



TECHNIUM
SOCIAL SCIENCES JOURNAL



Vol. 56/2024
A New Decade for Social Changes

PLUS
COMMUNICATION P



International
Communication & PR

Development and evaluation of a new instrument that measures motivation towards academic achievement (IMLA) in higher education

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Abstract. Academic motivation in teaching and learning processes, both in general and in particular in higher education, has been of great interest in educational research, since it is the basis of academic success. In this work, the model "Expectations-Value of achievement motivation" has been considered, which uses a socio-cognitive perspective to design an inventory that allows measuring the motivation for academic achievement in higher education. With this objective, the Motivational Inventory of Academic Achievement (IMLA) is created, supported by a rigorous methodological process in order to make this instrument reliable and valid. The psychometric properties of the IMLA were determined from the analysis of content validity, reliability and construct in a sample of 464 higher education students from a Chilean and a Spanish university. The results indicate that the IMLA has 9 factors that explain 64.11% of the total variance and a Cronbach's alpha of .913, a rating considered high according to the requirements of a measurement instrument. In this way, this study contributes with the creation of a tool that integrates important motivational aspects focused on internal cognitive beliefs, based on expectations and the value of the task, as well as incorporating the assessment of the environment, for which reason it is estimated. that the IMLA is an instrument with a high potential for the educational and scientific field.

Keywords. inventory, psychometric properties, achievement motivation, higher education

Introduction

The importance of academic motivation in the processes of teaching and learning in the framework of education has been of great importance and interest in educational research, since it is at the basis of academic success, being related to the self-regulation of learning. Motivational factors play an important role in organizing and directing the behavior of a student who will devote his or her time and energy to academic tasks to the extent that his or her motivation is greater.

Achievement motivation, coined by McClelland (1989), refers precisely to the drive to excel, to reach goals, or to strive only for the intrinsic satisfaction of doing better. This type of motivation is considered highly influential in people's participation and well-being (Guay et

al., 2008; Trenshaw et al., 2016) and the distinction between subjects occurs as a product of contextual, mental and emotional differences specific to each individual (Jenkins and Demaray, 2015). The importance of intrinsic motivation is due to the fact that students who show high levels of this type of motivation also tend to have a higher degree of self-determination (Weiss et al., 2018), make more social connections with the people around them (Noyens et al., 2019), and have a higher prevalence for learning-oriented goals (Kim and Cho 2014).

The scientific literature is diverse and abundant in the explanation and conceptualization of motivation in the educational and teaching environment (Al-Jubari et al., 2019; Bandura, 1997; Deci & Ryan, 2000, 2008, 2015), being one of the most prominent definitions, the one that refers to a cognitive process that emphasizes the role of thoughts, beliefs and emotional manifestations as distinctive elements of motivation and that direct a subject towards the achievement of a goal (Pintrich & Schunk, 2006).

Academic motivation as a function of achievement in the classroom context involves considering a set of processes that make possible the activation and maintenance of academic behaviors, involving decisions about behavior related to the learning process and the particular aspects of each person in his or her role as a student (Deci & Ryan, 2000).

Most academic motivation studies focus on self-determination theory (Deci & Ryan, 2000; Zepke & Leach, 2010; Shogren et al., 2018; Al-Jubari et al., 2019), with an approach focused on motivation that circumscribes the social situations in which people experience well-being and vitality (Tomás and Gutiérrez, 2019) and that emphasizes examining the quality or type of motivation of the learning subject that underlies behavior, differentiating the amount or level of motivation shown by the student body before a specific learning activity, according to the type of motivation that underlies it (Ryan & Deci, 2000a; 2000b; Deci & Ryan, 2008).

From the perspective of self-determination theory, it is the satisfaction of basic needs (autonomy, competence and social relationship) that leads to a more self-determined motivation and a more internalized locus of causality, that is, to a state in which the individual feels intrinsically motivated and interprets the results of his or her actions as something that depends on him or herself (Stover et al., 2017).

Evaluation of academic motivation in higher education

Motivation assessment instruments provide information about the key factors that affect motivation, so it is important to measure with precision in order to identify areas of weakness and develop initiatives aimed at overcoming them, with the purpose of measuring motivational dimensions for any type of objective, namely, approach/avoidance and achievement/maintenance.

