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Inclusion and equity in education: enablers, barriers, and innovations

Inclusión y equidad en educación: facilitadores, barreras e innovaciones

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Inclusion and equity in education

National and international organizations view inclusion as a fundamental objective and process for advancing equitable education. In this way, inclusion and equity constitute a political, educational, and ethical commitment to building more just societies where the right of all people to quality education is guaranteed. Thus, the need to analyze, research, propose, and socialize the practices, facilitators, and innovations that have been implemented to transform education systems is highlighted. Despite progress, barriers still exist that limit access, learning, and participation for all members of the educational community. Therefore, emphasis is placed on the importance of analyzing and promoting policies, practices, and cultures that recognize diversity as an opportunity that enriches education and the development of society, considering that such diversity is not limited solely to disability.

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"Everyone goes their own way": perceptions of students of special education centers about interpersonal relationships with their peers

"Cada uno sigue su camino": percepción del alumnado de centros de educación especial sobre las relaciones interpersonales con sus iguales

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Abstract

Ensuring inclusive, quality education poses a challenge for the education system. In recent years, educational progress has been made to ensure that the right to education of certain groups, such as students with special educational needs, is not violated. However, schooling models that segregate on the basis of abilities persist. To understand this reality, it is essential to listen to the voices of the true protagonists. The objective of this study was to analyze the perceptions of students in special education centers in the Region of Murcia (Spain) regarding the quality of their interpersonal relationships with their peers, both in special education centers and in mainstream schools. To this end, a qualitative phenomenological design was used through semi-structured interviews with 36 students enrolled in special education centers. The results revealed different perceptions, demonstrating the impact of the quality of the relationships they establish on their sense of belonging to the group. Based on the findings of this study, it has been possible to identify some of the aspects that hinder the creation of strong interpersonal bonds and reflect on the socio-educational implications necessary to foster quality relationships and, consequently, improve the educational and social inclusion of all students.

Keywords: inclusive education, special education, persons with disabilities, interpersonal relations, students.

Resumen

Garantizar una educación inclusiva y de calidad supone un reto para el sistema educativo. En los últimos años, se han realizado progresos educativos para no vulnerar el derecho a la educación de determinados colectivos, como es el alumnado con necesidades educativas especiales. Sin embargo, persisten modelos de escolarización que segregan por motivos de capacidad. Para poder conocer esta realidad es fundamental escuchar la voz de los verdaderos protagonistas. El objetivo de este estudio ha sido analizar la percepción del alumnado de los centros de educación especial de la Región de Murcia (España) sobre la calidad de sus relaciones interpersonales con sus iguales, tanto de centros de educación especial como de centros ordinarios. Para ello, se empleó un diseño cualitativo de tipo fenomenológico a través de entrevistas semiestructuradas a 36 alumnos escolarizados en centros de educación especial. Los resultados han mostrado diferentes percepciones, pudiéndose comprobar la repercusión que tiene la calidad de las relaciones que establecen respecto a su sentimiento de pertenencia al grupo. A partir de los hallazgos de este estudio, se han podido señalar algunos de los aspectos que dificultan la creación de vínculos interpersonales sólidos y reflexionar sobre las implicaciones socioeducativas necesarias para favorecer relaciones de calidad y, en consecuencia, mejorar la inclusión educativa y social de todo el alumnado.

Palabras clave: educación inclusiva, educación especial, persona con discapacidad, relaciones interpersonales, estudiantes.

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1. Introduction

Although inclusive education is the subject of international debate regarding its meaning, due to the different interpretations attributed to it (Arnaiz-Sánchez et al., 2024), the specialized literature defines it as a process that seeks to ensure that students of all ages are provided with meaningful, quality educational opportunities in their local community, together with their friends and peers (Todorova and Bilgeri, 2025).

Achieving inclusive education is currently a challenge, becoming one of the major sustainable development goals for transforming 21st-century society. Progress in inclusive education has been recognized at the international level (UNESCO, 2020) and in Spain (Echeita, 2022), but certain practices that hinder its achievement continue to be observed (Graham, 2024). One of these barriers is the existence of different schooling environments for certain students in the education system, such as special education centers, which are attended by those with significant disabilities (Ainscow, 2024).

This situation is identical in various countries around the world (Echeita and Simón, 2020). In the case of Spain, despite the fact that the education law recognizes the right to inclusive education and stipulates that all students must be educated in regular schools, there are 484 special education centers (Ministerio de Educación, Formación Profesional y Deportes, 2025). This fact has been denounced by the Committee on the Rights of People with Disabilities [CRPD] (2024), as the Spanish education system repeatedly violates the right to inclusive and quality education by excluding people with disabilities from general education. According to Göransson et al. (2020), the coexistence of different types of schooling is a form of exclusion, segregation, isolation, classification, differentiation, and discrimination in the classroom, which can compromise social interactions and relationships among peers (Pirker et al., 2025).

The social relationships that students establish in learning environments are fundamental both for their development and for the construction of inclusive environments (Hartmann et al., 2024), as the key role played by peers as agents of inclusion has been highlighted (Montanero et al., 2024). To this end, the classroom must become an environment that promotes friendship, and the welcoming and acceptance of differences (Lin et al., 2025). Although children with disabilities often face difficulties in being socially accepted, which complicates their interpersonal relationships (Biswal and Mishra, 2025), they show a preference for forming friendships with people without disabilities (Hoffman et al., 2021).

Research has pointed to the benefits of peer learning in ordinary contexts. Thus, greater effectiveness of teaching-learning processes has been proven (Koegel et al., 2012); greater recognition and appreciation of differences, which leads to greater motivation to learn (Nieto and Moriña, 2021); as well as an increase in opportunities to promote socio-affective development (Pinto et al., 2019). However, students enrolled in special education centers have fewer opportunities, which can make them invisible to others, both inside and outside of school (Vila-Merino et al., 2024).

Douma et al. (2024) highlight that reducing the presence and participation of students enrolled in separate schooling modalities in activities with their peers in ordinary modalities can negatively affect their interpersonal relationships, generating a lower preference for them. According to Goodall and MacKenzie (2018), this lack of close friendships contributes to feelings of exclusion. In order to understand these realities, it is essential to consider and listen to the opinions of the protagonists through a process of listening to their voices (Fielding, 2011).

The student voice movement encompasses all initiatives that promote student participation, consultation, opinion, and leadership in educational institutions. In the field of educational research, this process and strategy allow researchers to get closer to students' perceived and lived reality (Proffitt et al., 2025). Listening to this voice is essential for gathering their perceptions of educational reality, which allows for more complex and diverse views on educational phenomena (Vinatea-Elorrieta et al., 2025). Furthermore, as Fielding (2011) proposes, this movement offers a valuable opportunity for schoolchildren with SEN who require highly specialized care to express themselves and make their opinions on education visible.

Listening to their voices is not a choice, since, as stated in the United Nations Convention on the Rights of the Child (ONU, 1989), children also have the right to participate, express their opinions, and

be heard. Similarly, the United Nations Convention on the Rights of People with Disabilities (UNCRPD) (ONU, 2006) also defends the right of children with disabilities to freely express their opinions on matters that affect them. However, despite these legal guarantees, Messiou (2019) points out that the voices of students remain surprisingly absent from important debates, especially those who are excluded within these groups, such as students with disabilities (Byrne and Lundy, 2020).

According to Messiou et al. (2025), the voice of students can reveal inequalities or injustices that affect marginalized groups, both socially and institutionally, and can serve to denounce an education system that sometimes neglects and renders certain groups invisible. Vlachou et al. (2024) argue that in order to achieve truly inclusive systems, it is necessary to recognize students with disabilities as an essential source of information, since they are experts in their own experiences. In this context, this process is presented as a key tool for improving educational practices and reforming the education system (Mayes, 2020).

Because of the latter, there is a need to know whether students enrolled in special education centers feel accepted. To this end, this study focuses on these students' perceptions of their interpersonal relationships with their peers, both in special education centers and in regular schools.

Therefore, the general objective of this research is to analyze the perception of students in special education centers in the Region of Murcia regarding the interpersonal relationships they establish with their peers. In order to achieve this, the following specific objectives are proposed:

1. To understand the quality of the relationships established between students in special education centers from the students' own perspective.
2. To identify the perception of students in special education centers regarding the quality of interpersonal relationships with peers in mainstream schools.

2. Methodology

2.1 Research design

This research falls within the interpretive paradigm and follows a phenomenological qualitative method. This design allows the object of study to be analyzed from the participants' perspective, which is the most suitable for understanding and describing their experiences. It also allows us to capture the essence of the phenomenon studied by eliminating pre-established theories or ideas (Vagle, 2025).

2.2 Context and participants

This study was conducted in the Region of Murcia (Spain), where there are a total of 13 special education centers, eight of which are public and five are private-subsidized. These centers are established as resource centers, distributed by geographical areas of operation, and serve a population of 963 students with Special Educational Needs (SEN). All of them have a diagnosis of intellectual disability, usually associated with other clinical conditions: sensory disability, autism spectrum disorder, mental health conditions, and/or cerebral palsy or damage.

All special education centers and a total of 36 students participated in this study, as shown in Table 1.

Table 1. *Study participants*

Center of special need	Age	Gender	Educational Stage	Experience in other schooling modalities	Identifier
Center 1	21	Male	PVI		Student 1
	15	Male	Secondary	Combined	Student 2
	19	Male	PVI		Student 3
Center 2	14	Female	6th grade	Regular Classroom	Student 4
	19	Male	PVI	Open Classroom	Student 5

Center of special need	Age	Gender	Educational Stage	Experience in other schooling modalities	Identifier
Center 3	19	Female	PVI		Student 6
	19	Female	PVI		Student 7
Center 4	20	Male	PVI	Open Classroom	Student 8
	11	Female	5th grade	Open Classroom	Student 9
	16	Male	Secondary	Regular Classroom	Student 10
School 5	20	Male	PVI		Student 11
	20	Male	PVI		Student 12
	19	Male	PVI		Student 13
	16	Male	Secondary education		Student 14
School 6	6	Female	1st grade		Student 15
	12	Female	6th grade		Student 16
	16	Male	Secondary		Student 17
	21	Male	PVI		Student 18
Center 7	20	Female	PVI		Student 19
	13	Male	6th grade		Student 20
School 8	13	Female	Elementary		Student 21
	15	Male	Secondary		Student 22
	16	Male	Secondary school		Student 23
	19	Male	PVI		Student 24
Center 9	17	Female	Secondary		Student 25
	19	Male	PVI		Student 26
	15	Male	Secondary education		Student 27
School 10	21	Male	PVI		Student 28
	16	Male	Secondary education		Student 29
School 11	19	Male	PVI	Open Classroom	Student 30
	18	Male	PVI	Regular Classroom	Student 31
Center 12	17	Male	PVI	Regular Classroom	Student 32
	17	Male	PVI	Regular Classroom	Student 33
	16	Female	Secondary Education	Combined	Student 34
School 13	21	Male	PVI		Student 35
	23	Male	PVI		Student 36

Their characteristics in terms of age, gender, educational stage, and experience in other types of schooling were heterogeneous.

The participants' ages ranged from 6 to 23 years (X = 17.17; SD = 3.42). Ten (27.78%) were female and 26 (72.22%) were male. Six students (16.67%) were in primary education, ten (27.78%) were in compulsory secondary education (ESO), and 20 (55.55%) were in inclusive life projects (PVI). In addition, of the total number of participants, 11 (30.56%) had previous experience in other types of schooling: regular classroom (N = 5; 45.46%), open classroom (N = 4; 36.36%), or combined schooling (N = 2; 18.18%).

2.3 Information collection technique

The technique used to collect information was the semi-structured interview. Following Kvale (2011), this technique was used because it allowed us

to understand how students perceived, interpreted, and experienced interpersonal relationships in the school environment.

A script was developed that included nine questions organized into three dimensions:

- *Dimension 1. Relationship with classmates* (Do you get along with your classmates? Have you ever had problems with your classmates? Do you have friends here?).
- *Dimension 2. Relationship with classmates from* regular *schools* (Do you do activities with children from other schools? Do you like spending time with children from other schools? Do you enjoy these activities?).
- *Dimension 3. Relationship with friends* (Who is your best friend? Do they go to school with you? What do you most enjoy doing with your friends?).

The design of this question script was adjusted to the participants' level of communicative competence and intellectual functioning. To this end, simple affirmative sentences were used and, in some cases, professionals from the schools provided support during the process to facilitate communication and understanding of the questions.

To obtain quality evidence, the initial script was submitted for expert review, in which a total of eight people participated, six of whom were university professors who were experts in the subject area and two of whom worked in educational centers with students with the same profile as the participants in this study.

In order to give the participating students, advance notice of the activity, both the teachers in charge and the students' families were informed well in advance. Likewise, to ensure compliance with ethical and confidentiality principles, as proposed by Pastor-Andrés et al. (2025), the assessment of a university ethics committee was requested, receiving its favorable report (report identification: 4312/2023), and information sheets, informed consent documents, and informed assent documents were prepared. The interviews were conducted individually and in person in designated areas within the educational centers, such as the library or the management team's offices, and lasted an average of approximately 30 minutes per session.

2.4 Information analysis plan

The data were processed according to the cyclical process of qualitative data analysis explained by Rodríguez et al. (1996). First, a verbatim transcription of the information collected was made. Second, the units of analysis were separated into thematic criteria associated with the objectives. Third, the units of analysis were identified and classified through an inductive coding process. One category, four codes, and 14 subcodes were identified, as shown in Table 2.

Table 2. *Book of categories, codes, and subcodes used for the analysis of the information*

Category 1. Interpersonal relationships between participating students and their peers	
Codes	**Subcodes**
(Schedule_lecCE) School hours with peers: interpersonal relationships between students at the special education center during school hours	(Schedule_lecCE_goodfriendship) They have friendly and companionable relationships with the rest of the students.
	(Horario_lecCE_acceptable_friendship) They have some friends and get along well with the rest of their classmates.
	(Schedule_lecCE_difficultyintherelationship) They have had or are having some problems with their classmates.
	(Schedule_lecCE_lackoffriendship) They do not have a good relationship with their classmates and have hardly had any friendships.

Category 1. Interpersonal relationships between participating students and their peers	
Codes	**Subcodes**
(Schedule_non-class_CE) Non-class time with peers: interpersonal relationships between students at the CEE during non-class time	(Schedule_non-school_regular_contact) They maintain close contact with their classmates and make plans to spend their free time together.
	(Schedule_non-school_time_sporadic_contact) They sometimes make plans with classmates outside of school.
	(Schedule_non-school_CEE_anecdotal_contact) They have little contact with classmates outside of school hours.
(Non-school hours_CO) Non-school hours with peers: interpersonal relationships between CEE students and CO students outside school hours	(Schedule_non-school_CO_regular_contact) They maintain close contact with classmates and make plans for leisure activities in their free time.
	(Schedule_non-school_CO_sporadic_contact) They sometimes make plans with classmates outside of school.
	(Non-school_hoursCO_anecdotal_contact) They have little contact with classmates outside school hours.
(School_hours_CO) School hours with peers: interpersonal relationships between CEE students and CO students during school hours	(Schedule_schoolCO_goodfriendship) They have friendly and companionable relationships with the rest of the students.
	(School_schedule_CO_acceptable_friendship) They have some friends and get along well with the rest of their classmates.
	(School_schedule_relationship_difficulties) They have had or are having some problems with their classmates.
	(Schedule_lecCO_lackoffriendship) They do not have a good relationship with their classmates and have hardly had any friendships.

