# Validation of an instrument to determine the perception of students about the educational environment and its incidence on mental symptoms and academic performance

# Validación de un instrumento para conocer la percepción de los estudiantes acerca del ambiente educativo y su incidencia en la sintomatología mental y el desempeño académico

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**Abstract:**

Background: There are information gaps about the perception that students have of the factors of the educational environment that favor the manifestation of mental symptoms and how it impacts on academic performance . Objective: Determine the content validity of an interview script through expert judgment. Method: An interview-type instrument was designed with nine open questions that refer to the educational environment, mental symptoms and academic performance, aimed at students in the health area; The evaluation of the questions was carried out based on the univocity and relevance scales using the Carrera, Vaquero and Basells (2017) method. Results: six questions obtained univocity and relevance indices ≥ 0.8, therefore they met the criteria of being generally understood and interpreted in only one way, in addition to being mostly adequate and/or relevant for the population to be studied. Instead, the questions: How would you describe your college and how do you feel in it? And what changes do you think are necessary in the educational environment to reduce mental symptoms? they obtained indices <0.8, so they were modified in their wording. Subsequently, they were sent in a second round of evaluation to the experts, in which they obtained indices ≥ 0.8. Conclusion: there is a valid interview script in its content to know the perception of the students of the health area about the educational environment and its implications on mental health.

**Keywords:** Educational environment, Academic performance, Students, Mental health.

**Resumen:**

Antecedentes: Existen vacíos de información acerca de la percepción que tienen los estudiantes de los factores del ambiente educativo que favorecen la manifestación de sintomatología mental y de cómo impacta en el desempeño académico. Objetivo: Determinar la validez de contenido de un guión de entrevista a través del juicio de expertos. Método: Se diseñó un instrumento tipo entrevista con nueve preguntas abiertas que hacen referencia al ambiente educativo, la sintomatología mental y el desempeño académico, dirigido a estudiantes del área de salud; la evaluación de las preguntas se realizó con base en las escalas de univocidad y pertinencia mediante el método de Carrera, Vaquero y Basells (2017). Resultados: seis preguntas obtuvieron índices de univocidad y pertinencia ≥ 0.8 por lo que cumplieron el criterio de ser comprendidas e interpretadas en general de una sola forma, además de ser en su mayoría adecuadas y/o relevantes para la población a estudiar. En cambio, las preguntas: ¿Cómo describirías tu facultad y cómo te sientes en ella? y ¿Qué cambios consideras que son necesarios en el ambiente educativo para disminuir la sintomatología mental? obtuvieron índices <0.8 por lo que se modificaron en su redacción. Posteriormente se enviaron en una segunda ronda de evaluación a los expertos, en la cual obtuvieron índices ≥ 0.8. Conclusión: se cuenta con un guión de entrevista válido en su

contenido para conocer la percepción de los estudiantes del área de salud sobre el ambiente educativo y sus implicaciones en la salud mental.

**Palabras clave**: Ambiente educativo, Desempeño académico, Estudiantes, Salud mental.

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## 1. Introduction

The educational environment is the context where student socialization and learning occurs (1). It also refers to the conditions of an institution, the relationships between its members, the perceptions and expectations of members about their environment (2). It integrates five main elements: The teaching intervention, the person who teaches, the academic and social self-perception and the learning environment. These elements include the actions and strategies used to promote learning, skills, knowledge and attitudes of teachers, as well as their students, among others (3). In addition, they include negative factors such as the complexity of the academic program, exhausting schedules, competition among students, poor study techniques, inadequate teaching intervention, among others (4). The educational program in the area of health is long, demanding and complex and as a consequence is associated with high levels of stress. Stress is defined as a set of responses produced by being in a risk situation, in turn, academic stress is that which occurs when exposed to factors in the educational environment that generate pressure on students (5). For example, evaluations, interpersonal relationships, family support, the presence of diseases, physical activity (6). In addition to this, academic stress favors the appearance of mental disorders such as anxiety and depression, as well as sleep disturbances (5).

The main mental disorders present in students in the health area are: 1. Anxiety, defined as excessive worry that negatively impacts the person's daily life, which is difficult to control and is associated with three or more symptoms physical and cognitive (7); 2. Depression is an affective disorder, characterized by changes in mood, in addition to other symptoms (8); 3. Insomnia is a sleep disorder that is characterized by difficulty falling asleep or staying asleep, with consequent daytime dysfunction (9). The presence of symptoms related to mental disorders promotes changes in students' habits, in the ability to concentrate, pay attention, in memory, and ultimately affects learning (5).