The first instruments oriented to the study of academic achievement motivation that have been the basis of later adaptations are the intrinsic motivation inventory by Ryan (1982), the task-specific academic self-regulation questionnaire (SRQ-a) by Ryan and Conell (1989), the academic motivation scale (EMA) by Vallerand et al (1989) and the motivation and learning strategies questionnaire by Pintrich et al (1993). In this sense, it is possible to appreciate that the instruments used to study the motivation to academic achievement of higher education students date their construction to the eighties and nineties and their subsequent application is based on adaptations of the same under the approach of the Self-Determination Theory (SDT) and on the analysis of three dimensions such as intrinsic motivation, extrinsic motivation and demotivation.

It should be noted that, since 2010, instruments designed to study academic motivation have incorporated other perspectives such as resilience, self-concept, self-efficacy, sense of

belonging to the group and the university, basic psychological needs and creativity, among others, establishing associations between motivation and academic achievement. In particular, academic self-concept has been shown to be most strongly related to achievement, while achievement motivation, autonomous motivation, and effort beliefs explain only a portion of the variance in academic achievement (Lavrijsen et al., 2022).

Since there is currently no comprehensive instrument to measure student motivation, the EMA scale has been validated in different areas of knowledge, such as Science (Skinner et al., 2017), Chemistry (Liu et al., 2017), Mathematics (Hammoudi, 2020), and in different countries (Davoglio et al., 2016; Ferreira et al., 2016). It is also relevant to highlight that the design of academic motivation instruments in the last decade has incorporated relevant elements. However, despite the advances mentioned above, there is a clear need to integrate aspects such as achievement behavior, motivational beliefs, cognitive processes and social context, in a comprehensive manner in order to contribute with more knowledge to the teaching and learning process in higher education.

Theoretical basis of the Inventory of Motivation for Academic Achievement

IMLA

In order to evaluate motivation in the field of higher education, the object of the present work, the Inventory of Motivation for Academic Achievement (IMLA) has been created assuming the theoretical model: "Value Expectations of Achievement Motivation from a socio-cognitive perspective". The model arises from a general and socio-cognitive perspective, which encompasses diverse fields of motivational psychology, with referents such as: Atkinson, (1964); Eccles, Wigfield & Schiefele (1998); Guthrie & Wigfield, (2000); Weiner, (1992); Bandura, (1988, 1993); Pintrich (1999); Schunk, (1991, 2001).

The model assumed in the present work can be summarized in what is called achievement behavior considered as a dependent, external and observable variable; it will determine behaviors such as: the choice of the task, the persistence in it, the amount of effort and involvement in the task, level of execution, etc.

Achievement behavior will be determined by motivational beliefs and cognitive processes. These include: the value of the task that shows the interest and beliefs of the importance of the task, as well as the cost involved; expectations, such as students' beliefs in the possibilities of success, affective memory, goals, competence judgments and self-schemas, perception of the difficulties of the task, appreciation of the social environment, and finally the interpretation and attribution of past events (Pintrich & Schumk, 2006).

The aim of the present study was to describe and analyze academic achievement motivation in university students in different cultural, economic, and contextual settings. For this purpose, a tool has been created, a key aspect of the work, which assesses the motivational level in higher education students.

METHOD

Process of elaboration and application of the IMLA

The IMLA was developed on the basis of the academic achievement motivation model, using 34 specific indicators that allow measuring the variables considered in this model. The list of items was submitted to the evaluation of 20 expert judges, of wide and recognized trajectory in the fields of psychoeducational, didactic and methodological knowledge (Escobar-Pérez and Cuervo-Martínez, 2008). These judges evaluated the content validity, in terms of clarity and relevance.

Once the necessary adjustments were made and the final version of the IMLA was ready, a first contact was established with the different authorities of the Schools and Faculties of Education and Psychology of the Chilean and Spanish universities, to explain the objectives and scope of the study, as well as to agree on the timetable for the application of the instrument in case they had the authorization to carry out the research in the institution. A Google form link was also created so that the students could answer the questionnaire at the agreed time; this process was accompanied by a member of the research team who could verify how autonomous the process of completing the instrument could be.

Finally, the IMLA was massively applied to the target population.

Description of the participants

In this study we had a sample defined as non-probabilistic and casual, made up of 471 Chilean and Spanish students, aged between 18 and 30 years and with a mean age of 22.69 years. Table 1 shows the sociodemographic data of the sample.