Fourth and finally, the data was arranged and transformed through the creation of semantic content networks. The software used for the processing and analysis of qualitative data was ATLAS.ti version 25 for Windows.

3. Results

The results are presented below, organized around the two specific objectives of this study.

3.1 Results of the specific objective

To understand the quality of the relationships established among students in special education centers from the students' own perspective

In order to respond to this objective, the analysis was carried out by looking at relationships at two different times: during school hours and outside school hours, as shown in Figure 1.

Figure 1. *Semantic network of the first specific objective*

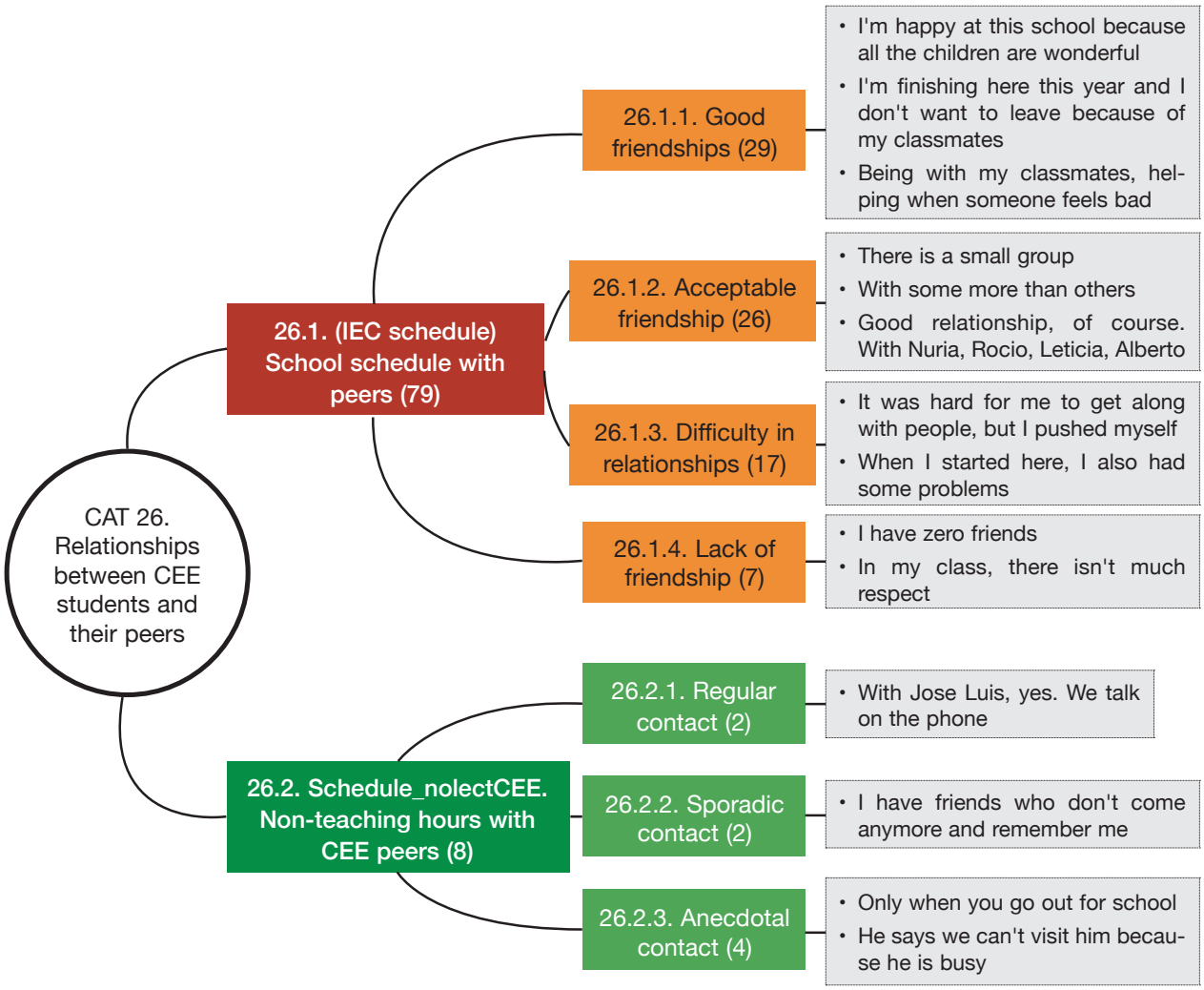


Table 3 shows the frequency and percentage of the analysis subcodes associated with the code "school hours with the same CEE" and "school hours with the same CO," allowing us to describe the perception of the quality of relationships during school hours. This table distinguishes between different levels of social connection, from good friendship to lack of friendship, which facilitates a comparison between the relational patterns observed in the two sets of data analyzed.

Table 3. *Frequency and percentage of analysis subcodes for the code School hours with the same CEE and School hours with the same CO*

	SUBCODES Ncitas (%)				
	Good Friendship	**Acceptable Friendship**	**Difficulty in Relationships**	**Lack of friendship**	**TOTAL**
With peers with special educational needs	29 (36,71 %)	26 (32,91 %)	17 (21,52 %)	7 (8,86 %)	79 (100 %)
With equal CO	5 (21,74 %)	12 (52,17 %)	2 (8,70 %)	4 (17,39 %)	23 (100 %)

With regard to relationships during school hours, 79 textual citations were obtained, organized and classified into four subcodes based on the perceived level of quality in interpersonal relationships: good friendship, acceptable friendship, difficulty in relationships, and lack of friendship, as shown in Table 3.

The participants perceive that their relationship with their schoolmates is good, establishing bonds of friendship (Nquotes = 29) due to their high regard for their classmates and a feeling of well-being:

> I am happy at this school because all the children at the school are wonderful. (student 25)

> I'm finishing here this year and I don't want to leave because of my classmates. (student 18)

Other participants point out that, although they have a good relationship with all their classmates in general, they only form friendships with some of them (Ncitas = 26):

> I get along with everyone, but with some more than others... with Noelia, Raquel, sometimes with Lucía, with Alejandro... (student 28)

However, there are quotes (Ncitas = 17) that indicate that some participants have experienced or are experiencing difficulties in their relationships with their classmates, although these situations have sometimes been resolved:

> I find it hard to get along with people. (student 32)

> When I started here, as I wasn't at this school before, I had some problems. (student 36)

Finally, there are students who, less frequently (Ncitas = 7), indicate that they do not have a good relationship with their classmates and have not established friendships with them, as can be seen in the following quotes:

> I have zero friends. (student 22)

> I don't have any friends in my class; there isn't much respect. (student 29)

Regarding the relationships established outside of school hours with their classmates at the CEE, eight quotes were obtained and classified into three subcodes of analysis based on the frequency with which the relationship or contact is perceived (regular, sporadic, or anecdotal), as shown in Table 4.

Table 4 shows the frequency and percentage of the subcodes associated with the code "non-school hours with CEE peers" and "school hours with CO peers," allowing us to describe the perception of the quality of relationships during non-school hours.

Table 4. *Frequency and percentage of analysis subcodes for the Non-school hours code with the same CEE and Non-school hours with the same CO*

	SUBCODES Ncitas (%)			
	Usual contact	**Occasional sporadic**	**Anecdotal contact**	**TOTAL**
With equal EC	2 (25 %)	2 (25 %)	4 (50 %)	8 (100 %)
With equal CO	15 (35,71 %)	24 (57,14 %)	3 (7,14 %)	42 (100 %)

Half of the quotes collected (Nquotes = 4) indicate that students at special education centers have little contact with their classmates outside of school hours, mentioning that they only interact with them on outings organized by the center or that they have few opportunities to interact with them outside of school hours, as can be seen in the following quotes:

> Only when we go out with the school. (student 20)

> I don't visit them outside of school... (student 17)

However, some participants point out that the contact they have with their classmates is sporadic (Ncitas = 2). Thus, they do not interact with them

on a regular basis, but there is occasional contact, as reflected in the following quote:

> I have classmates I don't see much, but they remember me. (student 10)

In addition, some participants indicate that they maintain contact with their classmates outside of school hours, either by spending free time together or by keeping in touch with them through other means, as shown in the two quotes identified (Ncitas = 2):

> With Juan, yes, we play together. (student 19)

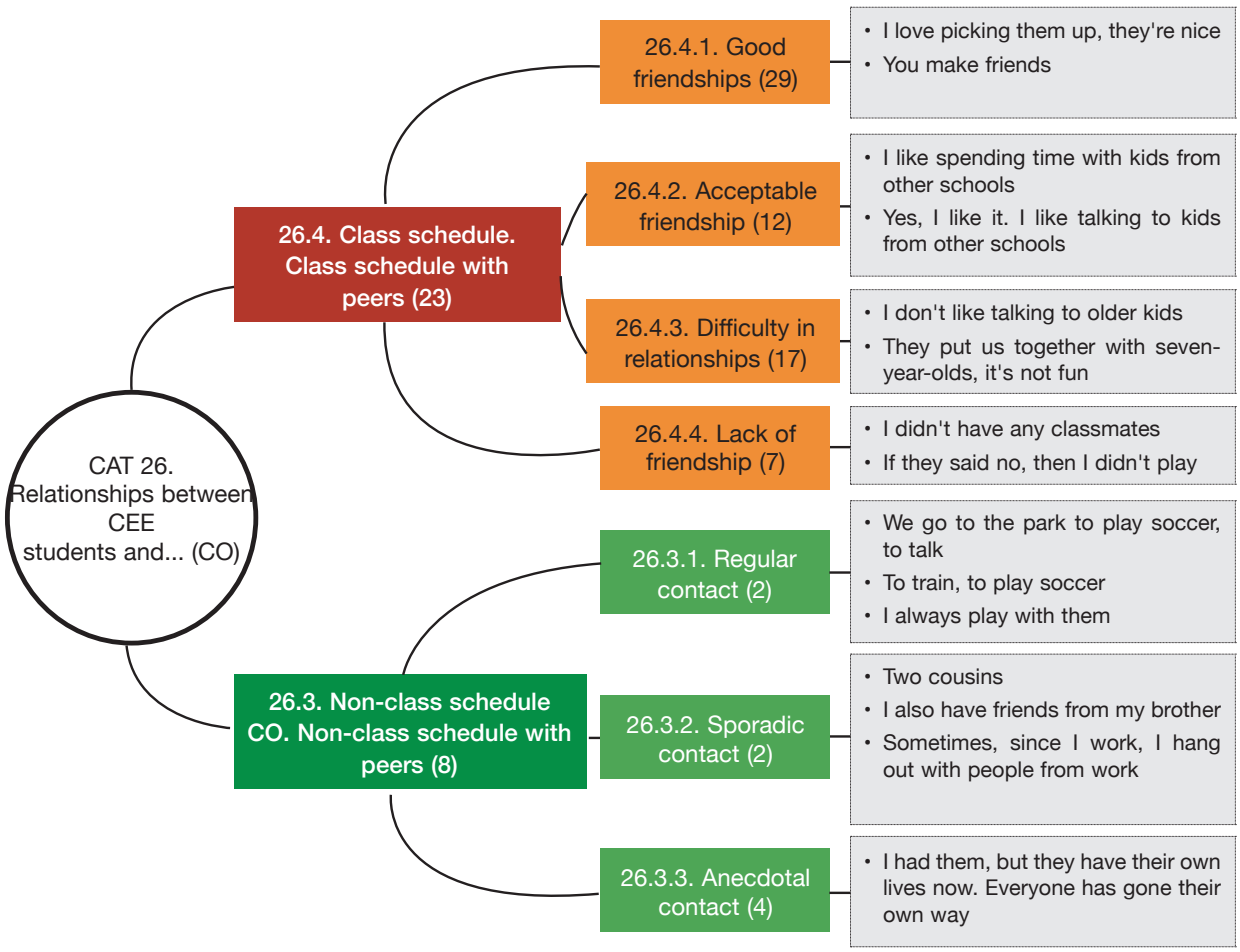
> We talk on the phone. (student 35)

3.2 Results of the specific objective

Identify the perception of students in special education centers regarding the quality of interpersonal relationships with peers in regular schools

To address this objective, a distinction has been made between relationships with peers from regular schools during and outside school hours, as shown in Figure 2.

Figure 2. *Semantic network of the second specific objective*



Forty-two quotes were obtained referring to the relationship established outside school hours between students at special education centers and children enrolled in other schools. As shown in Table 4, these relationships were classified into three codes based on the frequency of contact: regular, sporadic, or anecdotal.

Some of the participants highlight a regular relationship with children from other schools (Ncitas = 15), with whom they make plans for leisure or

extracurricular activities, as shown in the following quotations:

> I always play with them. (student 31).
>
> We go training. We play soccer. (student 30).
>
> We go to the park to play soccer, to talk... When we're there, we also listen to music. (student 26).

However, most of the quotes (Ncitas = 24) indicate that the relationships that participants establish with children from other schools outside school hours are sporadic and tend to be limited to family relationships, acquaintances, or close neighbors, as reflected in the following quotes:

> I only play with two cousins. (student 13)
>
> I have friends too, I have my brother's friends and we mess around a bit. (student 29)
>
> I play with friends from my building. (student 32)

Other quotes (Ncitas = 3) reveal a lack of interaction with other children in their free time, highlighting, in some cases, the loss of relationships with those who were previously their friends, as can be seen in the following quote:

> I had them, but I don't know if I live right next door to them. But they have their own lives now. (student 28)

As for the relationships established during school hours with classmates from other schools, 23 quotes were obtained, which were classified into four codes according to the perceived level of quality in interpersonal relationships: good friendship, acceptable friendship, difficulty in relationships, and lack of friendship, as shown in Table 3.

Most of the quotes (Nquotes = 12) identify that CEE students perceive a satisfactory relationship with their CO peers during school hours, showing an interest in sharing activities and socializing, as reflected in the following quotes:

> I like spending time with children from other schools (Student 1).
>
> Yes, I do. I like talking to the schools (Student 10).

Other quotes collected (Ncitas = 5) reveal a positive relationship with classmates from other schools, whom they consider friends and who stand out for their friendly attitude, as shown in the following quotes:

> I love meeting up with them, they're nice. (Student 19)
>
> It's great. You make friends. (Student 4)

However, some comments from participants (Quotes = 4) reveal a lack of friendship ties and a feeling of distance from their peers in mainstream schools, as can be seen in the following quotes:

> I don't have classmates or friends from other schools. Everyone goes their own way. (student 35)
>
> They don't come to my classroom. (student 2)

Finally, some participants have pointed out difficulties in establishing friendships (Ncitas = 2), and consider that the age difference between those who come from regular schools and participate in activities alongside special education centers acts as an obstacle, as evidenced in the following quotes:

> They put us together with seven-year-olds, six from school, and that's not fun. (student 32).
>
> I don't like talking to the older kids. (student 10)

4. Discussion and conclusions

With regard to specific objective 1, to ascertain the quality of the relationships established between students in special education centers from their own perspective, the results indicate that the school context of special education centers constitutes a significant space for interpersonal relationships for students. In this study, we found that one of the great possibilities offered by schooling is the interactions and communication that are established between peers, as previously pointed out by Hartmann et al. (2024), Lin et al. (2025), and Montanero et al. (2024). Likewise, the perception of belonging to the group and emotional well-being appear to be key elements associated with these relationships, coinciding with

the findings of Nieto and Moriña (2021). Although some students have also experienced certain difficulties in their relationships with their peers, many have been able to resolve the problems that have arisen and improve their relationships with each other, so these situations can be interpreted as part of the relational dynamics established in the educational context. In some specific cases, this difficulty persists. According to the participants, these difficulties are usually motivated by a lack of camaraderie, which reinforces the need to work on this aspect in schools, as argued by Koegel et al. (2012). In this sense, it can be seen that the special education centers where the participants are enrolled promote a climate of support and understanding that facilitates the progressive improvement of interpersonal relationships, contributing to the well-being of the students.

