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ARTÍCULOS DE INVESTIGACIÓN

Academic self-efficacy, self-regulated learning and academic performance in first-year university students

Autoeficacia académica, autorregulación del aprendizaje y rendimiento académico en estudiantes universitarios iniciales

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Summary

The aim of this research was to determine the relationship between academic self-efficacy, self-regulated learning and academic performance of first-year university students in the Metropolitan Lima area. An assessment was made of 284 students (138 male and 146 female students) admitted to a private university of Lima for the 2013-2 term by using a non-probability and incidental procedure and the General Academic Self-Efficacy Questionnaire, the University Academic Self-Regulated Learning Questionnaire; and for the academic performance of every student, their registered weighted GPA was taken into account. Formulated hypothesis was accepted as correlation coefficients resulting from academic self-efficacy; self-regulated learning and academic performance were both positive and significant, but low. In addition, the correlation between academic self-efficacy and self-regulated learning were positive, significant and moderate.

Key words: Academic self-efficacy, self-regulated learning, academic performance.

Resumen

El objetivo del presente estudio fue determinar la relación entre la autoeficacia académica, la autorregulación del aprendizaje con el rendimiento académico en estudiantes universitarios iniciales de Lima Metropolitana. Se evaluó a 284 estudiantes (138 varones y 146 mujeres) ingresantes a una universidad privada de Lima Metropolitana en el período 2013-2, obtenidos a través de un procedimiento no probabilístico, incidental. Se utilizó el Cuestionario de Autoeficacia Académica General, el Cuestionario sobre Autorregulación para el Aprendizaje Académico en la Universidad y para el rendimiento académico se consideró el promedio ponderado consignado en el récord académico de cada estudiante. Se aceptan las hipótesis formuladas debido a que los coeficientes de correlación obtenidos entre la autoeficacia académica, la autorregulación del aprendizaje y el rendimiento académico fueron positivos y significativos en ambos casos, pero bajos. Además la correlación entre la autoeficacia académica y la autorregulación del aprendizaje resultó ser positiva, significativa y moderada.

Palabras clave: Autoeficacia académica, autorregulación del aprendizaje, rendimiento académico.

During the university education, students are continuously setting goals and face several challenges to successfully finish their careers. Not only adversities arise but also motivations that lead them to implement some specific strategies to achieve their goals. To accomplish an action and achieve the desired academic goals, the student must have the abilities or competences required to undertake the tasks. However, having these abilities or competences constitutes a necessary but not enough condition.

Motivation means the hypothetical construct that tries to explain the start, maintenance, direction, persistency and conclusion of a behavior aimed at goals (Palmero & Sánchez, 2008) and it consists of variables involving in the behavior activation and direction. The self-regulation and self-efficacy (Petri & Govern, 2006) are the most studied processes in the education context. The first one is about the capacity to use one´s own resources to plan, control and analyze the execution (Boekaerts, Pintrich & Seidner, 2000), and the second one is about people´s judgments about their capacity to organize and take the necessary course of actions to achieve types of outcomes (Bandura, 1997). Therefore, it is suggested that in terms of learning the academic goals set by the students will mainly depend on how capable they think they are to achieve certain challenges and on their capacity to use their resources strategically.

In the psychology of motivation, within the dominant framework of the social cognitive scope, the self-efficacy and self-regulation study is resulting in a large number of discoveries (Pintrich & Zusho, 2002; Schunk, 1996; Zimmerman & Martínez-Pons, 1990), as for the motivational processes in terms of learning, wherein the value of these two constructs are mainly linked as academic performance predictors.

Academic Self-Efficacy

The academic self-efficacy concept does not refer to the abilities of the individual or personal resources that allow them to control the continuous changing circumstances of the academic environment, but to their opinion about what can o cannot do with them (Bandura, 1995).

This process is the idiosyncratic assessment mediating between the

situation or task, the student activation and their performance, so that the higher the level of personal academic efficacy expectations, the greater the efforts made and the more the time spent by the individual to achieve learning goals (Puente, 2005). Should the student has optimal abilities and there are appropriate incentives, the expectations about the efficacy will become an essential determining factor of the type of activity to be chosen by the student, how much effort will be made in the activity and how long efforts will be made to manage the stress producing behaviors (Colom, 2012). As for the last aspect, individuals tend to prevent transactions with the stress producing environments when the demands are considered as a threat and the individual´s capabilities are not enough to meet them satisfactorily (Chemers, Hu & García, 2001).