Table 1.
Sociodemographic description of the participants

| Category | Percentage |
|----------------------------|---|
| gender | 27.6% male 71.76% women |
| Country of origin | 60.9% Spaniards 39% chilean |
| Aid received | 55% scholarship holders 7.4% self-funded 32.3% family aid 5.3% other aid |
| University where you study | 90.4% public university 9.6% private university |
| Distance home - university | 37.6% live in the city 41.4% in the surrounding area 3.2% in another city |
| Career choice | 93.4% by vocation 3.2% by family influence 3.2% by score |

Data analysis

The psychometric properties of the IMLA were determined from the analysis of content, reliability and construct validity.

The content validation analyses, considered in this study, were mainly carried out in the process of analysis by expert judges. The ratings were issued based on a rating scale of 1 to 5 points, which yielded mean scores ranging from 3.8 to 4.8 for item clarity and from 3.4 to 5.0 for item relevance. The reports served as the basis for the calculation of the Content Validity Coefficient according to the approach suggested by Hernández-Nieto (2002).

Para garantizar la validez y la precisión del análisis estadístico, fue necesario avalar la obtención del mismo resultado o compatibilidad en los diferentes experimentos o pruebas estadísticas. De las pruebas de fiabilidad usadas, se ha elegido el Alfa de Cronbach, por ser la prueba más utilizada para determinar la consistencia interna de un instrumento (Reidl-Martínez, 2013).

In this paper, the aim was to find out whether the IMLA, which is intended to measure the academic achievement motivation of university students, is measuring this construct. For this process, the following steps have been followed: 1- Kaiser-Meyer-Olkin (KMO) and Bartlett 2- Communalities, 3- Total variance explained and 4- Factor matrix. All this because the KMO test allows sampling adequacy and indicates the proportion of variance explained in the variables that can be caused by underlying factors. Bartlett's test of sphericity contrasts the hypothesis of the correlation matrix, which indicates whether the variables are related or not, from the level of significance to determine the usefulness of a factor analysis. Communality tests indicate the amount of variance in each variable that is accounted for. The total variance explained indicates the proportion of variance in each dimension that can be explained by the common factors in the factor analysis.

The description of each factor derived from the factor analysis and descriptive analyses that show the behavior of the factors (mean, median, mode, standard deviation, skewness and kurtosis) are also added.

Ethical safeguards

The ethical procedures followed have been supported by the certification of the bioethics and biosafety committee, issued by the Universidad del Bío-Bío, which stipulates the safeguarding of data confidentiality, respect for the dignity of individuals and the adequacy of the study research to the scientific and ethical standards of the discipline and the Institution. In addition to this document, all study participants were asked to sign an informed consent form.

Results

Content validity.

The results shown in Table 2 indicate that the Content Validity of the Inventory reaches a validity index of .926, which is considered excellent.

Table 2.

Calculation of the validity coefficient

| Ítem | Sxi | Vmx | CVCi | Pei | CVCtc |
|-------------|------------|------------|-------------|------------|--------------|
| 1 | 58 | 5.8 | 0.9666667 | 2.143E-05 | 0.9666452 |
| 2 | 52 | 5.7 | 0.95 | 2.143E-05 | 0.9499786 |
| 3 | 51 | 5.6 | 0.9333333 | 2.143E-05 | 0.9333119 |
| 4 | 51 | 5.1 | 0.85 | 2.143E-05 | 0.8499786 |
| 5 | 48 | 6 | 1 | 2.143E-05 | 0.9999786 |
| 6 | 53 | 5.3 | 0.8833333 | 2.143E-05 | 0.8833119 |
| 7 | 57 | 5.7 | 0.95 | 2.143E-05 | 0.9499786 |
| 8 | 54 | 5.4 | 0.9 | 2.143E-05 | 0.8999786 |
| 9 | 52 | 5.2 | 0.8666667 | 2.143E-05 | 0.8666452 |
| 10 | 58 | 5.8 | 0.9666667 | 2.143E-05 | 0.9666452 |
| 11 | 59 | 5.9 | 0.9833333 | 2.143E-05 | 0.9833119 |
| 12 | 58 | 5.8 | 0.9666667 | 2.143E-05 | 0.9666452 |
| 13 | 54 | 6 | 1 | 2.143E-05 | 0.9999786 |
| 14 | 55 | 5.5 | 0.9166667 | 2.143E-05 | 0.9166452 |
| 15 | 52 | 5.2 | 0.8666667 | 2.143E-05 | 0.8666452 |
| 16 | 55 | 5.5 | 0.9166667 | 2.143E-05 | 0.9166452 |
| 17 | 58 | 5.8 | 0.9666667 | 2.143E-05 | 0.9666452 |