The training process in careers in the health area is characterized by its great demand. Thus , there are research studies that show that students in health areas have higher stress levels than other university careers, in addition, with a higher prevalence of mental disorders and poor academic performance. In a cross-sectional study conducted by Capdevila-Gaudens et al. (10) in 43 medical schools in Spain with 5,216 students, they observed a general prevalence of depression of 41% where 23.4% of participants presented moderate to severe levels and 10% with suicidal ideation. Regarding anxiety levels, the prevalence was 25%. These results were consistent with the results of other studies where it was observed that 8.9% of medical students presented a regular-poor-very poor self-perceived health, with 54.9% presenting a prevalence of probable anxiety and 60.9% probable. depression (11). Similarly, the incidence of anxiety, depression, stress and drug use in medical students has been observed; where those associated with university life stand out as causative factors, including excessive activities and lack of sleep (12). In accordance with this, the need arises to develop an instrument that allows understanding the perception of students in the health area about the factors of the educational environment that favor the manifestation of mental symptoms and how this impacts on academic performance, since that an instrument with a qualitative approach that includes these phenomena was not found. Therefore , the objective of this work is to design and

determine the content validity of an interview-type instrument that recovers the feelings and thoughts of students regarding the educational environment and how they consider that it affects anxiety, depression and sleep disorders. .

The validation of an instrument measures the degree to which the phenomenon being studied occurs; that is, the degree to which it meets the objective for which it was built. In addition to this, content validity makes it possible to determine if the instrument adequately represents a specific content domain (13). This validation is necessary since it is a self-developed instrument (14) and it can be carried out through expert judgment, which consists of recruiting a group of experienced people in the area in order to evaluate the content and determine what so pertinent and unequivocal is it to be applied (15-16). Thus, according to this, De la Cruz and Gordillo (17) developed, validated and implemented an interview to understand the educational practices that impact the teaching and learning of foreign languages through a trial of judges, before and after the application of this On the other hand, Obregón and González (18) developed an interview to evaluate the use of Wikipedia in university education, and through consultation with five experts it was possible to reformulate questions until obtaining the final script. Similarly, Robles et al. (19) designed an interview to understand the formative process of judokas, which was subjected to a trial and later to a statistical analysis, as well as García-Martín et al. (20) developed an instrument to analyze the training process in expert players following a similar method.

## 2. Methods

### Instrument design

A semi-structured interview type instrument was designed with nine open questions, aimed at students in the health area. Interviews are defined as an exchange of information between two or more people, which allows knowing the meaning of a topic of interest (15). The interview questions were developed based on the literature review, although they were self-made.

### Validation

The validation process was carried out only with the expert judgment technique because the questions that make up the interview are open. Accordingly, it is not possible to carry out other types of validation such as: Exploratory Factor Analysis and Confirmatory Factor Analysis. For its development, 15 judges were invited, who met the following inclusion criteria: being a psychologist, having at least one year of work experience and experience in the field of the research project. In addition to this, the criteria of being available to participate, motivated and being impartial were met. They were sent an invitation by email, where the general objective of the research was explained, which consists of analyzing from the perception of the students in the health area, how the educational environment favors the manifestation of mental symptoms and how it affects their performance. academic; as well as instructions and a link to access a digitized form. In addition, it was explained to them that, once the validation process was completed, they would be given a certificate of participation as judge or judge to evaluator. The form consisted of two sections, one on relevant personal and academic data, for example, academic degree and professional training in teaching and research; and another section about the validation instructions, with the relevance and univocity scales, of the questions in the interview script, which they could access once they gave their consent. The evaluation of the questions was carried out based on the univocity and relevance scale proposed by Cabello and Carrera (14) (table 1 and 2) (14), in which values of 0, 1, 2 and 3 are assigned, representing a null, low, high and optimal category, respectively.

**Table 1.** Univocity scale.

| Category | Worth | Definition |
|---|---|---|
| None | 0 | It may not be understood or interpreted in very different ways |
| Low | 1 | It can be understood or interpreted in different ways. |
| High | 2 | It can be generally understood and interpreted in only one way. |
| Optimal | 3 | It can undoubtedly be understood and interpreted in only one way. |

Source: Cabello & Carrera, 2017.

