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Factors associated with the educational climate from the perception of students who leave the National University of Costa Rica

Factores asociados al clima educativo a partir de la percepción de estudiantes que abandonan la Universidad Nacional de Costa Rica

José Andrey Zamora Araya • Eduardo Aguilar Fernández • Magaly Rodríguez Pineda

Abstract

This study aimed to explore what factors are associated with the educational climate of the Universidad Nacional de Costa Rica, based on the perception of students who dropped out of the institution during the period 2017-2020. A quantitative, exploratory, non-experimental, and correlational approach was used. Through the application of an exploratory factor analysis, this approach allowed for the identification of variables related to the educational climate before dropping out of the university. These variables are grouped into five factors: curriculum organization (course methodology, degree program expectations, the faculty teaching courses); student commitment (attendance at classes, degree of compliance with the assigned courses, attendance at consultation hours); material conditions for studying (state of the electronic devices, Internet connection, physical space for academic work); the interaction in the university context (services provided by the university, relationship with administrative staff and the start of classes) and, finally, the educational interaction (interaction with peers and teachers). The study reveals that the educational climate is a multidimensional construct that the exploratory factor analysis subdivided into five factors. These factors can be the basis for implementing measures to enhance academic interactions and student retention conditions.

Keywords: School dropout, school adaptation, educational environment, factor analysis, higher education.

Resumen

El objetivo de este estudio fue explorar cuáles factores se asocian con el clima educativo de la Universidad Nacional de Costa Rica a partir de la percepción del estudiantado que abandonó la institución durante el periodo 2017-2020. Se utilizó un enfoque cuantitativo de tipo exploratorio no-experimental y correlacional que a partir de la aplicación de un análisis factorial exploratorio permitió identificar que las variables relacionadas al clima educativo antes de abandonar la universidad se agrupan en cinco factores: organización curricular (metodología de los cursos, expectativas de la carrera, profesorado imparte los cursos); compromiso estudiantil (asistencia a clases, grado de cumplimiento de las materias asignadas, asistencia a horas de consulta); condiciones materiales para el estudio (estado del dispositivo electrónico, conexión a Internet, espacio físico para labores académicas); la interacción en el contexto universitario (servicios brindados por la universidad, relación con el personal administrativo e inicio de las clases), y por último la interacción educativa (interacción con compañeros y profesores). Del estudio se deriva que el clima educativo es un constructo multidimensional que el análisis factorial exploratorio subdividió en cinco factores que pueden ser la base para tomar acciones tendientes a mejorar las interacciones académicas y las condiciones de permanencia del estudiantado.

Palabras clave: Abandono escolar, adaptación escolar, ambiente educativo, análisis factorial, educación superior.

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Introduction

The educational climate is one of the factors that have been associated with academic performance and the degree of student satisfaction with higher education institutions. For example, it has been mentioned that there is a relation between a positive school climate and an improvement in academic achievement at both primary and secondary levels (Ismail et al., 2020; Steinmayr et al., 2018). In addition, it has been indicated that a suitable educational environment reduces harmful behavior such as bullying and discrimination (Aldridge et al., 2018; Berkowitz, 2022; Hong et al., 2018).

However, at the higher education level, there are few studies related to the school climate; they often focus on the transition process between secondary education and university (Rovai et al., 2005).

The term *educational climate* is associated with others such as, among others, *classroom climate*, *institutional environment*, and *school atmosphere*. However, it should be mentioned that studies referring to educational climate or institutional environment at a higher level traditionally focus on two aspects. The first concerns university workers, i.e., teaching and administrative staff; studies in this line aim to examine people's perceptions regarding the work environment in topics such as working conditions, work performance, institutional services, interpersonal relationships, and job satisfaction (Duche-Pérez et al., 2019; Marreros, 2018).

The second aspect focuses on the student body, so the studies are related to student experiences; as a result, discussions revolve around the educational climate, school environments, or classroom. In consequence, the studies center their attention on the dynamics occurring in the classroom and are usually interested in the

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dynamics associated with academic performance (Moritz-Rudasill et al., 2018; Wang & Degol, 2016).

Furthermore, there are studies exploring student perception of the institutional environment in areas that go beyond the classroom, such as institutional support, extracurricular activities, or their adaptation to university life (Almada, 2021; Cabrera et al., 2019). Experiences related to university admission can influence students' academic decisions regarding their persistence at the educational institution, particularly during their university entrance year (Tinto, 2012; Zuñiga-Vilchez et al., 2020).

