Research Article

Motivational Variables as Predictors of Academic Achievement Among University Students

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1. Independent researcher

Introduction. There is international evidence about the existence of a relationship between students' level of motivation towards learning and their academic performance. This article presents the findings of a study whose objective was to identify predictor variables of the academic performance among Chilean university students in the field of their motivation towards learning.

Method. The MSLQ test (*Motivated Strategies for Learning Questionnaire)* by Pintrich et al. (1991) has been used to measure motivation variables towards learning in a sample of 117 university students. A multiple regression model has been built with the students' *academic performance* as the dependent variable and the items from the MSLQ *motivation* scale as independent variables, to identify predictors of academic performance.

Findings. The regression model obtained identifies significant predictors of students' academic performance (*adjusted* R^2 = 0.30; p<0.001). The main positive predictor variables obtained are *self-efficacy*, *anxiety* and *learning control beliefs.*

Discussion. The study has obtained empirical evidence about the predictive nature that variables on motivation towards learning have with respect to university students´ academic performance. These findings confirm previous evidence on the relationship between motivation towards learning and academic performance. The study also confirms the usefulness of the MSLQ test by Pintrich et al. (1991) to study the relationship between motivation towards learning and academic performance among university students.

Implications. Motivational factors are significant predictors of university students´ academic performance, therefore they should be taken into account by educational policies and strategies designers at the university level to achieve better learning among students.

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Introduction

This article presents the findings of a study whose objective was to identify variables related to the *motivation for learning* of university students that can be considered *predictors of their academic performance.*

The academic performance of university students is a phenomenon that depends on various factors, which can be classified into factors related to the students and factors related to the learning context (Schunk, 2012). Among the factors located in the student's sphere is *motivation towards learning* (Zimmerman, 2008). Facing the high academic challenges of university life demands high motivation levels from students, which allow them to have the necessary energy to achieve learning goals (Pintrich, 1995). However, students do not always present the desirable levels of motivation towards learning, situation which results in them having difficulties in successfully addressing higher education challenges.

Research on students' attitude towards learning and their motivation levels to carry out learning at the university level can contribute to more effectively orient teaching in universities for the development of self-regulation skills (Puustinen & Pulkkinen, 2001) in students, and their achievement of higher level learning.

The study on the role of motivation in learning

A fundamental author in the study of motivation and its importance for learning is Albert Bandura (1982, 1989, 1991, 1994, 1999a, 1999b, 2005, 2006). Bandura investigated the nature and function of human *agency* within a conceptual model called *social cognitive theory,* which gives cognitive, vicarious, self-reflective, self-regulatory processes a central role. Bandura (1989) addresses the psychological mechanisms

of personal agency, and the structure of self-regulatory systems. Under this perspective, people are active agents in their life course, and not mere operators of internal mechanisms orchestrated by environmental events (Bandura, 1999a). Individuals contribute to their own motivation and action within a model in which action, cognitive, affective and other personal factors, and the environment interact. A model of the determinants of human action must include self-generated influences (Bandura, 1989). Personal agency operates within a broad network of sociostructural influences and social systems (Bandura, 1991, 1999b). Social cognitive theory rejects a dualism between personal agency and a disembodied social structure of human activity.

Self-regulation

In Psychology, there is a growing interest on self-referential phenomena (Bandura, 1989) and self-regulation (Puustinen & Pulkkinen, 2001). According to this perspective, self-generated activities are at the center of human behavioral processes. They not only contribute to the meaning of many external influences, but also act as determinants of motivation and action. The ability to exert control over your thinking, motivation, and action is a distinctively human characteristic. People can make changes in themselves and their situations through changes in their thinking and beliefs. Individuals are self-regulating agents (Bandura, 2005). They adopt personal standards and monitor and regulate their own actions (Pintrich, 1995). Through self-awareness, they reflect on their personal effectiveness and the meaning of their activities, and make corrective adjustments if necessary.