| | | | | | |
|------------------------------|----|-----|-----------|-----------|--------------|
| 18 | 58 | 5.8 | 0.9666667 | 2.143E-05 | 0.9666452 |
| 19 | 58 | 5.8 | 0.9666667 | 2.143E-05 | 0.9666452 |
| 20 | 57 | 5.7 | 0.95 | 2.143E-05 | 0.9499786 |
| 21 | 51 | 5.6 | 0.9333333 | 2.143E-05 | 0.9333119 |
| 22 | 50 | 5 | 0.8333333 | 2.143E-05 | 0.8333119 |
| 23 | 59 | 5.9 | 0.9833333 | 2.143E-05 | 0.9833119 |
| 24 | 53 | 5.3 | 0.8833333 | 2.143E-05 | 0.8833119 |
| 25 | 60 | 6 | 1 | 2.143E-05 | 0.9999786 |
| 26 | 60 | 6 | 1 | 2.143E-05 | 0.9999786 |
| 27 | 59 | 5.9 | 0.9833333 | 2.143E-05 | 0.9833119 |
| 28 | 53 | 5.3 | 0.8833333 | 2.143E-05 | 0.8833119 |
| 29 | 53 | 5.3 | 0.8833333 | 2.143E-05 | 0.8833119 |
| 30 | 54 | 5.4 | 0.9 | 2.143E-05 | 0.8999786 |
| 31 | 52 | 5.2 | 0.8666667 | 2.143E-05 | 0.8666452 |
| 32 | 50 | 5 | 0.8333333 | 2.143E-05 | 0.8333119 |
| 33 | 54 | 5.4 | 0.9 | 2.143E-05 | 0.8999786 |
| 34 | 53 | 5.3 | 0.8833333 | 2.143E-05 | 0.8833119 |
| Content validity coefficient | | | | | 0.926 |

Note: Sxi = Sum of the scores assigned by each judge to each of the items, Vmx = Maximum value of the scale used by the judges, CVCi = Content coefficient, (max/no. of judges), Pei = Probability of error for each item), (probability of random agreement between judges), CVCTc = Content validity coefficient. Confiabilidad.

With respect to reliability, a Cronbach's alpha of .913 and .921 for typed items was obtained. This expresses a high reliability of the inventory (see Table 3).

Table 3.
Reliability obtained by Cronbach's Alpha

| Reliability Statistics | | |
|------------------------|---|------------|
| Cronbach's alpha | Cronbach's alpha based on the typed items | N of items |
| .913 | .921 | 34 |

With respect to the correlations, it is observed that the correlation of item 33 is low at .192. It has been decided to keep it since, if this item were eliminated, the reliability would rise to .914, which would not contribute significance to this reliability (see Table 4).

Table 4.
Total-item correlations and Cronbach's alpha in the elimination of each item.

| Total-element statistics | | | | | |
|--------------------------|--|--|--|------------------------------|--|
| items | Mean of the scale if the element is eliminated | Variance of the scale if the element is eliminated | Correlation element-to-total correlation corrected | Squared multiple correlation | Cronbach's alpha if the element is removed |
| 1 | 127.08 | 305.076 | .492 | .363 | .910 |
| 2 | 126.75 | 306.008 | .534 | .399 | .910 |
| 3 | 127.07 | 303.648 | .522 | .435 | .910 |
| 4 | 126.96 | 304.586 | .444 | .419 | .911 |