**Table 2.** Relevance Scale

| Category | Worth | Definition |
|---|---|---|
| None | 0 | Nothing appropriate and/or relevant to the population |
| Low | 1 | Inadequate and/or relevant to the population |
| High | 2 | Mostly adequate and/or relevant to the population |
| Optimal | 3 | Completely adequate and/or relevant to the population |

Source : Cabello & Carrera, 2017.

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For the analysis, the Carrera, Vaquero and Basells procedure (21) was used, which establishes criteria that allow objectively directing the actions to be carried out during the validation process. Using this method, an index of univocity (iU) and relevance (iP) was obtained through the application of previously published formulas (21). These formulas allowed the judges' answers to be weighted by obtaining a value between 0 and 1 for each question, determining whether they should be kept, modified or eliminated according to the following criteria:

- iU or iP $\geq 0.8$ remains in its original form
- iU or iP $\leq 0.79$ or $\geq 0.60$ is modified
- iU or iP $\leq 0.59$ is removed

As a complement to this procedure, Kendall's W concordance coefficient was used, with the purpose of determining the degree of agreement between the judges and, with this, establishing if there is consensus in the process of assigning the values of univocity and relevance (16).

## 3. Results

Of the 15 judges who were invited, only 10 agreed to participate, and one was eliminated because he did not answer all the questions, leaving a total of nine participants. Sociodemographic data were obtained from the first section of the form (Table 3). Regarding scientific production, two judges lacked scientific production and the rest had participated in the preparation of various research articles and theses, both as principal investigators and as advisors. Which, even though it is an important aspect, does not affect your participation as an evaluating judge of an interview script. After the application of the Carrera, Vaquero and Basells procedure, the uniqueness and relevance indices were obtained (table 4). In addition to the previous results, it was considered relevant to report the comments of the judges, to enrich the quality of the questions in the script, since their experience as psychologists is important for the correct interpretation of the questions by the students (table 5).

**Table 3.** Sociodemographic data.

| Category | Description | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 2 | 22.2% |
| | Feminine | 7 | 77.7% |
| Maximum degree of studies | Degree | one | 11.1% |
| | master's degree | 6 | 66.6% |
| | Doctorate | 2 | 22.2% |
| Professional research experience | 0-5 years | 7 | 77.7% |
| | 6-10 years | 0 | 0% |
| | ≥ 11 years | 2 | 22.2% |
| Professional experience in teaching | 0-5 years | 3 | 33.3% |
| | 6-10 years | 2 | 22.2% |
| | ≥ 11 years | 4 | 44.4% |

**Table 4.** Univocity and relevance indices

| Question number | Univocity | Relevance |
|---|---|---|
| 1. How would you describe your college and how do you feel in it? | 0.5926* | 0.7407+ |
| 2. What symptoms of stress, anxiety, depression and/or sleep disturbance have you presented after entering the faculty? | 0.8148 | 0.9259 |
| 3. What aspects of the educational environment do you consider influence your symptoms and in what way? | 0.8519 | 0.8889 |
| 4. What strategies and/or treatment do you use to manage your mental symptoms, and how effective is it? | 0.8889 | 0.8519 |
| 5. Which of the symptoms you present do you consider affects your academic performance and in what way? | 0.8889 | 0.963 |
| 6. What strategies does your faculty offer and how do they support the reduction of your mental symptoms? | 0.8889 | 0.8519 |
| 7. What changes do you think are necessary in the educational environment to reduce mental symptoms? | 0.7778+ | 0.8148 |
| 8. What changes do you think are necessary in the educational environment to improve your academic performance? | 0.8519 | 0.9259 |

*, met the elimination criteria. +, complied with the criteria for modification in the wording.