As for the relationship between the affective dimension and self-efficacy, Tuckman and Monetti (2011) established that self-efficacy beliefs produce feelings or emotions before performance, that is, the fact of believing that it is likely to be successful in facing something, gives rise to positive feelings, while failure produces negative emotions; pleasure and anxiety during performance (Zajacova, Lynch & Espenshade, 2005).

Self-efficacy beliefs have influence in self-regulation and in the academic motivation and therefore, research works have addressed efficacy aspects, such as, self-efficacy and career choice (Hackett, 1995); self-efficacy of students, motivation and academic performance. These studies are very important since it was established that self-efficacy and self-regulation are related to performance. It was showed that students with high self-efficacy obtain better grades and showed greater persistence in science and engineering courses than those students with no confidence (Pajares & Schunk, 2001).

Schunk and Zimmerman (1995) reported that there is a relationship between self-efficacy and academic motivation when choosing activities so that students with high beliefs in their capabilities will choose complex and challenging tasks unlike those students with low self-efficacy, who will tend to avoid them.

In addition, self-efficacy makes the student feel motivated by several

tasks and courses they have affinity for, and avoid tasks in which they do not feel confident. It also calculates the time that will be spent with each task, as well as the behavior to be adopted in the face of complicated situations (Tuckman & Monetti, 2011). Therefore, students with low achievement in tasks will also have a low level of self-efficacy, unlike the students who accomplish tasks successfully.

Kohler (2009) studied the relationship between academic self-efficacy and academic performance and reported that although the female student scores obtained were higher than the male student scores, they are not a significant differentiation and concluded that self-efficacy in both male and female students was an effective academic performance predictor.

Self-efficacy influences the actions and success of individuals in different areas, thereby facing and overcoming fears, having success throughout life and having a good academic performance (Zajacova et al., 2005). The students with high academic self-efficacy will use more cognitive strategies that are useful to learn, organize their time and regulate their own efforts. Academic self-efficacy provides confidence to control different academic situations.

Self-Regulated Learning

Self-regulated learning can also be defined as a way to use one´s own resources to plan, control and analyze the execution of activities, tasks and preparation of learning products (Schunk & Zimmerman, 1995).

According to Zimmerman and Schunk (1997), the following characteristics should be considered so that learning can be considered as self-regulated: The use of different learning strategies, to be self-efficient when applying the strategies and to be committed to achieving goals. The primary goal of a self-regulation culture is to ensure that the entity involved in it is capable of improving and seeking its inherent quality and that such culture is born from the willing of individuals who are part of it.

For that reason, self-regulated learning concept has been increasing its value in the literature, due to the important research progress on how

the students actively participate in their learning process, monitoring and controlling the basic processes to achieve academic goals (Schunk, 2012). Thus, learning is increasingly considered an activity accomplished by the students themselves and not a reactive response to teaching, for that reason, the students self-regulating their learning are proactive in their efforts to learn, since they are aware of their strengthens and limitations.

The self-regulated learning construct is related to the ways of independent and effective academic learning including metacognition process, intrinsic motivation and strategic performance (Perry, 2002). It is also stated that the self-regulated learning influences the motivational and emotional aspect of individuals in a direct way. If a student has the necessary tools and methods to learn and study, their academic performance will be improved and consequently, their efforts will be reflected in their grades. According to the above-mentioned points, the student will be not only more motivated but also intrinsically motivated and will have positive emotions that will help to strength motivation.

It was found that students with high academic performance are usually self-regulated learners (Schunk & Zimmerman, 1995), since findings show that compared to students with low academic performance, they set more specific learning goals, use more learning strategies, self-monitor their own learning and assess their progress toward a goal in a more systematic manner (Pint rich & Sushi, 2002).