Self-efficacy beliefs

Self-regulation also encompasses the mechanism of *self-efficacy,* which plays a central role in the personal exercise of agency, due to its strong impact on thought, affect, motivation and action (Bandura, 1994). **Self-efficacy** is defined as *those beliefs concerning one's capabilities to learn or perform behaviors at designated levels* (Schunk, 1996). Agency can be exercised by a person through their confidence in their own efficacy (Bandura, 1991), that is, in their abilities to exercise control over the events that affect their lives and produce given achievements (Bandura, 2006). Self-efficacy beliefs are important determinants of human action. They operate in action through motivational, cognitive and affective processes. A higher level of self-efficacy in an individual results in greater academic performance (Zimmerman et al., 1992).

Motivation and academic performance

Empirical research on self-regulated learning has shown a positive correlation between students' self-regulation and their academic performance (Pintrich, 1995; Zimmerman et al., 1992; Zimmerman, 2008; de Fátima Goulão, 2014). In the motivation field, a strong sense of efficacy improves achievement and personal well-being in various ways (Bandura, 1994). Self-efficacy beliefs foster intrinsic interest and deep immersion in activities. Students with a high sense of self-efficacy define challenging goals for themselves, maintain a commitment to them, and present higher levels of academic achievement. Zimmerman et al. (1992) carried out an empirical study in which they identified *goal setting* and *self-efficacy beliefs* as predictors of academic performance of students in a university course.

Pintrich's study on motivation and self-regulated learning

A fundamental author in the study of motivation and self-regulated learning is Paul R. Pintrich, who began his research in that field during the 1980s (McKeachie et al., 1986). Years later, together with EV De Groot, he presented evidence regarding the favorable effect of the use of self-regulation strategies on academic performance. Pintrich and De Groot (1990) used a test to measure students' perception of self-efficacy, their intrinsic valuation of what they have learned, their anxiety, their self-regulation, and their use of learning strategies. The analysis of the data revealed that *self-regulation*, *self-efficacy* and *anxiety* are predictors of academic achievement (Pintrich & De Groot, 1990).

The MSLQ test

In 1991, Pintrich et al. presented the famous MSLQ test, designed to evaluate the motivational orientations of university students and their use of learning strategies. The test is based on a general cognitive theory of motivation and learning strategies. Subsequently, Garcia and Pintrich (1995) present a report on the MSLQ test in which they demonstrate that the MSLQ has a good level of reliability, and that its factor

structure supports the validity of the theoretical framework on which it is based. The predictive validity of the test was reasonably good. These findings allowed both authors to affirm that the MSLQ is a useful, reliable and valid instrument for the study of motivation and learning strategies.

MSLQ test structure

The MSLQ test by Pintrich et al. (1991) is made up of two scales, one for motivation and the other for learning strategies. The *motivation scale* has 31 items and six subscales of *evaluation*, *expectations* and *affect*; the **evaluation** subscale includes *intrinsic goal orientation* and *extrinsic goal orientation*; the **expectations** subscale includes *self-efficacy* and *learning control*; and the **affect** subscale includes *anxiety*. Below is a description of the six motivation scales of the MSLQ test:

1. *Intrinsic goal orientation:* the degree to which the student perceives himself or herself as engaging in a task for reasons such as challenge, curiosity, or mastery.
2. *Extrinsic goal orientation:* degree to which the student perceives himself as participating in a task for reasons such as grades, rewards, performance, evaluation by others, or competition.
3. *Assessment of the task:* student's evaluation of how interesting, important and useful the task is.
4. *Control beliefs about learning:* Student beliefs that his or her efforts to learn will have positive results.
5. *Self-efficacy beliefs:* self-assessment of one's ability to master a given task.
6. *Test Anxiety*: student´s anxiety related to academic performance.