In contrast to the above, if we focus on the relationship between students at special education centers outside school hours, there is a clear discontinuity between the relationships that develop within the center and those that are maintained outside it, as participants indicate that they have little interaction with their peers after school hours. Among the main reasons for this situation are the lack of free time and, especially, the distance between their places of residence, which limits opportunities to meet and socialize outside the center. Thus, when students continue to maintain relationships outside the center, it is usually by telephone or because they live in the same town, which facilitates the continuity of the relationship. Therefore, although participants generally perceive a good friendship with their classmates during school hours, there are various obstacles that hinder the continuity and consolidation of these bonds outside of school hours, suggesting that friendships built in the school environment do not always manage to consolidate in other social spaces.

Regarding specific objective 2, to identify the perception of students in special education centers regarding the quality of interpersonal relationships with peers in regular schools, the findings show that students in special education centers value the experiences shared in joint activities with their peers in regular schools. Participants consider these experiences to be an opportunity to establish friendships, coinciding with the ideas of Hoffman et al. (2021) and Pinto et al. (2019). However, the study highlights the existence of persistent barriers that limit the development of deeper relationships. Specifically, participants point to two barriers: 1) The lack of opportunities to interact with their peers from regular schools, highlighting a feeling of isolation as a result of the lack of interaction with their classmates. 2) The age of those participating in joint activities with the special education center, as older participants point out that this difference makes it difficult to consolidate friendships.

Furthermore, the relationships established during joint activities between special education centers and mainstream schools do not extend beyond school hours, indicating that, despite establishing good relationships between classmates, friendships are not formed, coinciding with the findings of Biswal and Mishra (2025), Pirker et al. (2025) and Vila-Merino et al. (2024). The students emphasize that the children they interact with outside the center are usually relatives, acquaintances, or close neighbors. Furthermore, according to the study participants, when they do form friendships with other children, these are not usually the same children they interact with during school activities, but in many cases are those with whom they do extracurricular activities or who live in their neighborhood. There are also some participants who hardly interact with other children, noting that they have lost touch with their former friends, as found by Douma et al. (2024). Therefore, although students in special education centers value the attitude of their peers in regular schools during joint activities, interaction is often limited, making it difficult to form genuine friendships.

Learning about the students' perceptions and listening to their voices has provided an understanding of how they experience and represent their interpersonal relationships, as indicated by Fielding (2011), Proffitt et al. (2025), and Vinatea-Elorrieta et al. (2025), allowing us to identify the positive aspects that promote inclusion, as well as those that still pose a barrier. Thus, in line with Messiou et al. (2025), the invaluable source of information represented by the students' voices has been confirmed. Considering the above, there is a clear need to promote initiatives such as those carried out in collaboration with other schools, since, as the participants express, they feel accepted and respected in them, which indicates that, through these activities, values of respect and tolerance are strengthened, as advocated in the CRPD (UN, 2006). In this regard, in line with the

contributions of Mayes (2020) and Vlachou et al. (2024), it can be seen that the attitudes adopted are a decisive element in the inclusion process.

Looking at the participants' relationships with their peers within the center, a quality friendship between classmates can be seen, while when looking at relationships with students from other centers, these relationships vary depending on the degree of participation and interaction between them. The bond established in these cases is usually limited to camaraderie and rarely develops into a friendship as strong as that which develops among students in special education centers. Consequently, encouraging this interaction improves their attitudes and, therefore, school coexistence, but carrying out specific activities is not enough to promote friendship among classmates. This highlights the need to allow for ongoing interaction between all students in order to foster the development of strong friendships. In this regard, the collaboration established between special education centers and regular schools should not be limited to occasional or anecdotal relationships, but rather it is necessary to maintain a frequent and sustained relationship over time, with the aim of fostering the development of friendships between classmates from both centers. It is also essential to provide opportunities to interact with peers of the same age who share similar tastes and interests, in order to facilitate the formation of friendships. However, collaboration between schools tends to be with preschools and elementary schools, thus reducing the opportunities for those in secondary school or PVI to interact with their peers. This highlights the importance of fighting for the right to inclusive and quality education, in which everyone can be adequately served without resorting to segregation.

With regard to relationships formed outside school hours, the study confirms that access to shared leisure spaces is one of the main challenges for students at special education centers. One of the main obstacles identified by the students is the distance between their places of residence. In many cases, students do not live in the same town where the school is located, and some even come from other regions. This geographical dispersion represents a barrier to social interaction and the consolidation of friendships beyond the school environment. Therefore, when they return to their towns or cities, the children they usually interact with in their free time tend to be family members, acquaintances, or close neighbors. It is true that some of them also participate in extracurricular activities where they interact with other children, although the situation is similar to that of their peers in regular schools when they participate in joint activities at their schools. Although the students say they get along well, there are no signs of friendship. As noted above, greater interaction and continuity in relationships are necessary for friendships to develop. If the student attended their local school, it would be easier to maintain relationships beyond specific moments and to form friendships that promote the social inclusion of students with disabilities.

In short, the results identify a set of structural and organizational barriers that negatively affect the quality and continuity of social relationships among students in special education centers, such as geographical dispersion, limited interaction with students from other centers, and difficulty in relating to peers with similar interests. Consequently, and considering all of the above, it is confirmed that the best location for students in special education centers is the regular classroom, the classroom that is a right for all. In addition, in order to promote the continuity of the relationship outside of school hours, their schooling should take place in the regular school that corresponds to their place of residence.

In this regard, there is a clear need for changes and improvements in our education system to promote the inclusion of all students, especially those who are enrolled in special education centers. To this end, it will be essential to address the concerns, difficulties, and obstacles that the agents involved perceive in educational practice in order to propose effective reforms that respond to the needs of all students in regular schools. This will contribute to the elimination of barriers, generating greater opportunities for socialization and inclusion in their environment.

The study has a number of limitations that mean the results should be interpreted with caution. For example, it only considers the perspective of one of the protagonists: students in special education centers. To enrich the study, it would be interesting to also consider other perspectives, listening to the other stakeholders involved, such as students in regular schools, teachers, and families.

Another limitation that can be mentioned is that the research was carried out in a specific con-

text, so the findings of the study cannot be generalized to other places, as each context is unique and has different characteristics.

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Authors' contribution

Dr. Salvador Alcaraz: conceptualization, data curation, methodology, project management, resources, software, writing – original draft.

Dra. Pilar Arnaiz-Sánchez: conceptualization, funding acquisition, research, project management, supervision, validation, writing – review and editing.

Elisabet Martín-Seva: conceptualization, formal analysis, methodology, visualization, writing – original draft.

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Exclusion and humiliation: educational situations of discrimination in Mapuche schools

Exclusión y humillación: situaciones pedagógicas de discriminación en escuelas mapuche

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Abstract

The article addresses the systematic exclusion present in rural Mapuche school classrooms. It is socially relevant due to the urgent need to create inclusive environments where all children are welcomed. We understand inclusion as an ideology that is conditioned by a structured and rigid educational system. The objective is to analyze accounts of discrimination by various educational actors in rural school classrooms with Lafkenche populations located in the territory known as Costa Araucanía, in Chile. The method was qualitative and the paradigm hermeneutic. The design is an instrumental case study. Semi-structured interviews were conducted, and the transcripts were subjected to analytical procedures of open and selective coding. The findings showed the presence of hidden discrimination, social rejection, rejection among the children themselves through disruptive behavior, feelings of shame for being Mapuche, self-discrimination with regard to the teaching of the Mapunzugun language, and feelings of shame for being Mapuche. The main conclusions relate to structural changes in different dimensions of inclusion, the failure of intercultural and inclusive policies, and the need for education that promotes a sense of cultural identity and belonging in territories with a high Mapuche population density.

Keywords: inclusive education, intercultural education, cultural discrimination, ethnic discrimination, social exclusion, students.

Resumen

El artículo aborda la exclusión sistemática presente en las aulas de las escuelas mapuche rurales, es relevante socialmente debido a la urgente necesidad de crear entornos inclusivos donde todos los niños y niñas sean acogidos, entendemos la inclusión como un ideario que está condicionado por un sistema educativo estructurado y rígido, el objetivo es analizar relatos de discriminación de diversos actores educativos en aulas de escuelas rurales con población lafkenche situadas en el territorio denominado Costa Araucanía, en Chile. El método fue cualitativo y el paradigma hermeneútico. El diseño es un estudio de casos instrumental. Se aplicaron entrevistas semiestructuradas, cuyas transcripciones se sometieron a procedimientos analíticos de codificación abierta y selectiva. Los hallazgos mostraron la presencia de discriminación oculta, rechazo social, rechazo entre los propios niños y niñas a través de conductas disruptivas, sentimiento de vergüenza por ser mapuche, auto discriminación respecto a la enseñanza de la lengua mapunzugun y sentimiento de vergüenza por ser mapuche. Las principales conclusiones se relacionan con los cambios estructurales en diferentes dimensiones de la inclusión, fracaso de políticas interculturales e inclusivas, y la necesidad de educación propia que promueva el arraigo con la identidad y pertenencia cultural en territorios donde existe una alta densidad poblacional mapuche.

Palabras clave: educación inclusiva, educación intercultural, discriminación cultural, discriminación étnica, exclusión social, estudiantes.

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1. Introduction

Educational inclusion is a transformative educational approach that seeks to reduce the barriers that affect student participation, retention, and progress in school. This is achieved through a profound change in the educational community to respond to the value of diversity (Echeita, 2006; Booth and Ainscow, 2015). This change involves all members of the community, which is why the democratic participation of everyone who belongs to it is essential. Unlike traditional models of education, the commitment to inclusive education does not exclude the participation of those who think, act, or have different conditions, as it considers difference to be a circumstance inherent to the human condition, as well as an essential value and an opportunity to enrich teaching and learning processes (Escobar et al., 2017).

In this scenario, the political project of free, critical, democratic, and inclusive public education is necessary insofar as school is the ideal setting for critiquing hegemonic and dominant social models, even though it is an institution that reproduces aspects of the national culture (Moscoso, 2011). In this sense, the appreciation of diversity is an urgent need in all educational institutions around the world, but particularly in areas with large indigenous populations. This is particularly evident in the Mapuche schools of Araucanía (Gülumapu), where invisibility, segregation, and omission of knowledge have caused both teachers and students moral harm as a result of the systematic violations suffered by a homogeneous curriculum prescribed by the Chilean state, where homogenization, standardization, and anonymization tend to destroy cultural diversity and cause people to lose their roots. Historically, schools have been one of the main political strategies used by the state to develop processes of internal colonization and territorial occupation, since under its modernizing idea of positivist progress, in the name of encyclopedic enlightenment and progress, it excludes the imaginaries, multiplicities, subjectivities, and contingencies of the concrete forms of the life of local populations, especially if they are indigenous (Mansilla, 2020). It is therefore important to address the concept of diversity, which is defined as an inherent condition of the human species, is multidimensional, and considers all the constituent aspects of the person. Indeed, the appreciation of human diversity, whether from the perspective of gender, origin, health status, context, sexual preference, or ethnic origin, requires citizens to develop skills that enable them to move toward the transcendence of recognizing the Other as different and exercising the rights that this implies (Bravo, 2022; Guédez, 2005).

In this same sense, the construct of diversity is associated with differences and has undergone significant analytical development in recent decades. In this regard, the reductionism of the term associated with clinical diagnoses of children with Special Educational Needs (SEN) has been questioned, which puts pressure on progress in this area. However, different social groups have made significant progress in developing a broader definition. For example, a study on diversity among higher education students refers to classmates with cognitive, sensory, linguistic, and physical differences, as well as those who are victims of conflict, people from other cultures, and those with different sexual and/or religious preferences (Martínez et al., 2022).

Respect for diversity is a value that requires constant implementation. When this occurs, we can speak of true inclusion, as isolated and merely formal inclusions are not sufficient (Gillberg, 2024). Consequently, the relationship between diversity and education is confirmed, requiring the inclusion of diversity in educational institutions, understood as an opportunity in the training of new professionals who will perform and promote their professional work towards the development of a more just and inclusive social world (Hernández, 2021). However, promoting diversity goes far beyond its incorporation into the curriculum; an inclusive culture must be created in society. Actions in the field of education lay the foundations for transforming societies and broadening our worldview through the eyes of others (Ragins and Ehrhardt, 2020).

It is also important to train teachers to promote inclusive teaching practices that respond not only to cognitive and social diversity, but also to territorial and cultural diversity (Ayala, 2020), as there are gaps between international and national discourse and teacher training programs, which show a lack of preparation for teaching in indigenous territories. In this regard, studies in Canada, New Zealand, Mexico, Sweden, and Chile highlight how "mutisms" are developed around experiences of exclusion, discrimination, and segregation, because the sequencing

of content, skills, and attitudes present in the syllabi of future education professionals is monocultural in nature, which profoundly affects and will continue to affect the realization of the expected and committed advances toward the possibility of shaping a more inclusive world. In some cases, this can be explained by the fact that the reforms that have been carried out are essentially based on conservative political-ideological rather than scientific principles (Millán et al., 2023; Bravo, 2022; Beach, 2019).

In Latin America and the Caribbean (Abya Yala), diversity and all its complexity is a problematic issue, particularly when tensions arise in educational establishments: educating for diversity is an ongoing challenge because it involves educating ourselves to recognize each other as human beings. In fact, cultural diversity in Colombia, known since its inception as ethno-education, includes protocols, narratives, and practices that, even though they have been redefined, remain far removed from real contexts because they are highly theoretical (Ruiz et al., 2020). Likewise, on April 30, 2025, i.e., very recently, Colombia formalized the recognition of the Indigenous Education System (SEIP) of the native peoples as a policy of the Republic. The categories involved are autonomy and self-determination, worldview, indigenous spirituality, native languages, culture, cultural interpretation, territory, territoriality, self-government, universality, unity, integrality, communality, graduality and progressiveness, and flexibility (Decree 0481, Ministerio de Educación Nacional de Colombia, 2025). This advance is very relevant because it constitutes a reference for the region.

In Chile, educating in social and cultural diversity has meant that teachers repeat the Western logic in which they have been trained, distancing students from the cultural ethos of the territory where the school is located, which translates into decontextualized teaching (Bravo, 2022). Strictly speaking, there is no right to one's own education, due to the monocultural logic of the curricula, which are the same from Arica to Magallanes, i.e., from north to south. In this context, the concept of educational inclusion is interesting, presented with regulatory robustness and an attractive discourse on acceptance by others, collaboration, innovation, and the improvement of educational communities. However, in practice, this diversity does not materialize, as universal content is prioritized, Spanish and English are imposed, and cultural components of the indigenous world are relegated to the background (Iglesias and Martin, 2020; San Martin et al., 2020; Núñez et al., 2020).