| | | | | | |
|----|--------|---------|------|------|------|
| 5 | 127.62 | 296.945 | .561 | .484 | .909 |
| 6 | 127.23 | 299.449 | .493 | .574 | .910 |
| 7 | 126.97 | 297.185 | .617 | .515 | .908 |
| 8 | 127.50 | 301.192 | .439 | .508 | .911 |
| 9 | 127.06 | 300.216 | .562 | .549 | .909 |
| 10 | 127.17 | 300.683 | .593 | .579 | .909 |
| 11 | 128.11 | 301.427 | .481 | .671 | .910 |
| 12 | 127.39 | 298.157 | .559 | .580 | .909 |
| 13 | 127.47 | 302.007 | .463 | .570 | .910 |
| 14 | 128.61 | 297.465 | .521 | .652 | .909 |
| 15 | 126.79 | 306.385 | .461 | .388 | .910 |
| 16 | 127.22 | 303.181 | .469 | .392 | .910 |
| 17 | 127.59 | 296.662 | .562 | .441 | .909 |
| 18 | 128.04 | 293.981 | .623 | .597 | .908 |
| 19 | 127.72 | 297.639 | .520 | .494 | .909 |
| 20 | 126.40 | 309.044 | .452 | .356 | .911 |
| 21 | 126.89 | 308.975 | .239 | .210 | .914 |
| 22 | 127.84 | 296.732 | .488 | .376 | .910 |
| 23 | 127.18 | 301.351 | .564 | .536 | .909 |
| 24 | 127.36 | 302.439 | .423 | .589 | .911 |
| 25 | 127.09 | 302.584 | .582 | .534 | .909 |
| 26 | 127.10 | 299.721 | .641 | .637 | .908 |
| 27 | 127.22 | 298.401 | .577 | .606 | .909 |
| 28 | 126.99 | 309.747 | .309 | .347 | .912 |
| 29 | 127.93 | 302.668 | .441 | .513 | .911 |
| 30 | 127.56 | 303.840 | .365 | .370 | .912 |
| 31 | 127.51 | 301.196 | .447 | .527 | .910 |
| 32 | 127.42 | 298.127 | .553 | .426 | .909 |
| 33 | 127.67 | 306.545 | .161 | .192 | .919 |
| 34 | 126.81 | 309.544 | .210 | .205 | .914 |

Construct validity.

a. KMO and Bartlett's test

When evaluating the correlations that exist between the items, and the partial correlations between them, the KMO test with a value of .898 (see Table 5), which is close to 1, indicates that the use of factor analysis is useful. The KMO test with a value of .898 (see Table 5), which is close to 1, indicates that the use of factor analysis is useful. Bartlett's Circularity test with a value of .000, practically 0, indicates that it is a good indicator for the use of factor analysis.

Table 5.
KMO Test and Bartlett's Test Scores

| KMO and Bartlett's Test | |
|--|--------------------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | .898 |
| Bartlett's Test of Sphericity | Approx. Chi-Square |
| | 6796.013 |
| | df |
| | 561 |
| | Sig. |
| | .000 |

b. Communalities

The communalities made it possible to find the indicators of the inventory presented, but also those items that reduce the levels of correlation in the matrix. The item with the highest correlation is shown as an indicator of the scale it measures, and vice versa. Items 11 with .818 and 24 with .756 are good predictors; however, item 21 with .121 is not a good indicator.

Therefore, it was eliminated at first and the factor analysis was recalculated; but the results of this second analysis did not show significant changes in the scores, so it was decided not to remove it (See Table 6).

Table 6.
Communalities

| items | Communalities | |
|-------|---------------|------------|
| | Initial | Extraction |
| 1 | .363 | .352 |
| 2 | .399 | .398 |
| 3 | .435 | .476 |
| 4 | .419 | .441 |
| 5 | .484 | .465 |
| 6 | .574 | .739 |
| 7 | .515 | .510 |
| 8 | .508 | .567 |
| 9 | .549 | .566 |
| 10 | .579 | .583 |
| 11 | .671 | .818 |
| 12 | .580 | .618 |
| 13 | .570 | .638 |
| 14 | .652 | .665 |
| 15 | .388 | .418 |
| 16 | .392 | .419 |
| 17 | .441 | .396 |
| 18 | .597 | .670 |
| 19 | .494 | .458 |
| 20 | .356 | .332 |
| 21 | .210 | .121 |
| 22 | .376 | .338 |
| 23 | .536 | .476 |
| 24 | .589 | .756 |
| 25 | .534 | .538 |
| 26 | .637 | .712 |
| 27 | .606 | .637 |
| 28 | .347 | .356 |
| 29 | .513 | .529 |
| 30 | .370 | .354 |
| 31 | .527 | .637 |
| 32 | .426 | .428 |
| 33 | .192 | .229 |
| 34 | .205 | .385 |

c. Total variance explained

Nine factors were obtained with the extraction method "principal axis factorization" and by Varimax rotation which maximizes the variance. The 9 factors explain 64.116% of the variance and 51.707 in the sum of squares extraction. The percentage of variance explained in the instrument is considered significant (See Table 7).