Lassen, Krawchuk and Rajani (2008) found that although self-variables are related to average scores per grade, self-efficacy for self-regulation is the best predictor of procrastination tendencies. Based on the findings from the two studies, the authors suggest that self-efficacy is a stronger predictor of the tendency to procrastinate than other motivation variables, such as self-regulation, academic self-efficacy and self-esteem. The costs of academic procrastination are evident: compared to neutral procrastinators, negative procrastinators reported low GPAs per grade, they expected and received a lower class grade, spent more hours procrastinating each day, took longer to begin assignments and expressed less confidence that they were capable of regulating their own learning. Self-efficacy is proposed as the key to understanding procrastination in adult students who have knowledge of

cognitive and metacognitive abilities and strategies but with low confidence to use them to organize their learning. Metacognitive strategy training will help students to know what to do and how to do it, but in order to increase self-efficacy for self-regulation, students will need repeated success experiences, encouragement and demonstrations of the benefits of using successful strategies.

Hypothesis

There is a significant relationship between academic self-efficacy, self-regulated learning and academic performance in first-year university students in the city of Lima.

Based on this hypothesis, the following specific hypotheses were proposed:

1. There is a significant relationship between academic self-efficacy and academic performance in first-year university students in the city of Lima

2. There is a significant relationship between self-regulated learning and academic performance in first-year university students in the city of Lima.

3. There is a significant relationship between academic self-efficacy and self-regulated learning in first-year university students in the city of Lima.

Method

This study corresponds to a substantial research, since it tries to solve a theoretical problem and is aimed at describing the reality (Sánchez & Reyes, 2002).

The research design is correlational (Alarcón, 2009) to the extent that the outcomes obtained from variable measurement have been analyzed to determine the extent and direction of the relationship between the study variables (Hernández, Fernández & Baptista, 2010).

Participants

The participants consisted of first-year undergraduate students, that is, students attending first cycle at a private university in the Metropolitan Lima area in the 2013-2 term. According to the statistical report of the university´s academic service department, there were 1090 undergraduate students enrolled in the 2013-2 academic term in regular conditions.

The calculated sample corresponded to 284 cases, and was calculated according to the Crochran formula, which is ideal for smaller population than 100 000 cases (Anguera, et al., 2010), and a confidence level of 95% (z=1.96) and an error margin of 5% were established as parameters.

The study sample was obtained from an incidental and non-probability procedure and it consisted of students from professional careers related to humanity, business and engineering, with 102, 116 and 66 cases, respectively. According to the gender variable, 138 (48.6%) students are male and 146 (51.4%) are female.

Instruments

An assessment was made of the judgments the students make about their own abilities to organize and perform the necessary actions to achieve the expected academic results through a General Academic Self-Efficacy Questionnaire prepared and validated by Torre (2006), based on the Bandura self-efficacy social cognitive theory and directed towards university students. This instrument consists of 9 5-point polytomous response items, and it is applied individually and collectively and with no time limit. As for psychometric properties, a Cronbach´s α of .903 (M=31.94, DE=5.651) was obtained from the questionnaire by calculating the scores of 1179 university students from the Universidad Pontificia de Comillas and the validity evidences were obtained through the analysis of correlations (Pearson´s r) with other variables, such as the study self-regulation (r=.482, p<.01), deep learning approach (r=.564, p<.01) and surface learning approach (r = -.109, p<.01).

The intermediary processes between reasons and attainment of

academic goals that regulate and guide the effective steps to achieve them were assessed through the University Academic Self-Regulated Learning Questionnaire also prepared by Torre (2006) based on the self-regulation theory of motivation under the Zimmerman and Pintrich´s cognitive approach. This instrument consists of 20 items at 5-point likert scale and it is applied individually or collectively during around 15 minutes. It was validated in a sample of 1188 students from the Universidad Pontificia de Comillas, and a Cronbach´s α confidence coefficient of .86 (M=74.50, DE=9.58) was obtained The correlation analysis with other variables, such as the study approach (deep r=.564, p<.01; achievement r=.531, p<.01; and surface (r=-.184, p<.01) and the academic self-efficacy (r=.482, p<.01), provided evidence of scale validity.

For the academic performance, the weighted GPA obtained in the 2013-2 term indicated in the student academic record was considered.