<div align="center">**Table 5.** Comments from judges</div>

| Question number | Comments |
|---|---|
| 1. How would you describe your college and how do you feel in it? | - They are good factors to analyze, but perhaps it is worth clarifying them a little more independently to avoid that the interpretation invalidates the item.<br>- It's two questions in one. For example, I can describe my faculty well, but not feel that way at the moment, or, on the contrary, I can feel good, but I would describe to you that my faculty is missing elements.<br>- It is possible that it is not clear if the reference is in terms of facilities, administrative services, functional aspects, location, meets academic expectations, among others.<br>- Specify the question "how would you describe the environment" more. |
| 2. What symptoms of stress, anxiety, depression and/or sleep disturbance have you presented after entering the faculty? | - It is a clear question, however, with such technical language, it can overwhelm new students, coupled with the fact that it requires a moderate degree of introspection that, although it is commonly had, may be absent if asked directly.<br>- It is common for the population to be unaware of symptoms that imply anxiety or depression. It is possible that they present them and do not know that it is part of it. |
| 3. What aspects of the educational environment do you consider influence your symptoms and in what way? | - I think that this question can be a little confused with the students of the first semester considering that they come from two years of pandemic and are still not very adapted to the university environment, and "aspects of the educational environment" could be confused a little. |
| 4. What strategies and/or treatment do you use to manage your mental symptoms, and how effective is it? | - There are two questions. I can use a strategy, but not be as effective. Defining mental would be more appropriate for the symptoms of anxiety, depression, etc.<br>- I recommend canceling the mental term, because it can be from physical (example tiredness) to emotional (tense, sad). |
| 5. Which of the symptoms you present do you consider affects your academic performance and in what way? | - They are clear and seek pertinent information, maybe they clearly say symptoms; raise defenses of those who answer the test, but it can still work well. |
| 6. What strategies does your faculty offer and how do they support the reduction of your mental symptoms? | - Specify what mental symptoms are.<br>- Mental symptomatology again does not seem correct to me, let's understand that stress also has physical symptoms.<br>- There are more options than the mental. I would also omit the term. |
| 7. What changes do you think are necessary in the educational environment to reduce mental symptoms? | - Specify what mental symptoms are.<br>- Change the term mental symptomatology.<br>- Change mental. |
| 8. What changes do you think are necessary in the educational environment to improve your academic performance? | - I recommend the following wording: What suggestions would be important to improve the educational environment? |

Based on these results, it was determined that questions 2, 3, 4, 5, 6 and 8 retain their original wording; however, the comments and suggestions of the judges regarding how to improve their writing were taken into account. Question 7: What changes do you think are necessary in the educational environment to reduce mental symptoms? met the modification criteria, as well as question 1: How would you describe your faculty and how do you feel in it? met the elimination criteria. It was decided to modify both questions due to their relevance and to carry out a new round of validation with the same judges, taking into account their comments and suggestions,

obtaining the results of tables 6 and 7. Finally, the coefficient was estimated Kendall's W using the SPSS program, obtaining a value of 0.05 for relevance with 0.83 significance and 0.06 for univocity with 0.82 significance, which indicates that the judges do not agree with each other.

**Table 6.** Univocity and relevance indices (second round)

| question number | univocity | Relevance |
|---|---|---|
| 1. How would you describe the educational environment of your college? | 0.8889 | 0.8519 |
| 2. How do you feel in your college? | 0.8148 | 0.8519 |
| 3. What changes do you think are necessary in the educational environment to improve your mental health? | 0.9259 | 0.9259 |

**Table 7.** Comments from judges (second round)

| Question number | Comments |
|---|---|
| 1. How would you describe the educational environment of your college? | - Well, ask on a specific topic.<br>- Making a description is based on the perception of each person, therefore, it guides you to gaps, so it would be favorable to increase the relevance above what is indicated. |
| 2. How do you feel in your college? | - It is a good question, but perhaps it is very ambiguous, it can be useful if you want to know the general feeling, but specifying the aspect in which you feel that way could be convenient.<br>- The question is very general, the answer can be in three areas (with physical, emotional or academic health). Define the objective you want to obtain with this question.<br>- Specify in what aspect (physical and/or emotional). |
| 3. What changes do you think are necessary in the educational environment to improve your mental health? | - This question is aimed at an objective that is to know the needs of the student.<br>- I think it's great.<br>- This question is important for a survey of students. |

## 4. Discussion

No qualitative instrument was found that retrieves information on the perception of students in the health area about the factors of the educational environment that favor the manifestation of mental symptoms and how it impacts on academic performance, for which it was necessary to design it based on in the theoretical framework, and with the support of psychology personnel to manage to integrate the appropriate questions that contribute to the recovery of the necessary and pertinent information for the achievement of the proposed objectives. In the same way, it was necessary to validate its content through the "expert judgment" technique.

De la Cruz and Gordillo (17) chose to elaborate the script that was implemented, after which a group of experts was consulted, after which it was re-elaborated and submitted again for evaluation for approval. On the contrary, in the present study, expert judgment had to be carried out twice, which generated the univocity and relevance indices necessary to maintain the questions, so there was no need to send it to a third round. This is similar to what was stated by Obregón and González (18) who designed an interview script and later asked a group of five experts for their opinions in several rounds, which allowed modification until a consensus was reached among them, and to determine reliability, they used the Lincoln and Guba criteria.