Background of research on motivation and academic performance

Several studies have used the MSLQ test to examine the ability of variables related to motivation to predict the academic performance of university students. A study by Kosnin (2007) built a regression model that explained 35.2% of the variance (R^2 =0.35; $F_{4.326}$ =4578; p<0.0005) of performance based on self-regulation variables, and they identified **anxiety (**β=0.14; p<0.01) and lack of **self-efficacy** (β=-0.17; p<0.01) as predictors of academic performance. Cardozo (2008) identified a correlation between motivation and performance in university students, with **self-efficacy** (r=0.368; p<0.05) as the main predictor. Al Khatib (2010) built a regression model (adj R^2 =0.394; $F_{7,403}$ =38.46) in which he identified **self-efficacy** (β=0.285; p<0.01) and **intrinsic goal orientation** (β=0.224; p<0.01) as predictors of academic performance. Radovan (2010) obtained a regression model (R^2 =0.20; F=9.13; p<0.001), with four predictors: age (β=0.3; p<0.001), **self-efficacy** (β=- 0.1; p<0.05) and **intrinsic goals** (β=-0.1; p<0.05). García-Ros and Pérez-González (2011) built a regression model (R^2 =0.23) with predictor variables: sex (β=0.14; p<0.05), access grade (β=0.25; p<0.001) and **self-efficacy** for learning (β=0.17; p<0.05). Cazan (2012) built a regression model that identified **self-efficacy** (β=-0.17; p<0.05) and **anxiety** (β=0.30; p<0.01) as predictors. Mohammadi et al. (2012) obtained a regression model (adj R^2 =0.39; $F_{6.130}$ =13.63; p<0.01) with **self-efficacy** (β=0.44; p<0. 05) and **extrinsic goal orientation** (β=-0.21; p<0.05) as predictors of academic achievement. Joo, Lim and Kim (2012) identified **intrinsic valuation** (β=0.17), **test anxiety (β=-0.14), and perception of usefulness** (β=0.20) as predictors of academic performance. Onoda (2014) identified **self-efficacy** as the most important influence on the use of self-regulation strategies, which in turn predicted language use skills. Tabatabaei Arjmand (2013) determined that **motivation levels** had a high correlation (r=0.856; p<0.001) with performance. Al-Harthy and Aldhafri (2014) determined that performance was correlated with **task valuation** (r=0.19; p<0.01) and **self-efficacy** (r=0.20; p<0.01). For their part, Black and Ice (2014) found a positive relationship between performance and **intrinsic goal orientation** (r=0.230; p<0.05), **self-efficacy** (r=0.437; p<0.05) and **anxiety** (r= -0.388; p<0.05). Lawanto et al. (2014) verified the existence of a relationship between performance and **task valuation** (r=0.285, p=0.032<0.05). de Fátima Goulão (2014) determined the existence of a relationship between performance and **self-efficacy** (r=0.286; p<0.05). Boyer and Usinger (2015) built a regression model (R^2 =0.20) and identified **control beliefs** and **self-efficacy** (β=0.43; p<0.001), and **anxiety** (β=-0.07; p<0.001) as predictors of academic success. Čotar Konrad (2015) demonstrated that **motivational beliefs** predict higher levels of academic performance (R^2 =0.20; $F_{3.137}$ =11.09; p<0.001), and that the contribution of the **self-efficacy variables** (β= 0.37; p=0.000<0.001) and **test anxiety** (β=-0.20; p=0.012<0.05) is statistically significant. Kirmizi (2015) built a regression model (R^2 = 0.23; $F_{2.52}$

= 6.14; p=0.000<0.001), in which the **self-efficacy** variable turned out to be the only significant predictor (β=0.397; p=0.001<0.01) of performance. Babaei Menghari et al. (2016) used statistical regression to demonstrate that **task value** (β=0.123; p=0.002<0.01), and **control of learning beliefs** (β=-0.19; p=0.003<0.01) are predictors of performance. Finally, Varghese et al. (2016) built a regression model (adj R^2=0.743; F=125.13; p=0.000<0.001), which identified **motivation for learning** (β=0.281; p=0.000<0.001), **perceived stress** (β=-0.415; p=0.000<0.001), and **emotional intelligence** (β=0.337; p=0.000<0.001) as predictors of academic performance.

A remarkable fact in this empirical research review is how frequently *self-efficacy beliefs* appear as a significant predictor variable of academic performance, a finding that coincides with the conclusions of the extensive empirical review carried out by Richardson et al. (2012).

Method

The study has used a quantitative research approach, and consisted on obtaining information on the levels of students´ motivation towards learning by using the Motivation scale of the MSLQ test (Pintrich et al., 1991), and the examination of its relationship with their academic performance by constructing a multiple linear regression model with the students' academic performance as the dependent variable.

Research Problem

The *research problem* for this study has been the relationship between *university students' motivation towards learning* and their *academic performance.*

Objectives

General objective

Identifying predictor variables of the academic performance of a group of university students, in the field of motivation towards learning.