Procedure

The instruments were supplied during the 2013-2 academic term (August-December) in group sessions during teaching hours, using around 20 minutes per group. For the study, sections of admitted students with the largest number of enrolled students in regular conditions were selected. Students gave their assent to participate in the research through an informed consent, so that they knew the objective, nature and confidentiality guaranteed of the results. Subsequently, the cumulative weighted averages in the 2013-2 term were provided by the University´s Office of Academic Record in order to identify and match these data with each participant according to the code recorded in the personal information form of the protocols applied.

The data analysis was carried out using the version 20 of the SPSS (Statistical Program for Social Science). The association between the study variables was established through the Pearson´s r linear correlation coefficient, and the alpha value (α) for statistical tests was set to .05, two tails (Field, 2009).

Results

Instrument Psychometric Goodness Analysis

General Academic Self-Efficacy Questionnaire

The results of the psychometric analysis of the General Academic Self-Efficacy Questionnaire show that there are corrected item-test correlations varying between .61 (item 8) and .76 (item 1), which are significant (p<.05) and exceed the criterion of .20 proposed by Kline (1995). Consequently, it is concluded that all the scale items have suitable homogeneity indexes. The confidence coefficient of the scores was calculated by using the internal consistency method, and a Cronbach´s alpha of .917 was obtained for the 9 elements of the scale. This allows concluding that the General Academic Self-Efficacy Questionnaire shows confidence (see table 1).

Table 1.
Calculation of Confidence of the General Academic Self-Efficacy Questionnaire

Item	M	DE	citc
Item 1	3.60	.98	.76*
Item 2	3.69	.74	.72*
Item 3	3.89	1.04	.75*
Item 4	3.49	.94	.71*
Item 5	3.43	.85	.70*
Item 6	3.56	.98	.65*
Item 7	3.90	.91	.73*
Item 8	3.43	.87	.61*
Item 9	3.91	.96	.74*
Cronbach´s Alpha = .917			

Note: n=306, citc=Corrected item-test correlation.
*p<.05

The evidence of construct validity of the General Academic Self-Efficacy Questionnaire was provided by the exploratory factor analysis after confirming that the data showed the necessary conditions through the relevant statistics. The Kaiser-Meyer-Olkin measure of sampling adequacy reaches a value of .937, which shows a suitable explanatory potential, and the Bartlett´s test of sphericity has a significant value (chi-square=1540.013;

p<.05), which shows that it is relevant to carry out a factor analysis using the data obtained. The exploratory factor analysis through the principal component method indicates that there is just one factor explaining 60.31% of the total variance, thereby being a valid one-dimensional measure (Ferrando, 1996) of the construct (see table 2).

Table 2.
Evidence of Construct Validity of the General Academic Self-efficacy Questionnaire

Item	M	DE	citc
Item 1	3.60	.98	.82
Item 2	3.69	.74	.79
Item 3	3.89	1.04	.82
Item 4	3.49	.94	.77
Item 5	3.43	.85	.77
Item 6	3.56	.98	.73
Item 7	3.90	.91	.79
Item 8	3.43	.87	.69
Item 9	3.91	.96	.81
	Explained variance		60.31%
	Determinant = .006		
	Kaiser-Meyer-Olkin measure of sampling adequacy = .937		
	Bartlett´s Test of sphericity - chi-square = 1540.013 G.L. = 36 p = .000		

Note: n=306

University Academic Self-Regulated Learning Questionnaire.

The confidence calculation of scores obtained from the University Academic Self-Regulated Learning Questionnaire was performed by applying the internal consistency method, and a Cronbach´s alpha of .862 was obtained for 20 elements of the scale and their corrected item-test correlations vary between 37 (item 4) and .67 (item 18), exceeding all Kline´s (1995) criteria, (see table 3). Therefore, it is concluded that this questionnaire is reliable.