Specifically, it is during the first year of attending university that many individuals choose to quit their studies, partly due to the experiences they have had. Actually, various studies on school dropout tend to concentrate on describing associated factors, framed within some of the proposed models, such as psychological, social, economic, or interaction (Proyecto Alfa-Guía, 2013; Rodríguez-Pineda & Zamora-Araya, 2021; Tinto, 2006), or on proposals for educational intervention or evaluations of these that help to enhance the levels of persistence in the institutions (Camino-Hampshire et al., 2020; Islas et al., 2018). Moreover, it is a common practice in studies to gauge students' perceptions of the interactions between social, personal, and economic factors, which are described as a way to understand individuals' subjective experiences and feelings about these topics.

Thus, this study aimed to explore the factors associated with the educational climate of the Universidad Nacional de Costa Rica (UNA), based on the perception of students who dropped out of the institution from 2017 to 2020. In this sense, the study aims to identify the constructs that would explain common aspects among the variables associated with the educational climate in students who entered the UNA and subsequently dropped out of the institution, so that the description and understanding of the relationships found can be simplified.

Educational climate

There are different terms related to the environment that students experience in educational institutions, the most common being school climate, educational environment, classroom atmosphere, and school or educational ambiance. This is possibly because the term can be associated with multiple dimensions, so its definition tends to be ambiguous, which means that there is no single way of conceptualizing it.

In any case, all these concepts refer to situations experienced within the school context. These situations encompass interactions with peers and with teaching or administrative staff, both in academic situations and coexistence within the institution, as well as social and cultural aspects (Abello et al., 2021; Escalante-Mateos et al., 2020; Galvez-Nieto et al., 2020).

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For example, the National School Climate Center (NSCC) states that the educational climate refers to the quality of school life, which is based on the patterns of experiences lived in school by parents, students, and school staff that reflect norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures (National School Climate Center, 2014).

Likewise, given its multifaceted nature, there is no consensus on what dimensions accurately represents the educational climate, although most studies point to the following four general factors: safety, teaching and learning processes, interpersonal relationships, and institutional environment (atmosphere and infrastructure). These factors reflect the lived experiences, norms, goals, and values of the students (Bradshaw et al., 2014; Ciccone & Freibeg, 2013; Cohen et al., 2009).

In this regard, the models proposed to study student dropout incorporate theoretical constructs that are similar to the factors associated with the educational climate. This is how interaction models argue that dropout is due to the lack of social and academic integration, where interpersonal relationships play an important role (Tinto, 2012). In contrast, psychological models focus more on studying the relationship between personality traits and dropout, as well as other latent variables such as perseverance, vocational choice, and academic performance, which are notable factors (Ethington, 1990; Proyecto Alfa-Guía, 2013).

Organizational models analyze the influence of institutional services, such as the quality of teaching and learning processes, classroom experiences, and institutional commitment in its relationship to enrollment discontinuance (Proyecto Alfa-Guía, 2013; Tinto, 2012). In addition, sociological models highlight that dropout arises as a lack of integration with the educational environment, possibly influenced by personal expectations and other social environments (Spady, 1970).

Furthermore, a positive educational climate enhances academic achievement, as a sense of belonging helps prevent student dropout, given that many strategies to address it are often strongly connected to factors associated with a positive school climate such as commitment, self-efficacy, and empowerment (Duckenfield & Reynolds, 2013). Additionally, the experience of well-being can affect participation in school activities beyond the influence of school climate perception, thereby promoting social competencies that facilitate adaptation to the educational context and, as a result, decreasing the risk of dropout (Lombardi et al., 2019).

Moreover, studies show an inverse association between a positive institutional climate and student dropout in both secondary and higher education due to the fact that a good educational climate influences educational processes and improves academic performance. This also fosters interpersonal relationships, which in turn favor social and academic integration among members of the community that, according to

interaction models, promotes student persistence (Alejos-Zelaya & Tello-Bedriñana, 2019; Contreras et al., 2022; Schaeper, 2020; Tinto, 2012).

In summary, the evidence suggests that a positive educational climate can help reduce dropout rates, so it is relevant to understand the factors that impact the educational climate to identify areas that the educational institution can improve and thus increase student retention levels.

Methodology

Type of research

The study is classified as a quantitative, exploratory, non-experimental and correlational type, as per Villalobos (2017), the variables are observed within a specific timeframe, in their natural context, without intending to manipulate them and seeking to determine the degree of association between them.