Specific objectives

1. Knowing the motivational aspects of a sample of students from a Chilean university.
2. Identifying students' academic performance predictor in the field of motivation towards learning.

Population and sample

The study population has been the second-year students at a Chilean university. The sample is non-random, its size is 117 students, 50% male and 50% female, aged from 18 to 24 years old most of them. The sample is divided as follows: a group from the business area (28%), a first group from Engineering (19%), a second group from Engineering (24%), and a group from the Health area (29%). The author was the teacher responsible for the course.

Study variables

The dependent variable was *the student's academic performance,* measured by their final grade in the course, and the independent variables were the 31 items of the *motivation scale* of the MSLQ test.

Instrument

The instrument used to collect the data was the MSLQ test (*Motivated Strategies for Learning Questionnaire)*, by Pintrich et al. (1991), translated to a Spanish version.

Data collection

To obtain the data, the MSLQ test Motivation Scale was enabled in a website on the university's Internet platform. Students answered the test in a self-administered way at the beginning of the academic semester. The data regarding the final grades of the students in the subject were

recorded at the end of the semester.

Analysis procedure: explanatory model for students' academic performance

A regression analysis has been conducted for the collected data. Regression analysis is a statistical technique that aims to construct a mathematical model to explain and predict a variable of interest, or dependent variable, from a set of independent variables. In more precise terms, regression analysis constructs a mathematical expression that results from a weighted sum of the original variables, and that explains a certain percentage of their variance. The objective of this study has been to analyze the relationship between the *academic performance* variable and the *motivation items* of the MSLQ test, and to evaluate the possibility of explaining and predicting the performance of the students in the sample based on their motivation levels.

Findings

Analysis of the validity and reliability of the instrument

The validity of an instrument is related to the question: *Does the instrument measure what it claims to measure?* (Kerlinger, 2002). An instrument has *content validity* when its ability to address the most relevant dimensions of the phenomenon of interest is accepted (DeVon et al., 2007). And it has *construct validity* when it satisfactorily explains the relationships between the items and scales of the instrument from a theoretical point of view (Lalanne, 2010). The instrument used, the MSLQ test, has content validity because it has been developed by its authors based on a robust reference framework (Pintrich et al., 1991), and there is consensus on its usefulness and ability to study self-regulated learning. The MSLQ was directly translated into Spanish from its original English version (Pintrich et al., 1991) by two university academics from the field of education and educational psychology, with fluent mastery of the English language. The *construct validity* of the test was analyzed using *exploratory factor analysis,* which shows that the factor structure of the test only partially adjusts to the original theoretical structure.

Reliability is defined as the *internal consistency of the measurement instrument* (Revelle & Condon, 2019). Reliability analysis seeks to determine the hypothetical reproducibility of the scores. It is not possible to say that a test *is* reliable or *not* reliable in absolute terms, but rather that the data provided by a sample of individuals have a certain *level of reliability* (Revelle & Condon, 2019). The level of reliability of the test was examined in this study by using the *Reliability module* of the SPSS statistical software, and the value obtained for the *Cronbach's alpha* statistic is 0.880, a value that is considered satisfactory, since it is greater than 0.7 (de Vaus, 2002). Table 1 presents the reliability level for the Motivation scale:

Cronbach's alpha	No. of items
.880	31

Table 1. *Reliability level of the MSLQ test*

Motivational aspects of the students´ learning

The following Table 2 shows the mean values of each item of the test for the sample of students.