Table 7.
Values of the total variance explained

| Factors | Initial values | | | Extraction Sum of Squares | | |
|---------|----------------|---------------|------------------|---------------------------|------------|------------------|
| | Total | % Variance | % Accumulated | Total | % Variance | % Accumulated |
| 1 | 9.853 | 28.979 | 28.979 | 9.399 | 27.645 | 27.645 |
| 2 | 2.514 | 7.393 | 36.373 | 2.109 | 6.202 | 33.847 |
| 3 | 1.823 | 5.361 | 41.734 | 1.386 | 4.077 | 37.924 |
| 4 | 1.546 | 4.548 | 46.282 | 1.166 | 3.431 | 41.355 |
| 5 | 1.534 | 4.513 | 50.795 | 1.034 | 3.042 | 44.397 |
| 6 | 1.349 | 3.968 | 54.762 | .820 | 2.413 | 46.810 |
| 7 | 1.176 | 3.459 | 58.221 | .713 | 2.097 | 48.906 |
| 8 | 1.026 | 3.017 | 61.238 | .525 | 1.543 | 50.449 |
| 9 | .979 | 2.879 | 64.116 | .428 | 1.258 | 51.707 |
| 10 | .904 | 2.660 | 66.776 | | | |

Each of the factors with their respective coefficients are listed in Table 8.

Table 8.
Matrix of ordered rotated components

| items | Factors | | | | | | | | |
|-------|---------|------|------|------|------|------|------|------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 6 | .790 | | | | | | | | |
| 9 | .680 | | | | | | | | |
| 5 | .566 | | | | | | | | |
| 7 | .516 | | | | | | | | |
| 3 | .464 | | | | | | | | |
| 2 | .407 | | | | | | | | |
| 26 | | .674 | | | | | | | |
| 12 | | .624 | | | | | | | |
| 10 | | .604 | | | | | | | |
| 25 | | .548 | | | | | | | |
| 23 | | .408 | | | | | | | |
| 20 | | .340 | | | | | | | |
| 31 | | | .775 | | | | | | |
| 8 | | | .705 | | | | | | |
| 27 | | | .641 | | | | | | |
| 32 | | | .460 | | | | | | |
| 1 | | | .338 | | | | | | |
| 18 | | | | .688 | | | | | |
| 19 | | | | .597 | | | | | |
| 29 | | | | .565 | | | | | |
| 30 | | | | .546 | | | | | |
| 17 | | | | .356 | | | | | |
| 11 | | | | | .858 | | | | |
| 14 | | | | | .740 | | | | |
| 24 | | | | | | .831 | | | |
| 13 | | | | | | .736 | | | |
| 22 | | | | | | .353 | | | |
| 16 | | | | | | | .603 | | |
| 15 | | | | | | | .549 | | |
| 4 | | | | | | | .499 | | |
| 34 | | | | | | | | .615 | |
| 33 | | | | | | | | .477 | |
| 21 | | | | | | | | | .361 |
| 28 | | | | | | | | | -.360 |

1. Nomination of the variables or factors found

As can be seen in the components matrix, the IMLA contains 9 differentiated factors. According to their characteristics, these can be described as follows:

F1. Task Value (TV): Indicates the value of learning, beliefs about the importance and usefulness of such learning, as well as the cost of achieving it.

F2. Expectations/Self-Efficacy (SE): Shows the possibility of success; the belief that the task to be performed will be executed effectively. Therefore, it is understood as the conviction of performance in a certain domain.

F3. Organizational Strategies (OS): Indicates the physical and mental effort in the organization of time for academic work, time distribution and persistence in such organization.

F4. Socio-cultural environment (ESC): Reflects the extent to which students perform in the social and cultural environment, reflecting the nature of interactions with family, peers and teachers.

F5. Self-schemas (SA): Reflects students' self-concept and beliefs about themselves.

F6. Social Skills (HS): Indicates perception of ability to communicate and interact socially.

F7. Affective memory (AM): Refers to the students' previous affective experiences, relating it to the type of activity or topic covered.

F8. Control over learning (CA): Indicates the degree to which a student perceives that he/she has control over academic events, both internal and external.

F9. Goals (ME): The mental representation by which a student strives to achieve individual goals, both short-term and long-term.