Table 3.
Calculation of Confidence of the Unviersity Academic Self-Regulated Learning Questionnaire

Item	M	DE	citc
Item 1	3.71	.94	.48*
Item 2	3.63	.97	.52*
Item 3	3.71	.80	.57*
Item 4	4.13	.90	.37*
Item 5	3.78	.90	.51*
Item 6	3.68	.85	.51*
Item 7	3.79	.86	.41*
Item 8	3.67	.88	.47*
Item 9	2.72	1.06	.29*
Item 10	3.73	.93	.39*
Item 11	3.78	.92	.45*
Item 12	3.73	.84	.52*
Item 13	3.39	1.00	.33*
Item 14	3.64	.81	.49*
Item 15	3.77	1.03	.46*
Item 16	3.55	.97	.45*
Item 17	3.37	.91	.41*
Item 18	3.65	.98	.60*
Item 19	3.45	.89	.37*
Item 20	3.81	.93	.51*
	Cronbach´s Alpha = .862		

Note: n=306, citc=Corrected item-test correlation.
*p<.05

The exploratory factor analysis provided evidence of construct validity of the University Academic Self-Regulated Learning Questionnaire. The Kaiser-Meyer-Olkin measure of sampling adequacy reaches a value of .882, which shows an adequate explanatory potential, and the Bartlett´s test of sphericity has a significant value (chi-square =1473.540; p<.05), so that the null hypothesis can be rejected, that is, the correlation matrix is not a identity matrix. The exploratory factor analysis through the principal component method demonstrates the one-dimensionality of the measure, since there is one factor explaining 38.50% of the total variance (Ferrando, 1996) and its factor weights vary between .47 (items 10 and 17) and .65 (item 3); (see table 4). Based on these results, it can be concluded that the questionnaire has a construct validity.

Table 4
Evidence of Construct Validity of the University Academic Self-Regulated Learning Questionnaire

Item	M	DE	Factor
Item 1	3.71	.94	.55
Item 2	3.63	.97	.60
Item 3	3.71	.80	.65
Item 4	4.13	.90	.45
Item 5	3.78	.90	.59
Item 6	3.68	.85	.59
Item 7	3.79	.86	.49
Item 8	3.67	.88	.55
Item 9	2.72	1.06	.34
Item 10	3.73	.93	.47
Item 11	3.78	.92	.52
Item 12	3.73	.84	.60
Item 13	3.39	1.00	.40
Item 14	3.64	.81	.57
Item 15	3.77	1.03	.54
Item 16	3.55	.97	.53
Item 17	3.37	.91	.47
Item 18	3.65	.98	.67
Item 19	3.45	.89	.42
Item 20	3.81	.93	.59
	Explained variance		38.50%
	Determinant = .007		
	Kaiser-Meyer-Olkin measure of sampling adequacy = .882		
	Bartlett´s test of sphericity - chi-square = 1473.540 G.L. = 190 p = .000		

Note: n=306

Descriptive Analysis.

The results of goodness of fit to the normal curve test of the student scores show that the academic self-efficacy, academic self-regulation and academic performance have such distribution. It is because of these results that the statistical data analyses were parametric (see table 5).

Table 5.
Kolmogorov-Smirnov´s Goodness of Fit to the Normal Curve Test

Variables	M	DE	Kolmogorov-Smirnov Z Test	Two-tailed p value
Academic self-efficacy	34.36	4.89	.921	.364
Self-regulated learning	73.15	9.30	.887	.412
Academic performance	13.48	1.77	.882	.419

Note: n=284
p < .05

Hypothesis Testing

The theoretical hypothesis was initially proposed and it suggested that there is a significant relationship between academic self-efficacy, academic self-regulation and academic performance in first-year university students in the city of Lima. The Pearson´s r linear correlation analysis was carried out for testing.

Based on the analysis of table 6, it can be observed that the academic self-efficacy scores and the cumulative weighted average have a positive, low and significant correlation (r=.353, p<.01). Therefore, the first hypothesis (H1) that establishes that there is a relationship between academic self-efficacy and academic performance in first-year university students in the city of Lima can be accepted.

Table 6.
Analysis of the Correlation between Academic Self-Efficacy and Academic Performance

Variables	Academic performance *r*	*Two-tailed p* value	95% CI	
			LB	UB
Academic self-efficacy	.353**	.000	.247	.450

Note: n=284; CI=Confidence interval; LB=Lower bound; UB=Upper bound.
**p<.01

In first-year university students, the correlation between self-regulated learning scores and the cumulative weighted average (academic performance) is positive, low (r=.325), and significant (p<.01) (see table 7). This indicates that the second hypothesis (H2) can be accepted, since there is a relationship between the study variables.