1. Intrinsic Goal Orientation	
1. In a class like this, I prefer course material that really challenges me so I can learn new things.	5,4
16. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.	5,6
22. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	5,5
24. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't...	4,7
2. Extrinsic Goal Orientation	
7. Getting a good grade in this class is the most satisfying thing for me right now.	5,4
11. The most important thing for me right now is improving my overall grade point average, so my main concern in...	5,7
13. If I can, I want to get better grades in this class than most of the other students.	5,6
30. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.	4,9
3. Task Value	
4. I think I will be able to use what I learn in this course in other courses.	5,9
10. It is important for me to learn the course material in this class.	5,8
17. I am very interested in the content area of this course.	5,0
23. I think the course material in this class is useful for me to learn.	5,8
26. I like the subject matter of this course.	4,9
27. Understanding the subject matter of this course is very important to me.	5,2
4. Self-Efficay for Learning & Performance	
5. I believe I will receive an excellent grade in this class.	5,2
6. I'm certain I can understand the most difficult material presented in the readings for this course.	5,5
12. I'm confident I can learn the basic concepts taught in this course.	6,3
15. I'm confident I can understand the most complex material presented by the instructor in this course.	5,6
20. I'm confident I can do an excellent job on the assignments and tests in this course.	5,9
21. I expect to do well in this class.	6,1
29. I'm certain I can master the skills being taught in this class.	5,8
31. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	5,6
5. Control of Learning Beliefs	
2. If I study in appropriate ways, then I will be able to learn the material in this course.	6,6
9. It is my own fault if I don't learn the material in this course.	5,8
18. If I try hard enough, then I will understand the course material.	6,3
25. If I don't understand the course material, it is because I didn't try hard enough.	5,7
6. Test Anxiety	
3. When I take a test I think about how poorly I am doing compared with other students.	3,6
8. When I take a test I think about items on other parts of the test I can't answer.`	4,1
14. When I take tests I think of the consequences of failing.	5,0

19. I have an uneasy, upset feeling when I take an exam.	5,1
28. I feel my heart beating fast when I take an exam.	4,4

Table 2. *Mean values of each item of the Motivation Scale of the MSLQ test for the sample of students*

For clarity, we now proceed to calculate the means for each of the six subscales of the MSLQ test Motivation Scale, shown in Table 3. These data show similar *extrinsic* and *intrinsic goal orientation* levels among the students. Also show high levels of *self-efficacy beliefs* and *control of learning beliefs* among them. And low levels of test anxiety. In summary, the students of the sample show high levels of self-confidence as learners for the subject.

Motivation subscale	Scores Mean
1. Intrinsic Goal Orientation	5.3
2. Extrinsic Goal Orientation	5.4
3. Task Value	5.4
4. Self-Efficay for Learning & Performance	5.8
5. Control of Learning Beliefs	6.1
6. Test Anxiety	4.4

Table 3. *Mean values of each subscale of the Motivation Scale of the MSLQ test for the sample of students*

Explanatory model for students' academic performance

Regression analysis has been used in this study to explain students´ *academic performance* based on their responses to the items on the Motivation scale of the MSLQ test. The **backward elimination** method was used, and the model obtained explains 30% of the variance of the *academic performance variable* (*adjusted R^2=0.299*) of the 31 Motivation scale items. The *predictors of academic performance identified are items 30, 9, 28, 12, 15, 3, 6, 8, 25, 20, 21, 18, 26, 4, 10, and 29.* Table 4 presents a summary of the model obtained:

R	R squared	Adjusted R-squared	Standard error of the estimate
.629p	.395	.299	.4495

Table 4. *Regression Analysis Model Summary*

The regression model has a predictive power for the academic performance of the students in the sample (*adjusted R^2=0.299)* that is within the range expected from the previous review of empirical research on the relationship between motivation and academic performance.

The regression model was subjected to a *significance test,* which examines the null hypothesis of no linear relationship between the dependent variable *academic performance* and the identified predictor variables. Table 5 shows that the F statistic presents a probability value equal to

p=0.000<0.001, which allows us to accept that *there is* a statistically significant linear relationship between the academic performance of the students and the identified predictor motivational variables.

	Sum of squares	Gl	mean square	F	Next.
Regression	13,216	16	.826	4.088	.000
Residue	20,207	100	,202		
Total	33,423	116			

Table 5. *Hypothesis testing for the relationship between academic performance and its predictors*

Compliance with the requirements of the regression model: Normality and Linearity