2. Descriptive statistics of the factors

From the descriptive statistics, it is possible to conclude that the mean of the factors exceeds the result 2, (over a maximum value of 5), except ESR and ME. Regarding the asymmetry, it is observed that it is negative in all the factors, which indicates that the values are centered in the upper part; the curve's ogive is displaced towards the upper part. However, this is not the case in the AE factor where the ogive is shifted towards the lower values. Kurtosis has positive values in: VT, EA, EO, MA and ME, indicating that the data accumulate in the center of the curve, especially in the ME factor, (leptokurtic). The ESC, AE, HS and CA factors, having negative kurtosis, imply that the data are distributed making a platycurtic curve.

Table 9.
Descriptive statistics of the factors

| | Descriptive statistics | | | | | | | | | |
|--------------|------------------------|--------|-------|-------|-------|-------|--------|-------|-------|-------|
| | VT | EA | EO | ESC | AE | HS | MA | CA | ME | |
| N Valid | 464 | 464 | 464 | 464 | 464 | 464 | 464 | 464 | 464 | |
| Mean | 2.268 | 2.179 | 2.224 | 1.869 | 2.278 | 2.369 | 2.306 | 2.186 | 1.552 | |
| Median | 2.367 | 2.211 | 2.284 | 1.88 | 2.397 | 2.442 | 2.367 | 2.491 | 1.805 | |
| Mode | 2.80 | 2.66 | 2.92 | 2.75 | 2.40 | 3.20 | 2.75 | 2.73 | 1.81 | |
| Desviation | .4189 | .3555 | .473 | .4517 | .8154 | .5858 | .3782 | .6399 | .4018 | |
| Skewness | -.912 | -1.138 | -.669 | -.260 | .114 | -.590 | -1.076 | -.926 | - | |
| | | | | | | | | | 1.635 | |
| Kurtosis | .558 | 1.96 | .082 | -.410 | -.414 | -.255 | 1.835 | -.066 | 1.759 | |
| KS of N Sig. | .000 | .001 | .018 | .299 | .000 | .001 | .000 | .000 | .000 | |
| Percentile | 25 | 2.016 | 1.984 | 1.911 | 1.563 | 1.657 | 1.930 | 2.035 | 1.776 | 1.444 |
| | 50 | 2.367 | 2.211 | 2.284 | 1.886 | 2.397 | 2.442 | 2.36 | 2.491 | 1.805 |
| | 75 | 2.594 | 2.460 | 2.577 | 2.201 | 2.826 | 2.844 | 2.568 | 2.730 | 1.805 |

Discussion

From the scientific literature, it is pointed out that motivation is an important variable because it affects learning, participation and well-being of people. The study and treatment of motivation associated with academic achievement behavior is undoubtedly complex and difficult to handle in research since it involves a series of components that broaden the perspective of academic motivation.

The concept of academic achievement motivation was put forward by McClelland (1989), who defined it as the drive to excel, to achieve goals or to strive only for the satisfaction of doing better. This type of motivation significantly influences the contextual, cognitive and emotional aspects of the Chilean and Spanish participants included in this study, an assessment that is consistent with the differences that the subjects express in intrinsic motivation, as stated by Jenkins and Demaray (2015).

Chowdhury et al. (2007), state that achievement motivation orients students in the fulfillment of their objectives, i.e. achievement motivation is related to purposes or life goals. According to Ryff (1989), among other factors, goals and/or personal projects are fundamental to have a vital meaning. Van Damme et al. (2012) propose the need to study the motivational mechanisms that allow people to persevere in their actions, that is, to know the mechanisms of self-regulation of goals in context. In this line, also, it is worth highlighting the work of Hardin et al. (2019), who discovered the existence of a relationship between achievement motivation and academic permanence.

Conclusions

The results obtained in this work have been satisfactory, mainly because a tool capable of measuring motivation towards academic achievement in a student body belonging to different educational systems and socio-cultural conditions has been constructed. The statistical analyses carried out have been sufficient to grant a preliminary reliability and validity to the inventory.

It is taken into account, that the present study is a pilot study, considering it necessary to continue advancing towards new variables that favor the improvement of the model. According to Stover et al (2017), there would be two unaddressed aspects in motivation: on the one hand, the lack of connection with alternative theories, and on the other, the analysis of the inconsistencies presented by the model.

The work presented with the creation of IMLA, has involved the link between trends in the use of revised motivational studies, the tendency to use those already created, the validation of motivational instruments to new cultures, and 2. the observation of the scarce interest in the creation of new instruments. This fact suggests the need for new approaches that incorporate integrative and updated elements in the study of academic achievement motivation.

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