Table 7
Analysis of the Correlation between Self-regulated Learning and Academic Performance

Variables	Academic performance *r*	*Two-tailed p* value	95% CI	
			LB	UB
Self-regulated learning	.325**	.000	.217	.425

Note: n=284; CI=Confidence interval; LB=Lower bound; UB=Upper bound.
**p<.01

The hypothesis that establishes the relationship between academic self-efficacy and self-regulated learning (H3) is accepted, since based on the analysis of scores obtained from the sample, it is observed that the association between both variables is moderate (r=.650) and significant (p<.01) (see table 8).

Table 8.
Analysis of the Correlation between Academic Self-Efficacy and Self-Regulated Learning

Variables	Learning self-regulation *r*	*Two-tailed p* value	95% CI	
			LB	UB
Academic self-efficacy	.650**	.000	.578	.712

Note: n=284; CI=Confidence interval; LB=Lower bound; UB=Upper bound.
**p<.01

Discussion

The results obtained from this study lead to accept the hypotheses proposed, thereby stating with some certainty that self-efficacy beliefs are related to the academic performance and they affect the choices and efforts made by the students, as well as the perseverance in the face of obstacles, thinking patterns and emotional reactions experienced in the context of learning

(Bandura, 1997). The academic self-efficacy level of students will be related to their subsequent results concerning grades, works, etc.

On the other hand, the self-regulated learning, as regulatory action, by which the student uses their resources and strategies correctly, is a beneficial and very useful motivational process to achieve the academic goal, which will be also influenced by different incentives that will kept them motivated, thereby obtaining a good performance.

In accordance with the information provided by Kohler (2009), Pajares (2001) and Zimmerman and Martínez-Pons (1990), self-efficacy and self-regulation are very important motivational processes to obtain a better academic performance in students, since they make them feel competent and have full confidence in their own abilities, resulting in high expectations for themselves, valuing assigned tasks and activities in a positive manner and make them feel responsible for complying with their objectives. Besides, these same behaviors strengthen the strategic control and domain of the student, since they can better conduct their learning processes and strategies, controlling the effort to be put in order to know certain subject and also control their emotions efficiently in the face of adversities (Klassen et al., 2008).

From the motivation socio-cognitive perspective, it can be stated that due to the relationship and implication of self-efficacy and self-regulation in the academic performance (Bandura, 1997), in order to perform an action and achieve a goal set, the students should not only have the abilities, capabilities or knowledge required to perform the task but also it is necessary to believe that it is possible to cope with demands required by the academic situation using their resources strategically, controlling and supervising their implementation.

Therefore, it is essential to encourage students to build and develop cognitive, metacognitive strategies, as well as personal self-regulation and motivational strategies in order to improve the academic performance. The necessary abilities to face situations and beliefs in one´s own ability or self-regulation efficacy are developed, to a large extent, by means of active mastery experiences, and can be improved with training.

Finally, it is known that students' environment is related to self-efficacy and self-regulation to be developed over time (Schunk & Zimmerman 1997). These same aspects of the individual will be influenced by factors such as their family, commitment and goals.

Conclusions

Based on the results of this research, it is possible to come to the following conclusions:

- The Academic Self-Efficacy Questionnaire provided evidenced of internal consistency of the scores (reliability) and validity by observing its internal structure based on the exploratory factor analysis.

- The University Academic Self-Regulated Learning Questionnaire provides evidences of construct validity through an exploratory factor and reliability analyses of the scores based on the internal consistency analysis.

- There is a positive and significant relationship between academic self-efficacy and academic performance in first-year university students in the city of Lima.

- There is a positive and significant relationship between self-regulated learning and academic performance in first-year university students in the city of Lima.

- There is a positive and significant relationship between academic self-efficacy and self-regulated learning in first-year university students in the city of Lima.

Recommendations

It is necessary to carry out other studies using representative samples from different universities with different type of management and geographical location in order to establish more precisely the differences between the results obtained from the relationship between motivational processes, the academic performance and their discrepancy considering other variables such as gender, age, career and type of basic education received.

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