Normality

In a regression model, the dependent variable must meet the *normality requirement*. This is usually verified by examining the *histogram of standardized residuals* of the dependent variable, that is, the standardized differences between the values predicted by the regression model and the observed values. In the following Figure 1 it is possible to see in the first graph that the histogram of standardized residuals of the *academic performance* variable presents a configuration similar to a normal distribution. The second graph, the QQ graph, compares the expected values according to the normality model with the observed values; It is observed that in this graph most of the points lie on the diagonal line, which is also proof of compliance with the normality requirement. The third graph is the PP graph, which compares the expected distribution of the residuals with its observed distribution; this graph also shows a compliance of the dependent variable with the normality condition.
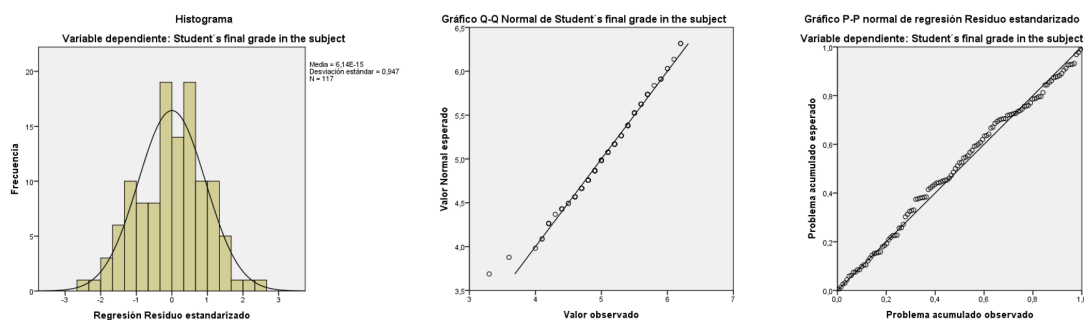

Figure 1. *Normality tests for the academic performance variable: Histogram, QQ graph, and PP graph of residuals*

Kolmogorov–Smirnov normality test has been carried out, which examines the significance of the hypothesis of normal distribution of the variable analyzed in large samples (n>30). The result of this test for the academic performance variable provides a *p value* equal to 0.200, a high value that does not allow us to reject the hypothesis, which leads to accepting the normality condition of the *academic performance variable*.

Linearity

The linearity of the relationships between the dependent variable and the identified predictor variables can be examined using partial regression plots for the observed residuals versus the theoretical or predicted values. Such graphs should not show defined patterns, but rather clouds of points randomly distributed around the horizontal axis through the value zero. The graphs of the identified predictor variables meet the indicated requirement, as seen in the following Figure 2.
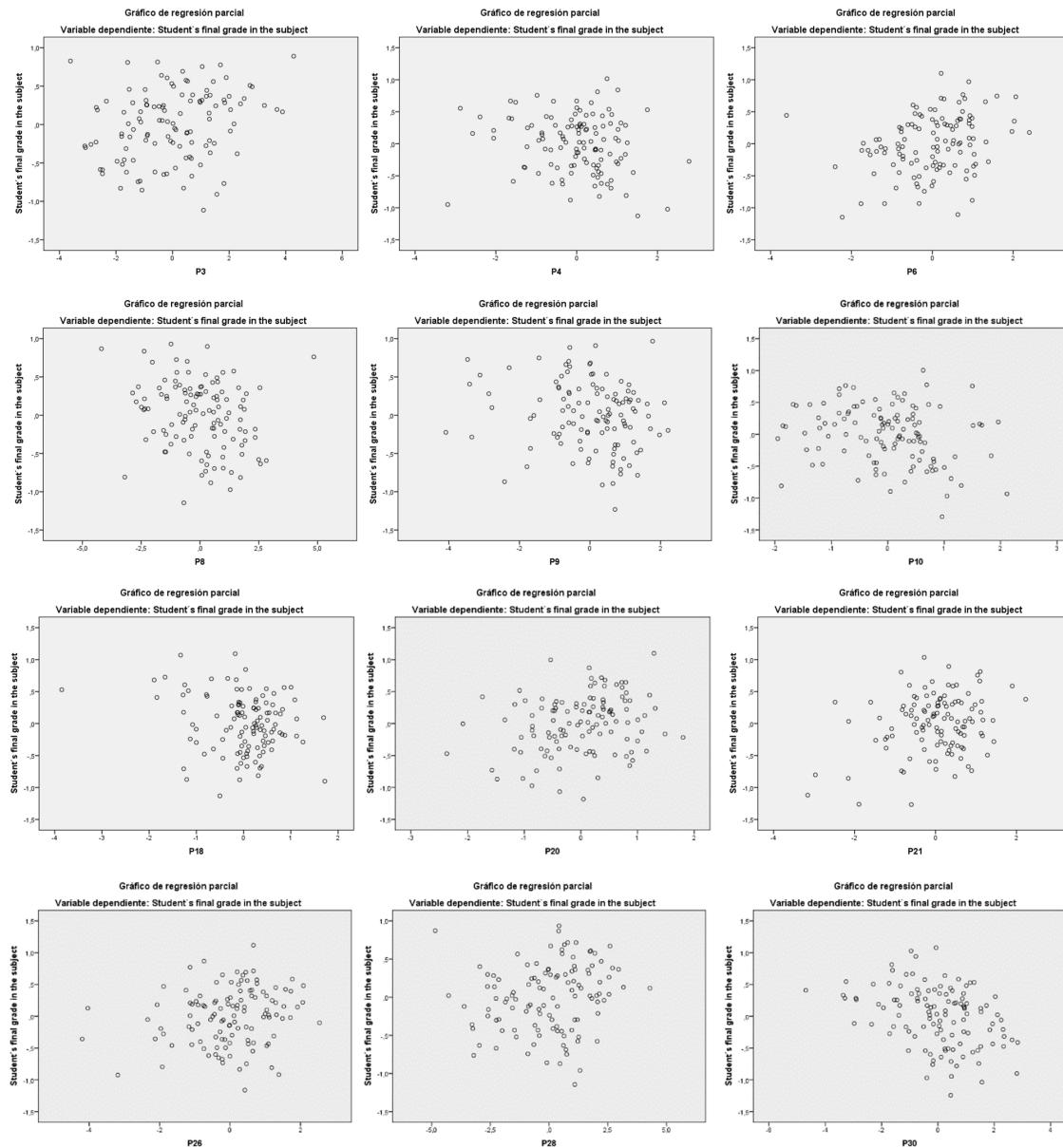
Figure 2. *The linearity of the relationships between some of the dependent variable and the predictor variables: Partial regression plots for the observed residuals versus the theoretical values for some of the predictor variables identified by the regression model*