Regarding the results of the validation process, six of the questions obtained univocity and relevance indices ≥ 0.8, for which reason their original wording was preserved, in a similar way to Mediavilla and García (22) when having the answers of the judges, it was determined through a statistical analysis that they met the objective of the research, so they did not make additional modifications, as did Palacio et al. (23), who validated the content of an existing interview after its translation, through a review by experts. to finally apply it and evaluate the comprehensibility and applicability through a statistical analysis and through this determine that it was not necessary to modify it. Unlike these authors, in the present investigation, the questions: How would you describe your faculty and how do you feel in it? And what changes do you think are necessary in the educational environment to reduce mental symptoms? They obtained uniqueness and relevance indices <0.8, for which reason they required adjustments.

In another sense, Robles et al. (19) validated their instrument before 10 expert judges, who evaluated the preliminary interview and based on the results, it was modified, without being subjected to further review. Likewise, García-Martín et al. (20) validated their interview before 11 expert judges, later they made modifications in the wording and eliminated items, however, it was not subjected to evaluation again. Both investigations differ from the present one regarding the number of judges, which were nine judges on both occasions, because they are the ones who agreed to participate out of 15 who were invited. Even though García-Martín et al. (20) propose a number of 10 as the ideal, there is controversy regarding which is the appropriate number, since it has been described that five judges is an acceptable number, for which nine experts are admissible for validation (20) and the method used is valid.

Some authors highlight that the validation and reliability criteria in instruments with a quantitative approach are well defined, unlike those with a qualitative approach (20). In addition to this, there is a scarcity of studies on the validation of semi-structured interviews, for which reason there is no main method to carry it out (17). This justifies the existence of different procedures and none considered the ideal. Because it is a qualitative instrument, it only reached validation by expert judgment. However, it is important and valuable that it be validated in its univocity and relevance, since the information that is recovered from the feelings and thoughts of the students regarding how the educational environment affects the mental symptoms and the academic performance of the students; It will allow the construction of welfare models to favor the integral and humanistic formation of students in the university environment. Therefore, this instrument can be applied in any higher education institution and also in upper secondary education.

Regarding the limitations, having only had 9 judges instead of 10, which is the most recommended by the literature, and that two of them lack scientific production and research experience, which could bias the results. In relation to ethical considerations, the present investigation is devoid of risk, however, the principles of autonomy, beneficence, non-maleficence and justice were respected. In addition to this, the confidential and anonymous nature of the data obtained was established.

## 5. Conclusions

- The content analysis of the interview script through the technique of expert judges, showed that it is a valid instrument to know the perception of students about the educational environment and its incidence on mental symptoms and academic performance; in addition to being likely to be applied to students in the health area.
- A semi-structured interview was decided in order to have the freedom to add additional questions with the intention of obtaining additional information, and with this, which allows the research objective to be answered.

- An interview script suitable to be applied to students and to be used as a basis to develop other instruments in this area of study for future research was obtained.

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**Contributions of the authors** : Natalia Mata de los Ríos: Design, development and writing of the article. Haydeé Parra Acosta: Advice on the design and development of the article. Review, correction and complementation in the writing of the article.

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**ANNEX I**

**Original interview script**
1. How would you describe your college and how do you feel in it?
2. What symptoms of stress, anxiety, depression and/or sleep disturbance have you presented after entering the faculty?
3. What aspects of the educational environment do you consider influence your symptoms and in what way?
4. What strategies and/or treatment do you use to manage your mental symptoms, and how effective is it?
5. Which of the symptoms you present do you consider affects your academic performance and in what way?
6. What strategies does your faculty offer and how do they support the reduction of your mental symptoms?
7. What changes do you think are necessary in the educational environment to reduce mental symptoms?
8. What changes do you think are necessary in the educational environment to improve your academic performance?

**Final interview script**
1. How would you describe the educational environment of your college?
2. How do you feel emotionally in your college?
3. What psychological symptoms have you presented after entering the faculty?
4. What aspects of the educational environment do you consider influence your symptoms and in what way?
5. What strategies and/or treatment do you use to manage your symptoms, how effective is it?
6. Which of the symptoms you present do you consider affects your academic performance and in what way?

7. What strategies does your faculty offer and how do they support the reduction of your symptoms?
8. What changes do you think are necessary in the educational environment to improve your mental health?
9. What changes do you think are necessary in the educational environment to improve your academic performance?