This attractive proposal for transformative education that aims at the democratization of schools, participation in equal opportunities, with equity and quality, is complicated by the association of a concept reduced to diagnoses and linked to integration that labels students according to different characteristics (Bravo and Mariñanco, 2021; Figueroa et al., 2021; Gajardo and Torrego, 2020). In this context, integration is a theoretical, practical, and political movement promoted in European countries whose origins are related to labeling, diagnosing, or classifying students considered "special," which has had a rather negative impact on their progress because it increases stereotypes or labels of certain human beings (Echeita, 2006; Iglesias and Martin, 2020).

According to Silver (1994), exclusion can be understood according to three models: the first refers to solidarity as a breakdown of social ties between individuals and society, where the state is responsible as the guarantor of social cohesion; the second takes a more economic view and relates to unlimited needs and individuals; the third considers the hierarchical relationships that exist in society, the institutions and rules that shape it, generating exclusion among those who are less advantaged. Meanwhile, schools as social institutions continue to show us situations of exclusion and discrimination that are latent in classrooms. Exclusion in schools is characterized by separation, disintegration, segregation, and not allowing participation (Ordóñez and Granja, 2023), a situation that worsens in rural schools as a result of the constant limitations that arise in these areas: neglect, inequality and inequity, lack of access to cultural centers or places where scientific knowledge circulates (Bautista et al., 2023).

In this context, a key concept is interculturality, which presents as a political, ontological, epistemic, and ethical project. Therefore, from a critical approach to interculturality, the domination-submission of indigenous peoples manifests itself in both objective and subjective dimensions and makes it clear that referring to interculturality as a horizontal relationship is nothing more than a euphemism to disguise vertical relationships (Gasché, 2008). This is explicitly evident in the absence of constitutional

recognition as public law entities and not merely as subjects of public interest. Subjectively, indigenous people living in urban areas often feel ashamed to speak their indigenous language and acknowledge their own cultural practices (Sartorello, 2009).

However, schools with a Mapuche population and all members of these educational communities have suffered educational, social, and economic discrimination, which manifests itself in the exclusion of cultural knowledge, ways of life, respect for the mother tongue, and racism (Muñoz, 2021). This reality requires special attention because these schools have high rates of poverty and illiteracy, a type of diversity that is not considered in schools, a situation that challenges us to decisively promote intercultural education in order to achieve inclusion in schools, especially those located on lands that have been colonized and occupied by outsiders (Valenzuela and Conejeros, 2023).

In this context, Mapuche education is achieved thanks to a constant desire to incorporate Mapuche cultural elements into everyday school life. This includes all interactions that are explicitly indigenous and ancestral in nature through social interactions, ongoing socialization of the Mapuche worldview, and not just actions that appear to be mere folkloric activities. In this complex scenario, we are witnessing significant structural tension in the relationship between the state and indigenous peoples, mediated by the school institution, because the content promoted in the special curriculum is not in line with the teaching in schools throughout Chile (Luna et al., 2018). This reality is creating a gap in understanding, where valuable perspectives on knowledge, identity, and community are absent from debates on equity, diversity, and inclusion. The teaching priorities in the indigenous world are profound and immerse us in their worldviews and ways of being, which are deeply interwoven into our ethos and way of interacting with the world around us (Ruwhiu et al., 2024). For reasons of social justice, intercultural educational processes in Mapuche schools must not only be critical and democratic but also linked to ecological-cultural spaces where Mapuche knowledge is incorporated into the formal curriculum and at all educational levels (Andrade et al., 2023, Echeverry, 2021).

Fraser's (2008) theory of social justice has two forms of vindication: one related to redistribution and the other to recognition, the latter linked to the acceptance of differences and cultural norms and the non-acceptance of their domination. Social justice is complemented by redistribution and recognition. Separately, neither is sufficient; progress must be made simultaneously. The task involves addressing a complex conception of justice that integrates both rationalities (Fraser, 2008). Ultimately, social justice in the field of education refers to the promotion of democratic values and social actions for all people. In the case of the Mapuche, this idea is reaffirmed, but a moral component is incorporated that highlights this social group's dissatisfaction with the invisibility and systematic segregation by the Chilean state, where the cultural and political value of the Mapuche people is sought (Balbontin, 2020; Mansilla et al., 2016; Sanhueza et al., 2019).

Honneth (1994), in his theory of recognition, argues that conflicts must be understood from the perspective of the humiliation experienced, which drives people to fight for recognition. In turn, this implies the need to rebuild the morale of individuals in the face of social indifference to gradually move towards social integration that allows for recognition, trust, self-esteem, and self-worth, thereby generating people's social dignity in terms of both their autonomy and their actions in society. Recognition is an open concept that refers to the unlimited possibilities of situated social interactions, making it historically and socially relative (Revuelta and Hernández, 2019). Therefore, talking and debating about recognition necessarily involves analyzing moral wounds, understood as those events experienced as unjust that affect a person's essential well-being, characterized mainly by self-denial. In short, the features of moral wounds consist of the profound and systematic denial of the recognition of otherness. In this context, three types of moral injuries can be identified: those that nullify a person's sense of security in his/her physical well-being; those linked to disrespect, i.e., the respect we deserve; and, finally, situations of humiliation where it is made clear that their talents are not worthy of any recognition (Honneth, 1999).

Moral injury often arises in a setting where individuals are performing a service as members of an institution that reflects their values and beliefs. Analyzing the complex relationship between moral injury and the context in which it occurs provides a very important understanding of the experiences

of those affected, but also of the systemic components that intensify people's vulnerability in various social systems (Honneth, 1999). The exclusion of knowledge and values creates a need for public and permanent acts of recognition. Recognition can be anthropological (contemplation of social structures from the subjects' point of view) or institutional (how the normative dimension is not consistent with the subjects' expectations). The social experiences of modern individuals have an irreplaceable value in the construction of their identity and ways of being and existing in the world. The normative expectations that manifest themselves from the emic perspective of the participants point to prescriptions that have a special representation. These norms form the anchor that helps to understand social reproduction and constitute the basis of negative experiences that explain the struggles for recognition (Deranty, 2016; Revuelta and Hernández, 2019).

2. Methodology

2.1 Methodological design

The study is based on qualitative methods, as its focus is on deepening social relations, demonstrating the variety of perspectives on the objects of study, subjective and social meanings related to it, including the study of the participants' knowledge and practices, analyzing interactions and ways of dealing with it, dimensions that cannot be reduced to quantitative expressions of an experimental and neo-positivist nature. Decisions and actions are guided by fieldwork (participants' narratives and the evolution of events that occur during the research). Therefore, the design is adjusted to the conditions of the participants' setting (Taylor and Bogdan, 1990). The specific qualitative design corresponds to an instrumental case study, which is defined as an investigation of the specificity and complexity of a particular reality. The case of this research corresponds to schools located in the territory known as "Costa Araucanía" (Mapuche-Lafkenche territory), through which its structure and circumstances can be understood, and whose findings are transferable to areas with similar attributes (other indigenous areas—not only in Chile, but also in Latin America—where schools are present within communities). In short, the case is a tool for understanding a problematic situation (Stake, 1998). The study is based on the reflective hermeneutic paradigm, which emphasizes the interpretation of the meanings of the participants from an analytical and holistic perspective of the object of study. Hermeneutics seeks to delve into the content and dynamics of the person studied from their intersubjectivity in order to construct a coherent interpretation of the whole, to understand their life and symbolic universe, rather than to arrive at absolute truths with claims of standardizing generalization (Gadamer, 1991; Arráez et al., 2006).

2.2 Context and participants

The context in which the research was conducted includes key informants from the Lafkenche Mapuche territory (coast of the Araucanía region) of *Gülumapu*, specifically the communes of Carahue, Toltén, Saavedra, Nueva Imperial, and Teodoro Schmidt. These territories have the lowest human development indices in Chile and coincide with a high density of indigenous population. The participants were management teams and teachers who work in classrooms with more than 50% of children with Mapuche descent. Six principals from each school, one teacher from each educational institution, and three traditional educators (Mapuche elders, some of whom are called kimches) were interviewed. Each of the participants voluntarily agreed to take part in a semi-structured interview, after signing an informed consent form. The interviews were conducted over a period of four months in the different territories mentioned above.

2.3 Instruments

Semi-structured narrative interviews were conducted to reveal the meanings attributed to inclusion by different educational actors in their academic performance. Therefore, a script was developed and validated by experts, both from a content perspective (two wise people from indigenous peoples: an indigenous Maya-Quiché doctor from the University of San Carlos in Guatemala and a doctoral candidate in indigenous linguistics, a Kimche from the Mapuche people and an academic in the Mapuche Language and Culture Education program at the Catholic University of Temuco, Chile) and in terms of method (two experts in qualitative methods from the

Catholic University of Temuco, Chile). The corpus of information was compiled through audio recordings, which were transcribed into a Word document while respecting the integrity of the content.

2.4 Data reduction and analysis procedure

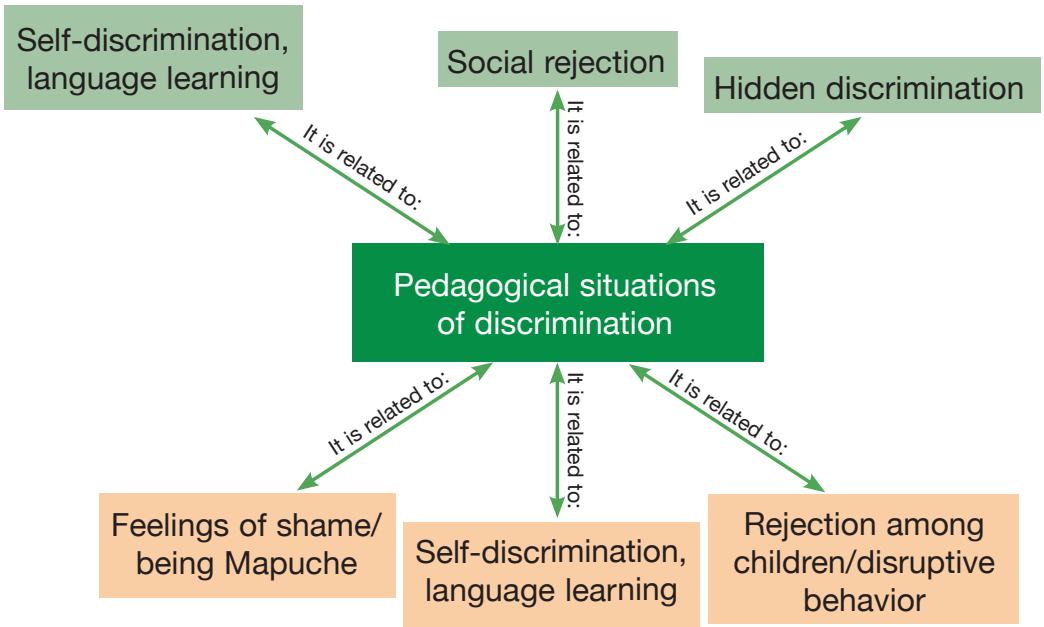
The data reduction process was carried out using Atlas ti version 24.0, after transcribing the data using Gail Jefferson's conventions, not only to establish code frequencies but also to capture the illocutionary force of the language expressed in the different narratives. The data analysis was carried out based on the approaches of Vasilachis de Gialdino (2006) and involved the stages of open coding (collecting codes and units of meaning from a hermeneutic perspective) and axial coding (generating conceptual networks that allow the unification of codes with each other in connection with a central category originated by the questions asked in the interviews). The procedures developed were inductive in nature, namely: empirical sampling (relating codes to interview excerpts), theoretical- e sampling (relating interview excerpts to specialized literature), and qualitative content analysis (evaluating the accounts while respecting the polyphony of voices). The approach, scope, and methodological design were written in such a way that the reader can easily understand the development of the research. The interviews followed an intercultural protocol for field access, which involved maintaining contact with key informants, not only for the purpose of conducting the interview, but also for the purpose of returning the systematized findings, as this allows us to overcome what often occurs with research on/with indigenous peoples: epistemic extractivism.

3. Results

The transcription of the interviews allowed codes to be extracted from the responses and narratives provided by key informants or participants (open interpretive coding). These codes were then grouped and related to each other around a central category, generating a network (axial coding). The network produced by this procedure, the empirical sampling (supporting the textuality of the participants that gave rise to the code), and the conceptual theoretical sampling are presented below.

The conceptual network "pedagogical situations of discrimination" presents the following codes, which were collected from the interviewees' responses: rejection among children/disruptive behavior, social rejection, hidden discrimination, feelings of shame/being Mapuche, self-discrimination, language learning, and denial of language learning/parents.

Figure 1. *Conceptual network 1. Pedagogical situations of discrimination*



The conceptual network "pedagogical situations of discrimination" presents the following codes: rejection among children/disruptive behavior, social rejection, hidden discrimination, feelings of shame/being Mapuche, self-discrimination, language learning, and denial of language learning/parents. The code "hidden discrimination" is illustrated in the following narrative from an interviewee:

> (…) I think that: if does exist, but: people don't say it(.) because anyway: it's ugly—we all know that it's ugly(.) to discriminate and: and a lot of people will turn on us(.) Eh:if there's a bad: bad perception of: a Mapuche(.) man or woman, eh: people keep it to themselves. They don't say it. But sometimes you can still feel it in their expressions. But that has been improving, at least here in this area. [E3:35]

This type of everyday racism is often covert, imperceptible, and seemingly invisible, but the text reveals domination and inequality within a context of specific social and intercultural relationships, which are put into practice and reproduced in the text (Merino et al., 2008).

In turn, the code "social rejection" is visualized in the following text:

> Eh:: I think that people from al- in some places- who have discriminated in that way have been rejected by the majority of people(.) So:: eh:: you learn it the hard way or the easy way, and as you grow up you come to understand [E3:67]

In this regard, Merino et al. (2008, p. 283) point out that:

> To describe in depth how a group perceives discrimination against its members, it is essential to consider the sociodemographic background of the interviewees, such as gender, age, and educational level. It is also relevant to know the stage of life in which the event occurred, the context and specific situation, the ethnic origin and level of authority of the perpetrator, and the victim's response or reaction to the event.

Likewise, the code "language learning denial/parents" appears in the following interview excerpt:

> eh, (.) I think it's also a matter of… I don't know, it's like an issue of ↑shame, maybe, I don't know, because (x) because maybe, I don't know, the Mapuche who live in the community (x) attribute it, I don't know how, to a lack of resources, poverty, I don't know how, to being backward, I think (.) that's where it must lie, and it's very striking because (hhh) they themselves have to be capable of:::(x) of being able to protect this (.) because in the end, like here at school, and then the school starts to fight here with the (x) with the guardian, well, I don't know, it's a guardian who is in the community or a Mapuche guardian who is not in the community: (.) but still, it's shocking, it's shocking if in the end we all have to pull in the same direction and be able to work together. [E4:67]

In this context, the indigenous language becomes a key category for promoting epistemic justice in complex intercultural relations. In this regard, for example, laughter directed at those who did not speak Spanish fluently also occurs in rural schools. However, there is camaraderie among peers when they support each other in speaking Wingkadungun better. This reality explains why some members of Mapuche communities (ancestral authorities) do not encourage the transmission of the language to new generations in order to avoid systematic acts of discrimination. Laughter and nicknames are often used to differentiate oneself from others (Porma, 2015). Similarly, Díaz et al. (2016) point out that states have had to adopt measures for a more culturally relevant education, focusing mainly on the revaluation of language as a form of coexistence. Parents' refusal is based on the belief that this type of teaching would hinder Mapuche children from learning Western culture, in which they will mainly develop and grow as individuals.