Predictors of academic performance

The *beta coefficients* values in the *standardized regression equation* are equal to the correlations between each independent variable and the dependent variable. Below are the items of the MSLQ test that exhibit the largest significant *beta coefficients* in the standardized regression

equation, and that, therefore, correlate to a greater degree with the dependent variable.

The MSLQ test items with the greatest explanatory power for a student's academic achievement are related to *self-efficacy beliefs* (items 6, 20 and 21). There are also items from the area of *anxiety* (3 and 8) and *learning control beliefs* (items 9 and 18).

The following Table 6 presents the items that have standardized *beta regression coefficients* significant at the 0.05 level, and the subscale of the MSLQ test to which each one belongs:

Subscale	Item	Beta
Self-efficacy beliefs	6. I'm certain I can understand the most difficult material presented in the readings for this course.	0.27
	20. I'm confident I can do an excellent job on the assignments and tests in this course.	0.23
	21. I expect to do well in this class.	0.23
Anxiety	3. When I take a test I think about how poorly I am doing compared with other students.	0.22
	8. When I take a test I think about items on other parts of the test I can't answer.	-0.24
Learning control beliefs	9. It is my own fault if I don't learn the material in this course.	-0.24
	18. If I try hard enough, then I will understand the course material.	-0.26
Task value	4. I think I will be able to use what I learn in this course in other courses.	-0.26
Extrinsic goals	30. I want to do well in this class because it is important to show my ability to my family, friends, employer...	-0.37

Table 6. *Significant predictors of academic performance and their beta regression coefficients*

Note 1. Beta standardized regression coefficients significant at the 0.05 level.

Note 2. A Spanish version of the test was used in the sudy, however, for a clarity aim, this table shows the items in their original version in English.

The findings of the regression analysis show the importance of self-efficacy beliefs. The items most strongly correlated with academic performance belong to this area. Indeed, the best academic performers students in the sample are those who are confident that they can understand the most difficult content presented in the course readings, who are confident that they can do an excellent job on their course assignments and tests, and who also expect perform well in class.