Participants

The study population included newly enrolled students from all UNA campuses in the 2017, 2018, 2019 and 2020 cohorts who attended at least one course in the I and II terms of each year but did not enroll in 2021. Around 3,900 new students enter UNA each year, but between 20% and 24% do not enroll starting from the second year. The research sample consisted of 503 students from these cohorts who willingly participated in the study.

Instrument

The administered questionnaire consisted of 53 questions distributed in three modules. The first was composed of 13 questions that inquired about the general characteristics of the student body, such as age, nationality, or employment status. The second module, consisting of 16 questions, targeted specific factors that caused students to discontinue enrolling at UNA. In the third module, 17 Likert scale questions were asked with five response options (*malo*, *regular*, *bueno*, *muy bueno*, *excelente* [poor, fair, good, very good, excellent]) to obtain information from students who dropped out of UNA regarding aspects of the educational climate. The questionnaire was initially sent to the students through the institutional email address provided by the UNA Registration Department using the LimeSurvey platform. After the first mailing, three weekly reminders were sent for approximately one month, finally achieving a response rate of 10%. Two experts validated the instrument, one with training in statistics and the other with knowledge in academic performance and school dropout. Their observations improved the structure and wording of the questionnaire.

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Data analysis

An exploratory factor analysis (EFA) was conducted to identify how variables related to the university educational climate are associated in students who dropped out of UNA. The analysis constitutes a multivariate technique that assumes the existence of an unknown set of latent variables referring to a theoretical construct or enabling the understanding of relationships between the variables (López-Aguado & Gutiérrez-Provecho, 2019).

The EFA was utilized to summarize the information from the 17 Likert scale questions, aiming to identify the factors related to the educational climate at UNA based on data provided by students who dropped out of the institution. The questions considered for the EFA were the following: the start of classes, the relationship with the administrative staff, the information provided by various services (scholarships, health, registration, libraries, etc.), the way the faculty taught classes, interaction with classmates, relationship with the faculty, organization and methodology of the courses, course schedules, academic performance, fulfillment of expectations of the degree program in which they had enrolled, Internet connection from the study space, the state of the electronic devices most frequently used to attend the courses, the physical space available for academic tasks, attendance to classes while they were enrolled at UNA, attendance to consultation hours or tutoring offered by the teacher staff, degree of compliance with the course assignments (homework, projects, exams, etc.).

To measure the reliability level of the scale, Cronbach's Alpha coefficient was utilized, and to measure the goodness of fit of the model, the mean square error of approximation, the comparative fit index, and the Tucker-Lewis index (RMSEA, CFI, and TLI, respectively) were calculated. In relation to these indicators, it has been mentioned that RMSEA values below 0.05 indicate a very good model fit. However, values less than 0.08 suggest an acceptable fit between the model and the data (Browne & Cudeck, 1992; Jöreskog & Sörbom, 1993). In contrast, for the CFI and TLI indexes, values above 0.95 are indicators of a relatively good model fit (Hu & Bentler, 1999). Nevertheless, TLI values above 0.90 are considered acceptable (Bentler & Bonett, 1980). There is a general consensus that high values of RMSEA and small values of CFI and TLI are indicators that the model fit is not adequate. However, it is important to consider that obtaining a set of desirable values for RMSEA, CFI, and TLI, taking into account conventional cut-off points, can be deemed as an indicator that the obtained model is susceptible to improvement (Xia & Yang, 2019).

To determine the appropriateness of conducting an EFA, the correlation matrix, Bartlett's sphericity test, and the Kaiser-Meyer-Olkin test (KMO) were used. The unweighted least squares factor extraction method was utilized for conducting the EFA, while Bartlett's method was employed for calculating the factor scores in conjunction with the oblimin oblique rotation method. In addition, the parallel analysis

criterion was used to determine the number of factors in the model. The analyses were performed using the R software version 4.2.1 (R Core Team, 2022).