With regard to the code "rejection among children/disruptive behavior," the following empirical quote from the interview illustrates this point:

> (...) >well< let's see (x) I remember (.) a child who:: >when I started at the school, I was the fifth-grade teacher< (.) and this child (.) didn't know:: he still couldn't read or write:: (.) so he didn't read (x) so he would sit in the classroom and do nothing (.) eh:: so (x) because there is discrimination because:: well, anyway (x) he has a profile that is kind of "violent?" and suddenly he gets <into trouble:: (.) in the classroom, I mean, for no reason, like> gua:: he screams:: and ?turns around? [E4: 78]

In this regard, Álvarez et al. (2016) argue that concern about the dynamics that occur within classrooms at different educational levels has increased exponentially and, as a result, the system currently faces major obstacles in regulating coexistence, combating phenomena that are already known and not so new, but alarming because of their current social visibility.

In relation to the code "Feeling of shame/being Mapuche," it appears in the following empirical quote:

> (…) : : yes::: but but you know that(.) no no ::it's not that I've observed it, just as there was (.) discrimination here, but I feel = that suddenly, because they consider themselves Mapuche, many are ashamed [E5: 92].

From this perspective, Zañartu et al. (2017) argue that the cultural traits of "being indigenous" can be both differentiating elements and attributes that give rise to stereotypes, which have become prejudices. Thus, instead of being used to highlight diversity in a positive way, they are used to mark differences and discriminate. In this context, for example, the word indigenous is itself a discriminatory term because it is associated with backwardness, poverty, and a history of exploitation and marginalization.

4. Discussion and conclusions

The results allow us to conclude that there are several key elements for overcoming these discontinuities, such as the construction of spaces of trust, participation in decision-making, the incorporation of Mapuche knowledge funds, and intercultural curriculum management, elements that are concluded from the testimonies collected.

The article demonstrates the systematic failure of policies that promote intercultural education in rural schools in the Araucanía region (Gulumapu), particularly in areas where Mapuche students are the majority, such as "Costa Araucanía" (Lafkenmapu), due to the persistence of discrimination in the classroom but also because intercultural education is seen as something functional, rather than an authentic conviction of the value of one's own education in relation to Western school education. The fact that students feel ashamed to speak a different language, one in which the main knowledge is not transmitted in school, shows that the importance of cultural content is considered secondary. In this sense, the concept of ethnic shame generates a deep internal feeling of exclusion that leaves marks that are difficult for schools with their monocultural practices to help overcome. On the contrary, this situation could be exacerbated, especially in the case of those children and young people who, through the dream (*pewma*) are called by the spirits of *chaw-ngünechen* (God) to be, train, and become ancestral authorities. This is the paradigmatic case of girls and boys who establish communication with *chaw-ngünechen* to become machi (ancestral authorities equivalent to doctors in Western society, mediators with the *wenumapu* or world of the heavens/celestial region). This calling causes changes in the behavior and lives of these individuals. Schools, unaware of the depth of this situation, confuse the ancestral calling with a mental health illness, attention deficit disorder, or other pathology typical of Western Judeo-Christian rationality.

This example of discrimination and exclusion is very serious because it violates rights, as a machi is an ancestral authority who has not chosen to be so of their own free will and who undergoes complex processes as part of their training. If a person does not accept or choose this path, they will become ill, their condition will worsen, and they could die. The educational institutions studied recognize this scenario and the complexity involved in the process, so there is generally support for the student and their family *(lof-che*). However, there is a lack of inclusive and culturally sensitive protocols because, due to the spiritual transformations experienced by the student, it will be very difficult for them to attend classes regularly, as the shamanic ethos prevails over the will of the individual. In fact, a person undergoing this process cannot wear the school uniform required by some internal regulations. Girls must wear the *trapelakucha*, *trarilonko*, cloth over the shoulder, and colored ribbon. In the case of boys, a cloth over the shoulders, a blanket, and a *trapelakucha.* In this regard, the Chilean Ministry of Education (MINEDUC) has a protocol that protects this right and is anchored in Convention 169 of the International Labor Organization (ILO), whose purpose is:

> Provide criteria to adults in the educational community for the development of a protocol for action in situations where children and young people are

> called to be machi, or any other cultural situation that may arise during their school life. Having clear guidelines will allow administrators, parents, guardians, teachers, and traditional educators to act in a manner consistent with their role in educating and supporting students, as well as to strengthen the protection, recognition, and appreciation of diversity in school settings. (Mineduc, 2023, p.1)

The above example is very interesting because it allows us to gauge the importance of cultural knowledge that different actors, mainly education professionals, involved in the educational process of indigenous students must possess, since ignorance of sacred cultural patterns can lead to situations of racism, mockery, and contempt. All human beings, from birth, have the inalienable right to the attributes, biological and cultural data that allow them to be individualized as subjects in society, and not to be deprived of them. The development of positive identities by students, within the framework of social interaction, is one of the central objectives of education today (Ogbu and Simons, 1988).

The other critical dimension that was identified in the study and that is present in the codes collected in the open coding process is the invisibility and exclusion of the mother tongue of *Mapuche-Lafkenche* indigenous students: *Mapunzugun*. In a more specific field, the historical process experienced by the *Mapunzugun* language and its speakers is an issue that is often ignored or silenced by academic research, public policies, and school agents involved in the socio-educational process. Intense and extensive intercultural and interethnic contact, coupled with its repercussions on *Mapuche* ways of life and social and communicative behaviors, are aspects that continue to this day with a clear framework of historical conflicts resulting from eternal colonization (Antimil and Olate, 2020; Durán and Ramos, 1986; Fanon, 1965).

The discourse of interculturality, multiculturalism, and the grand narrative of inclusion remains a theoretical formalism, euphemisms, clichés, and slogans that read very well but do not come to life in practice. And if any changes do occur, they are not the result of deliberate policies by states and their ministerial agencies, but rather of decisions made by teachers who have been trained from a critical intercultural perspective that is not functional to the hegemonic system. Now, why does discrimination and contempt for the Mapuche world continue to exist in the third decade of the 21st century? Mainly because the Chilean state does not recognize cultural differences that translate into processes of full pedagogical autonomy. We must not forget that Chile is one of the only countries in Latin America and the Caribbean where indigenous peoples do not have the right to their own education. This is not the case in countries such as Colombia, Guatemala, Brazil, and Mexico, where ethno-education exists. However, the fact that there is education in the territories does not fully guarantee that racism, discrimination, and violence against indigenous peoples will disappear, but it is an important political step.

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Authors' contribution

Dra. Ninosca Bravo-Villa: manuscript writing, selection of participants and context of the problem, application and transcription of semi-structured interviews, analysis of transcripts.

Dr. Juan Mansilla-Sepúlveda: manuscript writing, methodological framework, syntactic-grammatical style correction, data reduction in Atlas Ti, general writing.

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Teachers´ perceptions and implementation of UDL within the framework of inclusive education

Percepciones docentes e implementación del DUA en el marco de la educación inclusiva

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Abstract

Universal Design for Learning (UDL) is an approach rooted in inclusive education that aims to increase student participation and engagement without relying on curricular adaptations. Although UDL is embedded in Spanish legislation (LOMLOE, 2020), little is known about teachers' perceptions of it or about its actual use in schools. This study explored teachers' attitudes towards UDL and how far they implement it in practice. A descriptive design was used with a convenience sample of 286 in-service teachers working at pre-university levels in Asturias, Spain. Participants completed the validated Attitudes towards UDL and Practical Implementation in the Classroom questionnaire (ADIPA), which showed high internal reliability (α = .891; ω = .896). Data were analysed using descriptive statistics, non-parametric tests, and Spearman correlations. Teachers generally held positive views of UDL and acknowledged its inclusive potential, but classroom implementation was inconsistent. Significant differences were found by gender, previous training, perceived training quality, school type, and teaching specialisation. Likewise, the association between attitudes and implementation was positive but weak. This highlights the need to strengthen the practical components of teacher training and to ensure organisational conditions that allow UDL to be implemented effectively, thereby contributing to national and international scholarly debates on inclusive education.

Keywords: inclusive education, Universal Design for Learning, teachers, teaching practice, formal education.

Resumen

El Diseño Universal para el Aprendizaje (DUA) ha emergido como un enfoque que, amparado en los principios de la Educación Inclusiva, favorece la participación y el compromiso de todo el alumnado sin depender de ajustes curriculares. Aunque el DUA ha cobrado fuerza en la normativa española (LOMLOE, 2020), la evidencia empírica sobre la percepción docente y su aplicación sigue siendo limitada. Por ello, este estudio analizó las actitudes del profesorado hacia el DUA y su grado de implementación en la práctica. Se empleó un diseño descriptivo con una muestra de 286 docentes en activo de etapas no universitarias del Principado de Asturias (España). Los participantes completaron el cuestionario validado Actitudes frente al DUA e Implementación Práctica en el Aula (ADIPA), con adecuada fiabilidad interna (α = ,891; ω = ,896). El análisis de datos incluyó estadísticos descriptivos, pruebas no paramétricas y correlaciones de Spearman. En general, el profesorado expresó actitudes favorables hacia el DUA, reconociendo su potencial inclusivo, aunque la implementación fue heterogénea. Se hallaron diferencias significativas con base en género, formación, calidad percibida de la formación, titularidad del centro y especialidad docente. Asimismo, la relación entre opinión e implementación fue positiva pero débil, lo que subraya la necesidad de reforzar los componentes prácticos de la formación y el desarrollo de unas condiciones organizativas que favorezcan la aplicación efectiva del DUA, contribuyendo a enriquecer al debate nacional e internacional sobre educación inclusiva.

Palabras clave: educación inclusiva, Diseño Universal para el Aprendizaje, docente, práctica pedagógica, educación formal.

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1. Introduction

Inclusive education has established itself as a benchmark approach when designing and developing any teaching-learning process, as well as responding to diversity in the classroom and, ultimately, as a goal to strive for (UNESCO, 2023). After a long and complex journey marked by marginalization and exclusion (Arnaiz, 2019), its international recognition was consolidated at the end of the 20th century, driven by far-reaching initiatives such as the World Conference on Education for All (Ainscow et al., 2019; Blanco and Duk, 2019), the Salamanca Statement (UNESCO, 1994), and the Convention on the Rights of People with Disabilities (Naciones Unidas, 2006). More recently, the 2030 Agenda reinforced this commitment by explicitly recognizing education as a universal right and promoting the development of more equitable and inclusive schools (UNESCO, 2015).

Although inclusive education is currently recognized as the most appropriate approach to responding to diversity, it continues to be a dilemma, insofar as it has not yet been fully implemented in education systems, partly due to the difficulty of providing a single, agreed-upon definition (Arnaiz-Sánchez et al., 2024; Ocampo-González, 2023). Despite this, the truth is that for authors such as Ainscow and Miles (2008) and Ocampo-González (2021), this approach makes sense when understanding inclusive education as a journey rather than a destination, a transformative approach aimed at continually reinventing itself to respond to new social and educational demands, but whose ultimate goal will always be to ensure the presence, participation, and learning of all students.

In this context, and as part of this long journey, the Center for Applied Special Technology (CAST) introduced the concept of Universal Design for Learning (UDL) in the 1990s, a theoretical-practical paradigm aimed at promoting the participation and engagement of all students in learning processes, avoiding the development of curricular adjustments and adaptations (Alba-Pastor, 2019; CAST, 2018; Rao et al., 2017; Dempsey et al., 2023). The approach is based on the principles of Universal Design (Mace, 1985; Connell et al., 1997), an approach linked to architecture whose aim is to ensure accessibility to products and environments for the greatest number of users without the need for subsequent modifications to the design. Translated to the educational field, this implies building more flexible curricula that are capable of responding to student diversity from the outset (Cortés-Díaz et al., 2022; Fernández-Portero, 2018; Horn and Banerjee, 2009).

To this end, the approach is based on the work of Rose and Meyer (2006), who proposed the metaphorical existence of three neurological networks that represent some of the most relevant functions of the brain when it comes to learning (recognition networks, strategic networks, and affective networks). These networks form the basis of the three principles of UDL (Table 1) and are operationalized in a series of guidelines and indicators that guide educational action (CAST, 2018).

Table 1. *Structure and principles of Universal Design for Learning (UDL)*

Principles of UDL	Description	Associated Networks Associated
Design multiple forms of engagement	Focuses on the *why* of learning, promoting motivation, self-regulation, and active student involvement.	Affective network → manages motivation, interest, and emotional regulation.
Design multiple forms of representation	Focuses on the *what* of learning, ensuring that information is presented in a variety of ways to cater to different styles of perception and understanding.	Recognition network → processes the information received and allows meaning to be attributed to it.
Design multiple forms of action and expression	Focuses on the *how* of learning, offering different ways for students to demonstrate what they have learned and develop executive skills.	Strategic network → involved in the planning and execution of physical and cognitive tasks.

Internationally, UDL has gradually permeated legislative frameworks from the Higher Education Opportunity Act in the United States (2008) to its incorporation into policies in countries such as Portugal, Chile, Ecuador, and Ireland, among others (de la Fuente-González, 2025). In Spain, its explicit inclusion in the LOMLOE (2020) has consolidated it as a benchmark approach in educational plan-

ning. In addition, and in parallel, complementary resources have been developed, such as the *DUA Wheel* (Márquez, 2022) and the *PractiUDL* guide (Sanahuja-Ribés et al., 2024), which have helped to facilitate its transfer into practice. Along the same lines, Rodríguez-Martín et al. (2020) compile some of the most relevant methodologies for implementing UDL in the classroom in their work *Huellas para la inclusión (Footprints for Inclusion*), including cooperative learning, game-based learning, and thinking-based learning.

On the other hand, recent research has highlighted both the pedagogical potential and the limitations of the approach. In this regard, although positive effects have been demonstrated in terms of accessibility, engagement, and academic results for students (Baumann and Melle, 2019; Smith Canter et al., 2017), difficulties have also been noted in its translation into practice and the persistence of institutional and systemic barriers (Avellán-Zambrano and Alcívar-Pincay, 2024; Berrios and Herrera, 2021).

In the Spanish context, however, there remains a significant knowledge gap. Despite its growing presence in educational regulations and curriculum documents, no empirical studies have been identified that directly analyze how UDL is implemented in schools or how it is perceived by the educational agents involved. This gap is particularly problematic given that teachers are an essential component in translating theoretical provisions into practice, particularly in the field of inclusive education (Hargreaves and Fullan, 2012; Sharma, 2018). Thus, the absence of empirical research represents a significant limitation, as it prevents us from accurately knowing the progress, resistance, or conditions that favor its implementation.

In this context, the present study responds to this lack of empirical evidence by providing data on teachers' perceptions and implementation of UDL and offering a perspective that has been little explored in the Spanish context to date.