Discussion

The students of the sample show *high levels of self-confidence as learners* for the subject. The main objective of this study has been to identify predictor variables of the academic performance of students from a Chilean university, within the scope of their motivation towards learning. To know the motivation levels of the students, the Motivation scale of the Pintrich et al. (1991) MSLQ test (*Motivated Strategies for Learning Questionnaire)* has been used. The motivation scale presents a **high level of reliability for the sample** (*Cronbach's alpha* =0.880).

The statistically significant *linear regression model* obtained allows predicting the academic performance of students from items of the Motivation scale, which has identified *self-efficacy beliefs* **as the main predictor of performance in a positive sense**. According to the regression model, better academic performance is achieved by those students who expect to have good academic performance, who are confident of being able to understand the most difficult content presented in the course, and who are confident of being able to do an excellent job with their assignments during the course.

Anxiety is another aspect that contains predictive items, but their influence on students´ academic performance is ambivalent. Comparing their performance with that of others has a positive effect on their performance for students, however the opposite occurs when they think about test questions that they believe they cannot answer.

On the other hand, **learning control beliefs**, the value assigned to the task, and extrinsic goal orientation *negatively affect academic performance.* More precisely, students believing it is their responsibility not to learn course content does not seem to help them perform better. Believeing they will be able to use what they learn in the course does not help the students to have a better performance either, despite what might be expected.

Finally, students´ **orientation to extrinsic goals** such as demonstrating their abilities to their family, friends, or other people, has a counterproductive effect on their academic performance. This confirms common sense, since it is expected that students´orientation towards *intrinsic* goals favors their academic performance.

A remarkable finding of this study is the predictive nature of **self-efficacy beliefs** regarding academic performance. This result coincides with the empirical research evidence reviewed prior to the study (Kosnin, 2007; Cardozo, 2008; Al Khatib, 2010; Radovan, 2010; García-Ros and Pérez-González, 2011; Cazan, 2012; Mohammadi et al., 2012; Onoda, 2014; Al-Harthy and Aldhafri, 2014; Black and Ice, 2014; de Fátima Goulão, 2014; Boyer and Usinger, 2015; Čotar Konrad, 2015; Kirmizi, 2015; Richardson et al., 2012).

The importance of **self-efficacy beliefs** was highlighted by Bandura early in 1982: he explained their relevance on motivation, affect and human action. According to Bandura, the higher an individual's level of self-efficacy, the greater his or her academic performance and the lower his or her level of anxiety. Bandura provides guidance for educators to reinforce students' self-efficacy beliefs (Bandura, 1999a). This can be achieved, he explained, by designing learning experiences that address problems at levels of increasing complexity and achievable for students. Successive successes create in students a strong confidence in their own effectiveness. The development of resilient self-efficacy requires positive experiences to overcome obstacles through persistent effort.

The findings of this study confirm the relevance of Pintrich's (1995) approach to the study of motivation and self-regulation. Pintrich gives importance to the development of learning regulation abilities in students. Studies such as the one presented in this article confirm the usefulness of the MSLQ test by Pintrich et al. (1991) to identify significant predictor variables of university students´ academic performance. In this way, instruments such as the MSLQ for measuring students' motivation for learning allow obtaining relevant information that can be used as an input for the design of teaching policies and strategies at the university level that are aimed at deep and lasting learning achievement, and that contribute to the training of professionals with greater levels of autonomy and proactivity.

In summary, motivational factors of learning among the students in the sample have proven to be significant predictors of their academic performance, and the MSLQ test to be a reliable and useful measurement instrument for research on the predictor variables of the academic performance of university students.

Implications

Motivational factors are significant predictors of the academic performance of university students, so they must be taken into account by designers of educational policies and strategies at the university level to achieve better learning among students.

There is evidence that a motivational teaching climate predicts student evaluations of teaching in higher education (Jones et al., 2022). Empirical findings also reveal that motivational strategies would not be applicable in any classroom without the creation of a helpful, engaging, interactive and enjoyable learning environment (Abdullah et al., 2019).

Educational design in higher education must use empirical evidence of the role of the motivational factors to achieve better learning.

Appendix

This material is available from the Supplementary data section and can be downloaded here.

Author Note

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Declarations