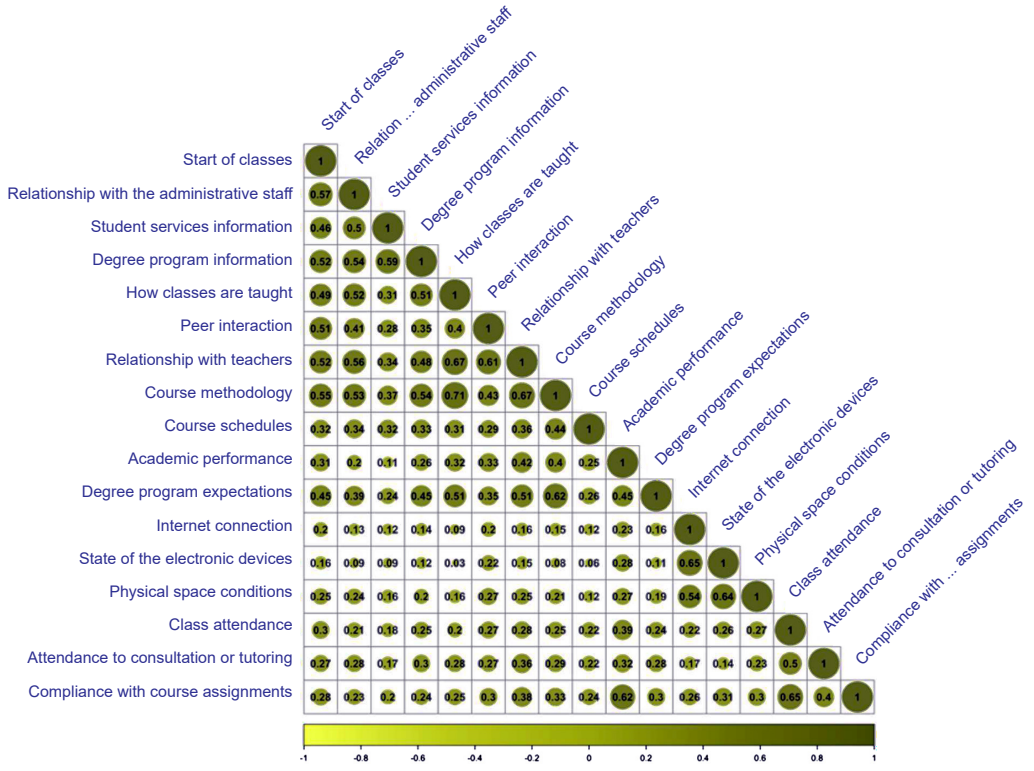
Results

The collected data revealed that the mean age of enrolled students was 20.9 years. Women comprised 56.06% of the students under study, and 55.07% did not receive a scholarship while attending the university. Moreover, 56.5% indicated that their parents did not have a university education (first-generation students), 19.51% mentioned that both parents had a university degree, and 23.98% responded that either the father or the mother had a university education.

Furthermore, the determinant of the correlation matrix between the variables was 0.0003, which indicated that there are variables with high correlations between them. Hence, the factor model technique is relevant for data analysis. In addition, the result of Bartlett's sphericity test ($\chi^2 = 752.768$ with 136 degrees of freedom and $p < 0.001$) rejects the null hypothesis that the correlation matrix is the identity, indicating that conducting an EFA is appropriate. Also, the KMO test showed a value of 0.882, which reveals that it is appropriate to perform an EFA (Figure 1).

Figure 1

UNA. Correlation matrix between the variables of the educational climate questionnaire based on the perceptions of the students who dropped out of the institution, period 2017-2020



Source: Own elaboration.

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Once the possibility of conducting the EFA was verified, the unweighted least squares method and oblimin rotation were used to analyze the 17 items related to the evaluation of the educational climate experienced by the students while they were enrolled at UNA. The parallel analysis criterion suggested the incorporation of five factors, considering the items whose factor loadings were greater than or equal to 0.40; these loadings are considered acceptable for the sample size under study (Kline, 1994). Employing this criterion facilitated the exclusion of items 1 and 9; this yielded 15 items that met the specified condition. Thus, factor 1 was designated as "educational interaction," comprising the variables "peer interaction" and "relationship with teachers." The other factors obtained were labeled as curriculum organization, student commitment, material conditions for studying, and interaction with the university context. Moreover, the internal consistency of the scales formed by each factor surpasses 0.70, which is considered acceptable (Table 1).