In this regard, the present study aims to analyze teachers' perceptions and implementation of UDL, providing empirical evidence to assess its applicability in educational practice. The research is contextualized in a region of northern Spain which, being integrated into the national regulatory framework and the European educational context, offers results with implications beyond its own territory. Likewise, the results can be used to compare with experiences in other countries where this approach is also widespread, enriching the international debate on the challenges of educational inclusion and the real applicability of UDL.

2. Methodology

2.1 Study design

A descriptive, cross-sectional study with a quantitative approach was conducted to examine the status of UDL among teachers in the Principality of Asturias (Spain) and identify possible relationships and patterns associated with their perceptions and implementation.

2.2 Sampling and participants

The participants were active teachers in non-university stages in the Principality of Asturias. Specifically, the sample, selected through convenience sampling, consisted of 286 participants (225 women, 61 men), with 0–35 years of experience (M = 16.28, SD = 10.70), assigned to public (90.2%) and charter schools (9.8%), located in rural (40.2%) and u"rban (59.8%) context. In addition, other sociodemographic and center variables were collected (gender, previous training in UDL, perceived quality of training, geographic location, ownership, highest degree, years of experience, center size, job position, teaching stages, and specialty).

2.3 Instrument

The validated questionnaire Attitudes towards UDL and Practical Implementation in the Classroom (ADIPA; de la Fuente-González, 2025) was used. This instrument analyzes opinions about UDL, as well as the frequency of use of practices aligned with the approach (e.g., designing multiple ways to access information, designing multiple alternatives for expression, using games as a teaching tool, cooperative learning, emotional education, thinking routines, executive functions, self-assessment) through a 6-option Likert scale and two dimensions: (I) *Opinion and perception of UDL*: 1 = *Strongly disagree* ... 6 = *Strongly agree* and (II) *Implementation of UDL in teaching practice*: 1 = *Never* ... 6 = *Always*. The internal reliability of the questionnaire was adequate,

with a Cronbach's alpha of 0.891 and a McDonald's omega of 0.896, which supports the consistency of the scores obtained in both dimensions.

2.4 Procedure

The questionnaire was distributed by institutional mail to all non-university centers in the Principality of Asturias. Data collection was carried out in stages over four months, with three reminders. Participation was voluntary, anonymous, and outside of school hours. Each analysis included only participants with complete data in the corresponding variables, avoiding the imputation of missing values and ensuring the validity of the estimates.

2.5 Data analysis

The analyses were carried out using Jamovi (v. 2.3.21) and were structured into three blocks presented below:

a. *Descriptive:* frequencies, percentages, mean, and standard deviation by item and by dimension.
b. *Comparisons between groups* using nonparametric tests:

- Mann-Whitney U for dichotomous variables (e.g., gender; rural/urban context; previous training in UDL [yes/no]; perceived quality of training [yes/no]; public/subsidized status; Special Education-PT specialty vs. others).
- Kruskal-Wallis for variables with more than two categories (e.g., number of students per center in sections; job position with combined categories; teaching stages).

c. *Associations/Correlations:*

- Spearman's rho between items and between dimensions (Opinion and perception of UDL ↔ Implementation of UDL in teaching practice).
- Chi-square for dependencies between nominal variables (and Pearson's Phi report when relevant).

In all cases, the significance level was set at $p < .05$.

3. Results

The results are structured into three blocks defined by the type of statistical analysis performed: (a) descriptive, (b) comparison of means based on sociodemographic variables, and (c) correlations between dimensions and items.

3.1 Descriptive analyses

Dimension I: Opinion and perception of the UDL

The distribution of responses (Table 2) indicates a generally favorable attitude toward the UDL. In the positive rating items, more than 70% of the responses are concentrated in *Agree* or *Strongly agree*. Item 5 (*Requires specific training for teachers*) stands out, with 59.1% *Strongly agree* and 22.7% *Agree*, reaching the highest mean (M = 5.26). Items 1 (M = 4.90), 2 (M = 5.00), and 7 (M = 4.90) also show high values. In contrast, item 6 (formulated in the opposite sense: *It is a fad like others in the field of education*) has the lowest mean (M = 2.79) and concentrates 51.8% of disagreement between *Strongly disagree* and *Disagree*.

Table 2. *Response frequencies, mean, and standard deviation for dimension (I) Opinion and perception of Universal Design for Learning*

The implementation of UDL in classroom practice...	1	2	3	4	5	6	Average	SD
1) ...Has a positive impact on the learning of all students	3,5 %	3,8 %	4,5 %	14,7 %	34,6 %	38,8 %	4,90	1,27
2) ...Contributes to creating an inclusive school	2,8 %	4,9 %	2,8 %	12,9 %	32,5 %	44,1 %	5,00	1,26
3) ...Must be reflected in teaching schedules	3,8 %	3,8 %	5,9%	14,7 %	33,9 %	37,8 %	4,84	1.18
4) …Requires application of verification principles and guidelines	2,1 %	3,8 %	5,6 %	16,1 %	38,5 %	33,9 %	4,87	1,36
5) ...Requires specific training for teachers	2,1 %	2,8 %	2,8 %	10,5 %	22,7 %	59,1 %	5,26	1,15

The implementation of UDL in classroom practice...	1	2	3	4	5	6	Average	SD
6) ...It is a trend like any other in the field of education	28,0 %	23,8%	15,4%	15,4 %	9,1 %	8,4 %	2,79	1,31
7) ...Increases (or maximizes) opportunities for all students to participate in learning situations	4,5 %	2,8 %	7,3 %	13,6 %	26,6 %	45,1 %	4,90	1,61

Note. SD = Standard deviation.

Dimension II: Implementation of the UDL in teaching practice

Table 3 shows that the most common practice among participating teachers is to present information through various channels (item 8; M = 4.52), with a cumulative 80.5% among *Quite often*, *Often*, and *Always*, and it is also the item with the highest frequency in *Always* (21.0%). This is followed by offering alternatives for expression (item 9; M = 4.37), using games as a learning tool (item 14; M = 4.19), cooperative learning (item 12; M = 4.12), and formative self-assessment (item 19; M = 4.00), with cumulative scores between *Quite often and Always* of 74.4%, 67.1%, 67.1%, and 61.5%, respectively. At the opposite end, the implementation of the *flipped classroom* methodology (item 15) is the least frequent (M = 2.66; only 3.1% *Always*). Modest averages are also reported for student participation in activity design (item 10; M = 3.10) and service learning (item 13; M = 3.31).

Table 3. *Response frequencies, mean, and standard deviation for dimension (II) Implementation of Universal Design for Learning in teaching practice*

In my day-to-day classroom...	1	2	3	4	5	6	Average	SD
8) …The information given to students is presented through different channels (text, image, audio, etc.	0,3 %	2,4 %	16,8 %	26,6 %	32,9 %	21,0 %	4,52	1,09
9) ...Alternatives are provided so that students can express what they have learned in different formats	0,7 %	8,0 %	16,8 %	22,7 %	31,1 %	20,6 %	4,37	1,25
10) ... Students participate in the design of classroom activities	7,7 %	30,8 %	24,8 %	22,4 %	9,4 %	4,9 %	3,10	1,29
11) ...Emotional education content is covered	1,7 %	12,2 %	25,5 %	20,3 %	25,9 %	14,3 %	3,99	1,32
12) …Cooperative learning methodologies are developed	1,4 %	7,3 %	24,1 %	25,5 %	28,3 %	13,3 %	4,12	1,21
13) ...Service-learning projects are promoted	13,3 %	17,1 %	28,0 %	17,8 %	14,3 %	9.4 %	3,31	1,49
14) ...Games are used as a learning resource	2,4 %	9,8 %	20,6 %	21,0 %	25,5 %	20,6 %	4,19	1,37
15) ...The flipped classroom methodology is used	27,6 %	20.6%	23.4 %	17,5 %	7,7 %	3,1 %	2,66	1,40
16) ...Thought-based learning is practiced	6,3 %	12,9 %	22,4 %	26,2 %	17,8 %	14,3 %	3,79	1,42
17) ...Tasks are promoted to develop executive functions	4,9 %	11,2 %	20,6 %	24,1%	27,6 %	11,5 %	3,93	1,35
18)...Thinking routines and metacognitive aspects are worked on	9,1 %	17,8 %	26,9 %	23,1%	14,7 %	8,4 %	3,42	1,40
19) ...Self-assessment is part of the formative assessment process.	4,9 %	14,0 %	19,6 %	20,3 %	20,6 %	20,6 %	4,00	1,50

Note. SD = Standard deviation.

3.2 Comparison of means by sociodemographic variables

3.2.1 Gender

Table 4 shows the significant differences between males and females. In particular, gender differences were identified in the dimension of *Opinion and perception of the UDL* (female: M = 4.68; male: M = 4.55; p = .041). At the item level, women scored higher on item 2 (*Contributes to creating an inclusive center*; M = 5.05 (1.28) vs. 4.85 (1.10); p = .043), item 3 (*Should be reflected in programming*; M = 4.95 (1.26) vs. 4.50 (1.37); p = .009) and item 7 (*Increases opportunities for participation*; M = 5.00 (1.33) vs. 4.57 (1.39); p = .005). In contrast, men scored higher on item 6 (*It is a fad*; M = 3.18 (1.67) vs. 2.69 (1.58); p = .040).

Finally, no differences were found in *the overall implementation of UDL in teaching practice*, although

differences were found in items 11 (*Emotional education*; M = 4.11 (1.34) vs. 3.57 (1.17) p = .004) and 14 (*game as a resource*; M = 4.28 (1.37) vs. 3.90 (1.31); p = .049), with higher means in the female group.

Table 4. *Significant differences between female and male genders (Mann-Whitney U test)*

Ítems	X (SD) Fem. (N=226)	X (SD) Male (N=60)	U of Mann-Whitney	Sig. (two-tailed)
(I) Opinion and perception of UDL	4,68 (0,86)	4,55 (0,72)	8620	,041
2. Contributes to creating an inclusive center	5,05 (1,28)	4,85 (1,10)	5674	,043
3. It should be reflected in teaching programs	4,95 (1,26)	4,50 (1,37)	5260	,009
6. It is a trend like any other in the field of education	2,69 (1,58)	3,18 (1,67)	5613	,040
7. Increases opportunities for participation	5,00 (1,33)	4,57 (1,39)	5260	,005
(II) Implementation UDL in teaching practice	3,82 (1,01)	3,64 (0,87)	6080	,219
11. Emotional education content is covered	4,11 (1,34)	3,57 (1,17)	5133	,004
14. Games are used as a learning resource	4,28 (1,37)	3,90 (1,31)	5659	,049

Note. X = mean; SD = standard deviation.

3.2.2 Previous training in UDL

Those who have received training in UDL show a better *opinion and perception of UDL* (M = 4.73 (0.80) vs. 4.50 (0.86); p = .005) and higher averages in items 1, 2, 3, 4, and 7 (all $p \leq .012$) (see Table 5). In item 6 (*It is a* fad like others in the field of education), the mean was lower among those who had received training (2.46 (1.53) vs. 3.37 (1.60); $p < .001$). Additionally, an extra item was included to ask teachers if they considered that the UDL was oriented towards students with Specific Educational Support Needs (NEAE), obtaining significant differences (2.45 (1.46) vs. 2.72 (1.39); p = .039) with lower scores for those who received training. No differences were found in the Implementation of UDL in teaching practice in relation to prior training.

Table 5. *Significant differences between having received or not received training in UDL (Mann-Whitney U test)*

Ítems	X (SD) No (N=104)	X (SD) Yes (N=182)	U of Mann-Whitney	Sig. (two-tailed)
(I) Opinion and perception of the UDL	4,50 (0,86)	4,73 (0,80)	7583	,005
1. Has a positive impact on learning	4,55 (1,34)	5,09 (1,19)	6747	<,001
2. Contributes to creating an inclusive school	4,65 (1,33)	5,19 (1,17)	6706	<,001
3. It should be reflected in teaching programs	4,60 (1,36)	4,98 (1,26)	7626	,006
4. Requires implementation of UDL principles and guidelines	4,67 (1,19)	4,98 (1,16)	7775	,012
6. It is a trend like any other in the field of education	3,37 (1,60)	2,46 (1,53)	6247	<,001
7. Increases opportunities for participation	4,50 (1,34)	5,13 (1,32)	6270	<,001
It is an approach geared toward students with specific educational support needs.	2,72 (1,39)	2.45 (1,46)	8045	,039
(II) Implementation of the UDL in teaching practice	3,76 (,91)	3,79 (1,02)	9365	,88

Note. X = mean; SD = standard deviation.

3.2.3 *Perceived quality of training*

As shown in Table 6, those who rated their training as facilitators scored higher on *Opinion and perception of the UDL* (M = 4.87 (0.69) vs. 4.47 (0.93); p = .001) and on all items in this dimension except item 5. Item 6 repeated the inverse pattern (2.08 (1.31) vs. 3.19 (1.65); p < .001) and in a new extra item entitled 'it involves additional effort for teachers' (4.19 (1.59) vs. 4.94 (1.23); p = .002). Once again, no differences were found in the implementation of methodological strategies linked to UDL in teaching practice.

Table 6. *Significant differences for the variable "Perceived quality of training" (Mann-Whitney U test)*

Ítems	X (ST) No (N=62)	X (SD) Yes (N=182)	U of Mann-Whitney	Sig. (two-tailed)
(I) Opinion and perception of the UDL	4,47 (0,93)	4,87 (0,69)	2620	0,001
1. Has a positive impact on learning	4,47 (1,41)	5,42 (0,91)	2073	<,001
2. Contributes to creating an inclusive school	4,66 (1,4)	5,47 (0,93)	2307	<,001
3. It should be reflected in teaching programs	4,56 (1,52)	5,20 (1,03)	2888	0,009
4. Requires the application of verification principles and guidelines	4,68 (1,34)	5,13 (1,03)	3017	0,027
6. It is a trend like any other in the field of education	3,19 (1,65)	2,08 (1,31)	2231	<,001
7. Increases opportunities for participation	4,58 (1,60)	5,42 (1,06)	2458	<,001
Requires additional effort on the part of teachers	4,94 (1,23)	4,19 (1,59)	2708	0,002
(II) Implementation of the UDL in teaching practice	3,72 (,99)	3,83 (1,04)	3462	0,44

Note. X = mean; SD = standard deviation.

3.2.4 *School ownership*

As can be seen in Table 7, differences were found in *opinion and perception of the UDL* in favor of public schools (M = 4.70 (0.79)) compared to charter schools (M = 4.22 (1.11); p = .016). The pattern is repeated in items 1, 2, and 4 ($p \leq .011$). On the other hand, the Implementation of UDL did not show any differences based on ownership.

Table 7. *Significant differences for the variable "School ownership" (Mann-Whitney U test)*

Ítems	X (SD) Subsidized (N=28)	X (SD) Public (N=258)	U of Mann-Whitney	Sig. (two-tailed)
(I) Opinion and perception of the UDL	4,22 (1,11)	4,70 (0,79)	2619	,016
1. Has a positive impact on learning	4,25 (1,43)	4,97 (1,24)	2435	,003
2. Contributes to creating an inclusive school	4,32 (1,49)	5,07 (1,21)	2451	,003
4. Requires the application of verification principles and guidelines	4,32 (1,36)	4,93 (1,15)	2615	,011
(II) Implementation of the UDL in teaching practice	3,89 (,83)	3,77 (,99)	3304	,462

Note. X = mean; SD = standard deviation.

