1,20	-1,06	0,66
F3- Self-efficacy of Social Interaction	7	5,00	10	8,35	1,10	-0,93	0,71
F4- Self-efficacy in Proactive Actions	7	3,71	10	7,55	1,33	-0,49	-0,21
F5- Self-efficacy in Academic Management	4	4,25	10	8,48	1,14	-1,09	1,11
Total Academic Self-Efficacy	34	5,21	9,94	8,02	1,03	-0,69	0,04

Table 2. Spearman Correlation Coefficients (ρ) between Learning Strategies Scales and Self-efficacy Scale.

Scales		F1-Metacognitive and Cognitive Self-Regulation	F2- Self-regulation Internal and Contextual Resources	F3- Social Self-Regulation	Total Strategies
F1- Academic Self-Efficacy	ρ	0,53	0,48	0,30	0,58
F2- Self-efficacy in Training Regulation	ρ	0,38	0,36	0,27	0,43
F3- Self-efficacy of Social Interaction	ρ	0,30	0,32	0,26	0,41
F4- Self-efficacy in Proactive Actions	ρ	0,55	0,50	0,35	0,61
F5-Self-efficacy in Academic Management	ρ	0,44	0,43	0,25	0,50
Total Academic Self-Efficacy	ρ	0,53	0,48	0,35	0,59

Discussion

According to the results found, most students use Cognitive and Metacognitive Self-Regulation strategies. They refer to general strategies for processing information such as repetition through speech and writing; making connections between new content and content they already know; the imposition of structure on the material, how to make topics and broader strategies such as establishing goals for the study, awareness of difficulties and change in study behavior. As most of the participants in this study are in the age group up to 21 years old ($n = 80$), they probably came directly from high school to university, bringing some experience of using these strategies.

The fact that the strategies of social self-regulation were those with the lowest scores may be because the scale had applied only one month after the beginning of the classes. This may have occurred to the fact that these strategies involve interaction with other students, such as studying in groups and asking for help from colleagues, which does not happen until they know each other better. These strategies were also the ones that had the lowest frequency in other studies like that of Alcará and Santos (2013). The authors also attributed the result to the period in which the students studied (night), making it difficult to interact with colleagues in extra-class hours, since most of the sample students worked during the day.

Regarding the Self-efficacy Scale, the participants scored higher on the Self-efficacy Factor in Academic Management, relating to the planning for academic activities and the effort and motivation undertaken, followed by Self-efficacy in Social Interaction, referring to the interaction with colleagues and teachers for purposes academic and social. The lowest scoring factor was Self-Efficacy in Proactive Actions, which refers to confidence in the ability to take advantage of training opportunities, to update knowledge and to promote institutional improvements.

The high score in Self-efficacy in Social Interaction was similar to that obtained by Polydoro and Guerreiro-Casanova (2010) and Guerreiro-Casanova and Polydoro (2011), showing that there is great impact of the pairs in the academic experiences during the first year, since the students perceive themselves capable of interacting with colleagues for academic purposes. These results suggest that the interaction groups are an important factor for integration in higher education (Igue, Bariani, & Milanese, 2008; Soares, Almeida, & Guisande, 2011).

On the other hand, the identification of the lowest mean found here, in Self-Efficacy in Proactive Actions, was also congruent with the findings of the aforementioned authors Guerreiro-Casanova and Polydoro (2011) and Polydoro and Guerreiro Casanova (2010). It seems, therefore, that at the beginning of higher education, students perceive themselves as less effective in taking advantage of training opportunities, in claiming and participating in extracurricular activities and in pursuit of updating their knowledge. In this

sense, it is also possible to infer that they perceive themselves as less effective in contributing ideas and improvements to the course and to the institution.

Considering the results obtained with the application of EEA-U and AEFS, it had observed that although the students perceive themselves capable of interacting with their colleagues, they use social self-regulation strategies less frequently, such as studying in groups and asking for help colleagues and teachers. This result related to the short time of coexistence with the peers in the period of application of the instruments, which occurred with only two months of coexistence. Future studies may explore this variable, with samples from other moments of higher education.

With respect to the association between the two constructs, learning strategies and academic self-efficacy, a moderate correlation has obtained, evidencing that students with higher scores in the report of the use of learning strategies are those who revealed greater self-efficacy in the accomplishment of tasks academics. Thus, the present study confirms that the two constructs have closely related to academic performance, which has also identified in studies such as Tijanero, Lemos, Araújo, Ferraces and Páramo (2012) and Costa, Araújo and Almeida (2014). Both evaluated university students and used the statistical method of linear regression to verify the predictive value of the constructs on academic performance. The first one confirmed that the use of strategies affects academic performance and the second one showed that better perceptions of academic effectiveness and involvement in academic activities are associated with better student performance.

The studies that aim to broaden the research about the variables that can influence the adaptation of the student and their academic performance are relevant. In this study, we opted to evaluate the learning strategies and the academic self-efficacy of university students. The choice of this sample was due to its specificity. Incoming university students face the inherent challenges of this stage of schooling that may hinder integration and adaptation to the new academic context. Knowing the variables that influence the academic performance of university students, such as learning strategies and academic self-efficacy, more broadly through their evaluation can contribute in a way to minimize the impact experienced by students. In addition, it can help managers, teachers and professionals who work in support centers, in order to optimize the academic success of students.

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