Table 1
Matrix of rotated factor loadings

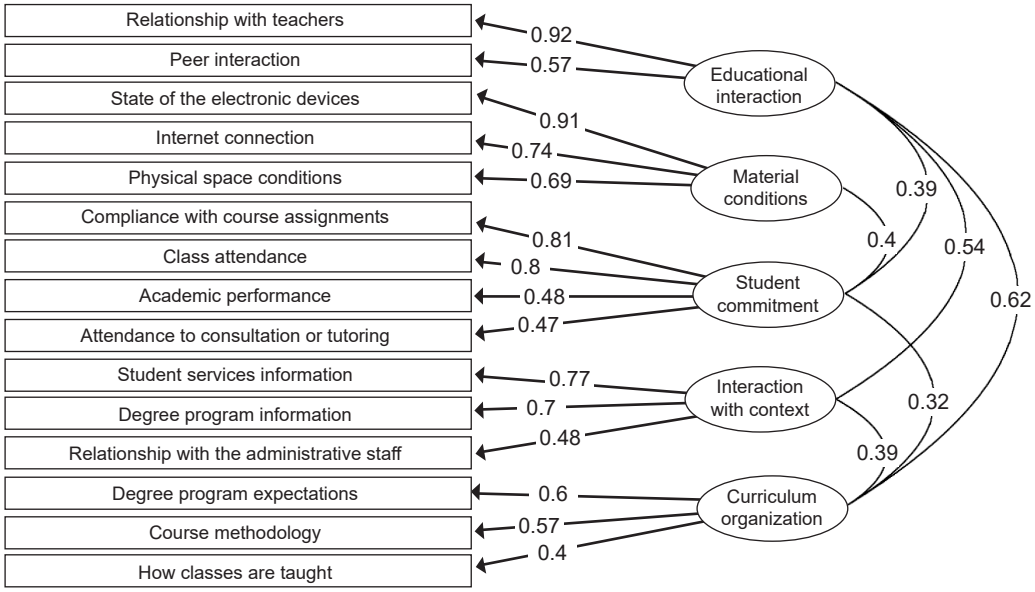
Items	Educational interaction	Material conditions	Student commitment	Interaction with context	Curriculum organization
Relationship with the administrative staff	0.342	0.024	-0.018	**0.478**	0.029
Student services information	-0.017	0.022	0.038	**0.765**	-0.076
Degree program information	-0.027	0.027	0.053	**0.698**	0.217
How classes are taught	0.396	-0.058	-0.043	0.165	**0.402**
Peer interaction	**0.575**	0.126	0.077	0.052	-0.054
Relationship with teachers	**0.920**	0.002	0.032	-0.027	0.038
Course methodology	0.248	0.002	0.002	0.202	**0.568**
Academic performance	0.035	0.103	**0.482**	-0.156	0.389
Degree program expectations	0.062	0.034	0.094	0.100	**0.600**
Internet connection	-0.028	**0.741**	-0.023	0.028	0.045
State of the electronic devices	-0.019	**0.907**	-0.003	-0.033	-0.027
Physical space conditions	0.091	**0.694**	0.016	0.067	-0.014
Class attendance	0.010	-0.015	**0.799**	0.101	-0.119
Attendance to consultation or tutoring	0.165	-0.025	**0.471**	0.111	-0.048
Compliance with course assignments	0.007	0.033	**0.812**	-0.037	0.081
Cronbach's Alpha	0.750	0.825	0.787	0.779	0.825
Average	3.204	2.909	3.046	2.982	2.912
Standard deviation	0.973	1.029	0.935	0.938	0.965

Source: Own elaboration.

Conversely, the correlations between the factors surpass 0.40, indicating non-orthogonality or lack of independence, while the factor loadings of all the variables present high values (above 0.40), so the degree of relationship between the factor

and its respective variables show appropriate values (Figure 2). In addition, the EFA yielded an RMSEA of 0.063, a TLI of 0.939, and a CFI of 0.977, which are deemed acceptable goodness-of-fit indicators. With these results, it can be assumed that the model of student perceptions and the covariance structures observed in the responses fit reasonably well.

Figure 2
UNA. Factors related to the educational climate based on the perception of the students who dropped out of the institution according to the EFA. Period 2017-2020



Source: Own elaboration.

Discussion

The EFA helped to group a series of variables related to the educational climate into five factors: curriculum organization, student commitment, material conditions for studying, interaction with the university context, and academic interaction.

The curriculum organization factor grouped variables such as course methodology, degree program expectations, and how the faculty teaches classes. This factor includes aspects related to the strategies implemented in the classroom to carry out the educational process. These strategies involve those activities conducted to help students achieve learning. In the teaching and learning process, the relationship between teacher and student constitutes a participative action that aims to strengthen the student's competencies. Hence, didactic strategies are a resource teachers use to clarify how to guide the actions that lead to the achievement of the learning objectives (Gutiérrez-Delgado et al., 2018).

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Furthermore, it is important to consider that the expectations about the degree program that students had prior to their admission to university may or may not correspond to the lived experience after enrolling. This can lead students to affirm their vocational choice, which might manifest as a sense of satisfaction with their choice, triggering a motivating effect. On the contrary, this can also induce frustration due to incongruence between expectations and experiences, which, in the worst case, might be associated with dropping out of university studies (Ambrocio et al., 2021).