3.2.5 *Teaching specialty (Special Education-PT vs. others)*

Table 8 shows the differences based on teaching specialty. In this case, Special Education-Therapeutic Pedagogy (TP) teachers have a better *opinion and perception of the UDL* (M = 4.85 (0.69) vs. 4.61 (0.85); p = .036), with higher averages in 1, 2, 3, 4, and 7 ($p \leq .044$) and lower averages in the inverse items (6 and the extra item: "additional effort"; $p \leq .002$). In contrast, *implementation*, in overall terms, was higher in the other specialties (M = 3.87 (0.93)

vs. 3.28 (1.10); $p < .001$), and no item in this dimension had higher means to support teachers or special education specialists (PT).

Table 8. *Significant differences for the variable "Teaching specialty" (Mann-Whitney U test)*

Ítems	X (SD) Special Education-PT. (N=43)	X (SD) Other (N=243)	U of Mann-Whitney	Sig. (two-tailed)
(I) Opinion and perception of the UDL	4.85 (0,69)	4.61 (0,85)	4179	,036
1. Has a positive impact on learning	5.33 (0,89)	4.82 (1,31)	4087	,016
2. Contributes to creating an inclusive school	5.33 (1,02)	4.94 (1,29)	4280	,044
3. It must be reflected in teaching programs	5.23 (1,1)	4.77 (1,33)	4095	,017
4. Requires the application of verification principles and guidelines	5.14 (1,15)	4.82 (1,18)	4247	,039
Requires additional effort on the part of teachers	4.12 (1,26)	4.66 (1,46)	3755	,002
6. It is a trend like any other in the field of education	2.07 (1,24)	2.92 (1,64)	3671	,001
7. Increases opportunities for participation	5.35 (1,00)	4.82 (1,40)	4099	,017
(II) Implementation of the UDL in teaching practice	3.28 (1.10)	3.87 (0,93)	3572	<,001
The information provided to students is presented through different channels	3.98 (1,21)	4.62 (1,05)	3691	,001
Alternatives are provided so that students can express what they have learned in different formats	3.77 (1,40)	4.48 (1,19)	3746	,002
Various technological resources are used to adapt activities to students' learning pace.	3.70 (1,34)	4.30 (1,15)	3956	,009
Students participate in the design of classroom activities.	2.60 (1,31)	3.19 (1,26)	3898	,006
Emotional education content is covered	3.56 (1,35)	4.07 (1,30)	4146	,027
Service-learning projects are promoted	2.74 (1,38)	3.41 (1,49)	3874	,006
thinking-based learning is promoted	3.09 (1,31)	3.92 (1,12)	3481	<,001
Flipped classroom methodology is used	2.21 (1,30)	2.74 (1,41)	4067	,018
Thinking routines and metacognitive aspects are worked on.	2.81 (1,42)	3.52 (1,37)	3706	,002
Self-assessment is part of the formative assessment process.	3.26 (1,61)	4.13 (1,44)	3597	<,001

Note. X = mean; SD = standard deviation.

3.2.6 Number of students per center

Differences were found in *the Implementation of UDL in teaching practice* ($\chi^2(5) = 11.34$; $p = .045$) (Table 9). Schools with 151-250 students obtained the highest mean (M = 4.07 (0.96)), while those with >450 students recorded the lowest (M = 3.55 (1.06)). The DS-CF (Dwass-Steel-Critchlow-Fligner) *post hoc* analysis shows a difference between 151–250 and >450 (W = −4.15; $p = .039$).

Table 9. *Significant differences for the variable "Number of students per center" (Kruskal-Wallis test for Opinion and Implementation of the DUA)*

	Opinion and perception of the UDL	Implementation of the UDL in the teaching practice
No. Students per center	**X (SD)**	**X (SD)**
-50 students (N=23)	X	3,81 (0,94)
51-150 students (N=55)	X	3,88 (0,91)
151-250 students (N=54)	4,76 (0,80)	4,07 (0,96)
251-350 students (N=46)	4,63 (0,80)	3,64 (0,96)
351-450 students (N=44)	4,72 (0,75)	3,78 (0,96)

+450 students (N=64)	4,51 (0,95)			3,55 (1,06)		
	X^2	gl	p	X^2	gl	p
	2,33	5	,802	11,34	5	,045

Note. X = media; SD = desviación típica.

3.2.7 Stages in which teaching is provided

Finally, Table 10 reports the differences in *the Implementation of UDL in teaching practice* ($\chi^2(9) = 16.6$; $p < .055$), with higher overall means in secondary education + sixth form (M = 4.01, SD = .97) and primary education (M = 4.00, SD = .90). In the *post hoc* analyses, ESO differs from Infant Education (p = .023) and Primary Education (p = .017), with lower means in ESO.

Table 10. *Significant differences for the variable "Stages at which teaching is provided" (Kruskal-Wallis test for Opinion and Implementation of the UDL*

	Opinion and perception of UDL			Implementation of UDL in teaching practice		
Stages Teaching	**X (SD)**			**X (SD)**		
High school (N= 3)	4,95 (,59)			3,64 (1,26)		
Early childhood education (N= 31)	4,73 (,72)			3,86 (1,07)		
Early Childhood Education, Primary Education (N= 40)	4,83 (,83)			3,64 (1,00)		
Early Childhood Education, Primary Education, Compulsory Secondary Education (N= 13)	4,54 (1,16)			3,52 (,84)		
Primary Education (N= 83)	4,72 (,70)			4,00 (,90)		
Compulsory Secondary Education (N= 48)	4,63 (.58)			3,40 (,88)		
Compulsory Secondary Education, Baccalaureate (N= 45)	4,50 (,99)			4,01 (,97)		
Compulsory Secondary Education, Baccalaureate, Vocational Training (N= 9)	4,71 (,52)			3,51 (1,32)		
Vocational Training (N= 7)	4,10 (1,32)			3,91 (1,12)		
	X^2	gl	p	X^2	gl	p
	11,5	9	,243	16,6	9	,055

3.2.8 Variables without significant differences

No differences were observed in opinion and perception of the UDL or in Implementation of UDL in teaching practice by school context (rural/urban), geographical location (center/west/east), years of teaching experience, or highest degree.

3.3 Correlations

The intra-dimension items correlated significantly with each other in both subscales, supporting the internal consistency of the instrument. The correlation between dimensions (Opinion - Implementation) was positive and significant, although with low values ($\rho = .259$; $p < .001$).

At the level of cross-correlations between items from different dimensions, *Opinion and Perception* items *UDL* 1-4 and 7 showed particularly strong associations with emotional education practices (item 11), cooperative learning (item 12), and play (item 14). In addition, items 3 and 7 showed notable correlations with executive functions (item 17). To a lesser extent, items 1-4 and 7 were associated with thinking routines (item 18) and self-assessment (item 19).

Item 4 (*Requires specific training*) correlated strongly with cooperative learning (item 12) and, to a lesser extent, with emotional education (item 11), while item 6 (*It is a fad*) showed negative correlations with items 11 and 12.

4. Discussion

The aim of the study was to describe and analyze the status of UDL in the Principality of Asturias (Spain), taking into account the opinions of teachers and its practical implementation. To this end, a quantitative design with a validated scale was applied, and descriptive analyses, non-parametric contrasts by sociodemographic variables, and correlations between items and dimensions were performed. In general terms, the attitudes of the participating teachers were mostly favorable, with heterogeneous implementation and a positive, albeit low-intensity relationship between valuing the approach and putting it into practice. This suggests that having a favorable opinion of UDL does not necessarily imply the implementation of methodological strategies associated with it. This weak relationship between opinion and implementation is consistent with studies that have shown that teacher beliefs, while necessary, do not in themselves guarantee the transformation of practice (Malinen et al., 2013), especially in approaches that require methodological and organizational adjustments such as UDL.

Particularly, in terms of differences between groups, patterns consistent with the literature on inclusion were observed: women score higher in opinion (and in items related to inclusion and participation), while men score higher in the reverse item ("it is a fad"), in line with previous studies that identified more favorable attitudes toward inclusion in women (e.g., Alghazo and Naggar, 2004; Pegalajar and Colmenero, 2017). This result suggests that gender attitudes toward inclusion also carry over to perceptions of UDL, reaffirming the need to consider these differences in initial and continuing teacher training.

Likewise, prior training in UDL and the perceived quality of training were associated with a better opinion and perception of UDL (and less agreement with the idea that the approach is a "fad"), but not with greater implementation of methodological strategies linked to UDL in teaching practice. This finding reflects what has been noted in research on inclusion, which highlights that training tends to impact beliefs before practices (Avramidis and Norwich, 2002; Scanlon et al., 2022). It also coincides with criticisms of the overly theoretical nature of some training proposals, limiting their transfer to the classroom (Arnaiz-Sánchez et al., 2021; Avellán-Zambrano and Alcívar-Pincay, 2024). These data, according to Espada-Chavarría et al. (2019) and Navarro and Navarro-Montaño (2023), suggest that it would be advisable to rethink how training in UDL is approached and to explore what conditions could favor more consistent application in teaching practice.

In terms of tenure, teachers in public schools showed a more favorable opinion than those in charter schools, consistent with previous findings on attitudes toward inclusion in Spain (e.g., Garzón-Castro et al., 2016). However, this result contrasts with findings in other contexts, such as Ecuador, where private schools exhibit more positive attitudes toward inclusion (Clavijo et al., 2016; Tárraga et al., 2020). This divergence points to the importance of addressing the structural conditions and educational policies of each school system, which can modulate the way teachers value UDL.

By specialty, special education teachers expressed a better opinion than other specialties (and less agreement with the reverse items), but implemented it less than the rest, a pattern that contrasts with studies describing greater use of inclusive practices among specialists (Espinoza et al., 2020; García-Cedillo et al., 2015) and invites exploration of organizational conditions that may be restricting their role in the regular classroom. One possible explanation is the persistence of the segregated model, which assigns individualized attention and the development of curricular adaptations to PT support teachers, reducing their opportunities to participate in regular classroom dynamics (Muntaner et al., 2016; Pérez-Gutiérrez et al., 2021). This contradiction invites us, once again, to rethink the role of support specialists within the framework of an inclusive school based on UDL.

On the other hand, in terms of organizational variables, in overall implementation, medium-sized schools (151-250 students) achieved the highest average and large schools (> 450) the lowest. Although we have not identified specific literature on UDL, these results are related to studies on inclusion that warn that school size and high ratios can constitute barriers to attention to diversity (Chiner and Cardona, 2013; Medina-Sánchez, 2021).

According to the different stages, Early Childhood and Primary Education (and Secondary Education + Baccalaureate) show greater imple-

mentation than Secondary Education alone, a pattern consistent with studies that describe a greater deployment of inclusive practices in the early stages (Ross-Hill, 2009; Suriá-Martínez, 2012). One possible explanation is that higher levels of education tend to be more conditioned by an academic culture focused on content and external assessments, which can hinder the adoption of flexible pedagogical approaches such as UDL. In this regard, Espinoza et al. (2020) suggest that curricular pressure and the weight of assessment in secondary school limit the incorporation of inclusive methodologies.

5. Conclusion

The research provides a quantitative snapshot of the opinion and implementation of UDL in a Spanish autonomous community, identifying differential patterns by training, specialty, tenure, school size, position, and stage. However, the findings are specific to the regional context analyzed and are based on self-reported responses. Therefore, future research could incorporate qualitative designs that allow for in-depth analysis of teachers' specific experiences, as well as quantitative studies that allow for the estimation of causal relationships between training, organizational conditions, and implementation.

In any case, three main implications emerge from the results of this study:

1. Training is associated with attitudes, but not necessarily with greater implementation, so training efforts should also focus on practical components that can be transferred to the classroom.
2. Organizational conditions (school ownership, student-teacher ratio, or stage of education) influence implementation, pointing to the need to address teachers' working conditions and students' learning conditions for better educational quality (e.g., coordination spaces, support in large schools).
3. The gap identified between opinion and practice suggests that improving the assessment of UDL is necessary but insufficient to produce broad methodological changes.

In conclusion, this research shows that teachers in the Principality of Asturias maintain mostly favorable attitudes toward UDL, with significant differences according to gender, ownership, and specialty, and with a still heterogeneous level of implementation. The weak relationship between opinion and practice, together with the weight of training and organizational factors, shows that valuing UDL does not in itself guarantee its transfer to the classroom. These findings, although limited to a regional context, show that several of the patterns observed coincide with trends described in other education systems, which reinforces their interest beyond the local sphere, thus contributing to the international debate on educational inclusion and ways to close the gap between theory and teaching performance.

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Authors' contribution

Sara de la Fuente González: conceptualization, data curation, formal analysis, research, methodology, project management, software, validation, visualization, writing—original draft, writing—review and editing.

Alejandro Rodríguez Martín: conceptualization, funding acquisition, methodology, resources, project management, supervision, writing – original draft, writing – revision and editing.

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Systematic review of Science teacher education and giftedness

Revisión sistemática de la formación docente en Ciencias y superdotación

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Abstract

This study conducted a systematic review of the national literature published between 2019 and 2024, with the aim of mapping and analyzing the education of Science teachers (Biology, Chemistry, and Physics) at the interface with Special Education, focusing on students with High Abilities/Giftedness. The analysis of 18 selected studies revealed four main thematic categories: initial teacher education curricula; teachers' conceptions regarding this specificity; pedagogical strategies and resources aimed at this population; and professional development actions in Science from an inclusive perspective. The results point to persistent gaps in teacher education, particularly in Physics, as well as misconceptions about giftedness, an uneven distribution of scientific production across the country, and a concentration of research within Graduate Programs. Despite these limitations, innovative initiatives stand out, such as inquiry-based experimentation, the STEAM approach, remote mentoring, gamification, and the use of active methodologies, which contribute to the recognition and development of these students' potential. It is concluded that initial and continuing education of Science teachers, articulated with Special Education, is essential for consolidating inclusive and equitable pedagogical practices; however, it is necessary to establish parameters for monitoring and evaluating the impact of these educational initiatives in Brazilian public Basic Education classrooms.

Keywords: teacher professional development, science education, giftedness, educational diversity, systematic review, special education.

Resumen

Este estudio realizó una revisión sistemática de la literatura nacional, publicada entre 2019 y 2024, con el objetivo de mapear y analizar la formación de docentes de Ciencias (Biología, Química y Física) en interfaz con la Educación Especial, dirigida a estudiantes con Altas Habilidades/Superdotación. El análisis de 18 estudios seleccionados reveló cuatro categorías temáticas principales: currículo de la formación inicial docente; concepciones de los docentes sobre esta especificidad; estrategias y recursos pedagógicos dirigidos a esta población; y acciones formativas en Ciencias desde una perspectiva inclusiva. Los resultados destacan brechas persistentes en la formación docente, especialmente en el área de Física, así como concepciones erróneas sobre la superdotación, distribución desigual de la producción científica en el territorio nacional y concentración de la investigación en Programas de Posgrado. A pesar de estas limitaciones, se destacan iniciativas innovadoras, como la experimentación investigativa, el enfoque STEAM, la mentoría remota, la gamificación y el uso de metodologías activas, que contribuyen al reconocimiento y desarrollo del potencial de estos estudiantes. Se concluye que la formación inicial y permanente de profesores de ciencias, vinculados a la educación especial, es esencial para la consolidación de prácticas pedagógicas inclusivas y equitativas; sin embargo, es necesario establecer parámetros para monitorear y evaluar el impacto de esta formación en las aulas de la educación básica pública brasileña.