The factor defined as student commitment incorporated variables related to class attendance, degree of compliance with course assignments, academic performance, and attendance at consultation hours. Student engagement is a phenomenon characterized by a set of specific orientations resulting from various concrete actions aimed at achieving academic success, comprehensive personal student development, and the development of the person (Aspeé et al., 2018). Consequently, this phenomenon represents a complex psychosocial process that involves individual and university characteristics (Schindler et al., 2017) that extend beyond the context of academic outcomes (Rojas et al., 2022). Therefore, the level of student participation in the execution of the different tasks required for their educational process is important, as is the level of institutional participation in the generation of actions that guarantee the students' success to promote an appropriate educational climate for learning.

The factor known as material conditions for studying encompassed variables such as the state of the electronic devices, Internet connection, and physical space for carrying out academic tasks. These characteristics are associated with students' access to new technologies, which are vital in the teaching and learning process and contribute to fostering a positive educational climate. Whether at home or in an educational institution, a proper infrastructure is needed to ensure the right conditions for an educational environment that fosters successful teaching and learning processes (Díaz-Barriga et al., 2022).

Interaction with the university context included variables related to the information received by the students about their degree program, the services provided by the university (scholarships, health, enrollment, and libraries, among others), the relationship with the administrative staff, and how the start of classes was. Regarding the information provided by the degree program, the organization and planning by those in charge generate in the students a sense of greater control and predictability over their process (Palomer et al., 2018). Furthermore, the information provided by the university is highly valuable, as it contributes to enhance the experience in the educational context (Lobos et al., 2021), where the attention of university staff plays a significant role.

Finally, the factor referred to as educational interaction combined the variables of interaction with peers and teachers. The opportunity to have peers and work in teams

creates positive impressions in the students; otherwise, there is a greater likelihood of experiencing increased academic difficulties (Palomer et al., 2018). Moreover, the bond between teachers and students is necessary for the achievement of the students' academic goals. To facilitate this bond, consolidated commitment from teachers to their profession and organization is essential. This commitment helps prevent negative attitudes among teachers, as well as alienation and lack of belonging to the institution on the part of the students, reducing the possibility of dropout, particularly in the early stages (Freund et al., 2022; Tinto, 1993).

Conclusion

The factor analysis enabled the identification of five factors related to the educational climate of students who dropped out of the university after their first year of classes. These factors were the following: (a) Educational interaction, (b) Material conditions, (c) Student commitment, (d) Interaction with the context, and (e) Curriculum organization.

Furthermore, the items comprising the subscales of each factor revealed key aspects associated with the respective latent variables, which in turn reflect adequate internal consistency (Cronbach's alpha values above 0.70). Thus, based on the psychometric results of the subscales, it can be considered that the questions posed were adequate to obtain information on the educational climate from the students who dropped out of UNA. Having an instrument that enables the collection of information about the educational climate at the university level can be a valuable asset for UNA, as it allows for the identification of institutional aspects that may require interventions in order to promote academic success among students.

The students had a positive perception (average value of 3 points on a scale of 5) of all the factors identified by the EFA, particularly their commitment to the university and interaction with faculty and peers. While it is true that the results indicate that the educational climate at UNA is perceived as good, despite the fact that the sample consists of students who dropped out of the university after their first year, there is still room for improvement, particularly in the constructs of curriculum organization and material conditions. These are related to methodological and vocational aspects in the former case and to accessibility conditions for the use of information and communication technologies in the latter case.

Considering the importance of an adequate educational climate for the achievement of learning, the identification of institutional weaknesses in aspects of the educational climate could generate improvement actions and guide them in such a way that students become involved in a more effective teaching and learning process and thus reduce the risk of dropping out. This way, forming the educational climate construct provides relevant information that can guide institutional action.

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Based on the results, it is considered relevant for future research to delve into the study of aspects related to the educational climate in which students develop during their first steps in university life. This will enable UNA to identify factors that could affect individuals' appropriate performance and establish preventive actions aimed at reducing the risk of dropping out of the academic training process. In addition, it is suggested that other studies can explore possible relationships between the educational climate and student dropout at the university level, addressing the issue by considering different research approaches.

The educational climate is a complex and relevant phenomenon, as it involves situations experienced within the context of the academic training process. It encompasses elements related to students' individual characteristics and institutional actions involving the institution's staff, organizational structure, and operational dynamics. These elements are necessary to ensure an optimal student experience and improve learning outcomes.

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