Palabras clave: desarrollo profesional docente, educación científica, superdotación, diversidad educativa, revisión sistemática, educación especial.

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1. Introduction

In contemporary educational debates, teacher training has taken center stage, as social, political, and technological changes demand professionals who are trained to work with diversity in schools. According to Saviani (2009), the role of initial training is to articulate theory and practice, overcome technocratic models, and strengthen teacher identity, assuming a political commitment to teaching and school democratization. According to Nóvoa (2009), continuing education should contribute to valuing the human and ethical dimensions of the profession, supporting autonomy and collaboration among teachers, and promoting professional development. Both authors criticize technocratic models and argue that initial and continuing education should be integrated and linked to everyday school life.

In the field of Special Education (Brazil, 2025), a cross-cutting teaching modality that offers services and school support to students with disabilities, autism spectrum disorder (ASD), and high abilities or giftedness (HA/GD), teacher training plays a fundamental role in the development of inclusive school practices. In the case of students with AH/SD, it is essential that teachers be able to identify and support their talents, for example, in the area of Natural Sciences, by creating stimulating environments (Renzulli, 1978; Alencar and Fleith, 2010), thereby contributing to equitable, high-quality science education (Carvalho, 2013; García, 2015).

Several countries have emphasized teacher training to recognize and promote gifted and talented students, articulating theory, practice, and equity (Townend et al., 2024; Weber and Mofield, 2023). In the United States, the standards of the National Association for Gifted Children (NAGC) highlight teacher training as essential for serving gifted students, while in Australia, the High Potential and Gifted Education Policy (2019) establishes continuing education as a requirement for working with this population. These trends highlight the importance of recognizing diversity of talents and developing creativity, inquiry, and critical thinking, bringing Brazil closer to a global movement of inclusion and appreciation of cognitive diversity.

Corroborating these perspectives, there is a clear need for consistent initial and continuing training, articulated with the principles of special and inclusive education, and for advances in empirical research on its impact on the recognition and support of student with giftedness in regular education. In Brazil, teacher training aimed at this population is still incipient, especially in the teaching of Natural Sciences, and despite advances in inclusive policies, there is a lack of studies on teacher preparation focused on identifying and supporting students with high potential.

Given this scenario, this study investigates national academic production on the training of Natural Sciences teachers in the context of student with giftedness, contributing to the theoretical strengthening and improvement of inclusive training policies and practices. Thus, this research seeks to map and analyze the scientific literature published in Brazil between 2019 and 2024 that addresses the training of science teachers (biology, chemistry, and physics) for special education in this context. The intention is to identify emerging thematic categories and perform a bibliometric characterization based on articles, dissertations, and theses, synthesizing existing scientific evidence to provide reliable, data-driven support for decision-making in training policies and practices.

We understand that the importance of analyzing national academic production allows us not only to identify gaps in teacher training but also to guide policies, professional development programs, and future research that strengthen teachers' ability to recognize, stimulate, and support the diversity of talents present in Brazilian classrooms, consolidating a scientific education that values cognitive plurality and enhances the learning of all students. Below, we will present the methodology used in the research.

2. Methodology

This study adopts a systematic literature review model based on the PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses)* 2020 model, whose inclusion of studies is based on four stages: identification (survey of available studies), screening (evaluated based on reading titles and abstracts), eligibility (based on reading the full text) to finally identify the included studies that will form the basis of the analyses and conclusions. The focus of the research is on the thematic units present in Brazilian productions that address teacher training in the area

of Natural Sciences (Chemistry, Physics, and Biology), aimed at the school inclusion of student with giftedness, terminology used by Brazilian legislation (Brazil, 2025). The main objective was to identify recurring categories, highlight trends, and recognize theoretical gaps related to the topic.

To achieve this purpose, scientific studies available in comprehensive and relevant databases were selected, specifically in the Brazilian Digital Library of Theses and Dissertations (BDTD) and in journals indexed in the CAPES Journal Portal. Inclusion and exclusion criteria were defined to cover as many studies as possible relevant to the research topic, ensuring the breadth of the search, methodological rigor, and consistency in the selection of the material analyzed.

The time frame adopted was from 2019 to 2024, justified by the changes promoted by Resolution CNE/CP No. 2/2019, which redefined the guidelines for teacher training in Brazil. According to authors such as Libâneo (2023), Zucchini (2023), and Rocha et al. (2022), this regulation reinforced a more technical and instrumental nature of training processes, reducing the space allocated to critical, reflective, and inclusive approaches, a particularly sensitive aspect in the education of student with giftedness. The searches were conducted between April 2024 and May 2025.

Step 1 — Identification

In this phase, studies were retrieved from the databases of the Coordination for the Improvement of Higher Education Personnel (CAPES), the Brazilian Digital Library of Theses and Dissertations (BDTD), and the Scientific Electronic Library Online (SciELO). Based on this survey, an initial sample of studies was constructed according to previously defined inclusion and eligibility criteria, such as:

- The use of the terms: (1) Science teacher training and giftedness; (2) Science teacher training and giftedness, limiting the search to their appearance in the title, abstract, and keywords of the articles.
- The use of four combinations of descriptors with the Boolean operator "AND" (Universidade Federal do Rio Grande do Sul, 2022; Picalho et al., 2022) considering titles, abstracts, and keywords for academic papers: (1) Education AND Chemistry AND giftedness; (2) Education AND Physics AND giftedness; (3) Education AND Science AND giftedness; (4) Education AND Biology AND giftedness.

These combinations were defined to cover the different areas of Natural Sciences, maintaining a focus on teacher training oriented towards the inclusion of students with AH/SD.

- Define the type of document as a parallel inclusion criterion, selecting in this first phase journal articles and academic papers (dissertations and theses) linked to national postgraduate programs (PPG), excluding papers presented at conferences, books, and book chapters.

After applying these criteria, the first search yielded a total of 82 records. After eliminating 22 duplicate records, a final set of 60 valid publications was obtained for the next screening stage.

Stage 2 — Screening

In this step, to delimit the sample and ensure that the studies met the defined criteria and the focus of the review, without the use of automation tools, the titles and abstracts of the studies were examined, and the following additional exclusion criteria were defined:

- Studies in the area of Physical Education, resulting from the misuse of the descriptor "Training AND Physical AND giftedness" (n = 10).
- Publications prior to 2019 (n = 15).

In total, 25 studies were excluded and 35 were eligible for the next stage.

Step 3 — Eligibility

At this stage, the full text of the 35 eligible studies was read, and 17 studies were excluded because they were considered inappropriate and their objectives diverged from the focus of this review. The exclusion criteria adopted were:

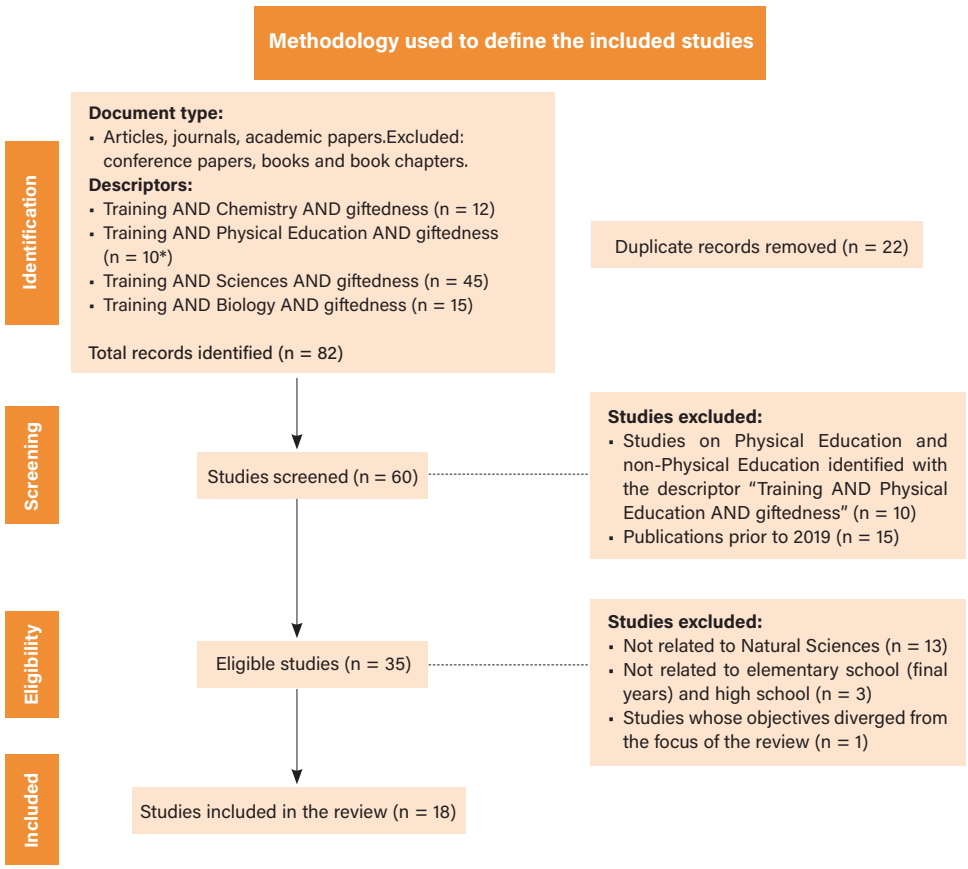
- Studies not related to the natural sciences (n = 13).
- Studies not related to the final years of primary or secondary education, but rather to the training of educators working in the early years of primary education or addressing initial teacher training (n = 3).
- The study deviated from the objectives and focus of the review because it was a study of twice-exceptionality and not teacher training, but rather psychology (n = 1).

Given the qualitative nature of the review, risk of bias was assessed by restricting the analysis to indexed articles, dissertations, and theses, recognizing that unpublished studies may contain additional information. In addition, two independent reviewers analyzed each study, and discrepancies were resolved by consensus to ensure consistency with the review's focus and objectives, as well as to ensure methodological rigor and thematic relevance.

Step 4 — Inclusion

Upon completion of the selection and eligibility stages, the authors of this study independently and by consensus selected 18 studies considered relevant to the scope of the research, as they addressed teacher training in CN, focusing on the school inclusion of students with AH/SD in basic education (final years of primary and secondary school). Finally, the PRISMA flow diagram is presented, which summarizes in an organized way all the stages of the search, selection, eligibility, and inclusion process, resulting in a final sample of 18 studies, as shown in Figure 1.

Figure 1. *PRISMA diagram of the systematic review process*



Data analysis followed the PRISMA 2020 guidelines, which guide the conduct and reporting of systematic reviews in a transparent and reproducible manner (Page et al., 2021). The protocol includes a checklist that organizes steps such as eligibility criteria, search strategies, study selection, synthesis

of results, and risk of bias assessment, as well as a flowchart detailing the process of study selection, identification, eligibility, and inclusion. The use of these guidelines ensured greater rigor and clarity at all stages of the review.

The review, record selection, and data extraction were performed independently by the authors, and any disagreements were resolved by consensus without using automated systems. For each study, information was collected on the area of Natural Sciences, the type and method of research, the content and strategies of teacher training, and its relationship with students with AH/SD.

The authors of this review recorded and resolved missing or ambiguous information. The variables analyzed included aspects of teacher training (including content, strategies, and inclusive approach), the area of Natural Sciences addressed (Chemistry, Physics, or Biology), the educational context related to Basic Education, and the type of publication (article, dissertation, or thesis).

Additional characteristics were also recorded, such as the year of publication, authorship, geographical region of origin, and the graduate program responsible for the production. The assessment of bias risk, appropriate for the qualitative nature of the review, focused on the clarity of the studies' objectives, methodological consistency, and thematic relevance. The synthesis of results was descriptive and comparative, as no meta-analysis was performed. Following the PRISMA guidelines (2020), eligible studies were classified by area of Natural Sciences and type of publication, and then tabulated and compared. The analysis allowed identifying thematic categories and bibliometric patterns, highlighting gaps in science teacher training, especially in physics for gifted and talented students, and pointing to emerging trends in the field.

A meta-analysis was not performed due to the methodological and thematic heterogeneity of the included studies. The assessment of publication bias considered the limitation derived from the exclusive inclusion of indexed articles, dissertations, and theses, recognizing that unpublished works could provide additional evidence. The certainty of the evidence was examined based on the consistency of the findings, the relevance to the topic under investigation, and the methodological rigor of the selected publications.

These studies comprise the *analytical corpus* and are organized below in Table 1.

Table 1. *Studies selected after a search conducted in BDTD, CAPES, and SciELO*

Código	Referência
E1	Rocha-Oliveira, R., Dias, V. B., & Siqueira, M. (2019). Formação de professores de Biologia e educação inclusiva: Indícios do Projeto Acadêmico Curricular. *Revista Brasileira de Pesquisa em Educação em Ciências, 19*, 225–250.
E2	Nicácio, J. L. (2019). *Formação de professores para o uso do software educacional HagáQuê no ensino de alunos com AH/SD* (Dissertação de Mestrado). Universidade Federal do Acre.
E3	Souto, K. C., Castro, H. C., & Delou, C. M. C. (2021). Da formação básica à prática docente: Qual a percepção do professor sobre a superdotação? *Travessias, 15*(2).
E4	Adams, F. W. (2021). Educação Especial na formação inicial de professores de Ciências da Natureza: Em foco os eventos científicos. *Revista Triângulo, 14*(2), 241–261.
E5	Brunetti, D. T. A. (2022). *Formação inicial de professores no curso de Licenciatura em Ciências Biológicas com foco nas altas habilidades e superdotação: Reflexões sobre a prática pedagógica e experiências inclusivas* (Dissertação de Mestrado). Universidade Estadual do Centro-Oeste.
E6	Brunetti, D. T., & Crisostimo, A. L. (2022). Formação inicial com foco nas altas habilidades/superdotação: Práticas inclusivas em Ciências Biológicas. *Amazônia: Revista de Educação em Ciências e Matemática, 18*, 188–203.
E7	Nóbrega, L. N. N. (2022). *A experimentação investigativa na sondagem de indicadores de Altas Habilidades ou Superdotação e na potencialização no ensino de Química* (Tese de Doutorado). Universidade Federal de Goiás.
E8	Nóbrega, L. N., Nobre-da-Silva, N. A., & Benite, C. R. M. (2022). Interface entre ensino de Química e Educação Especial: Pressupostos teóricos para atendimento a estudantes com AH/SD. *ACTIO, 7*(3), 1–23.
E9	Ferreira, O. (2023). *Altas habilidades/superdotação e o ensino de Ciências: Reflexões sobre a inclusão na Educação Básica* (Dissertação de Mestrado Profissional). Universidade Federal do Pará.
E10	Xavier, M. B. (2023). *Mentoria de enriquecimento remoto na pandemia: Estudo de caso retrospectivo em AH/SD* (Dissertação de Mestrado). Universidade Federal Fluminense.
E11	Lima, F. S. C. de. (2023). *Resolução de Problemas como metodologia de ensino para educação inclusiva* (Tese de Doutorado). Universidade Federal do Rio Grande do Sul.

E12 Salgado, A. R. D. (2023). Iniciação científica no contexto das altas habilidades ou superdotação. *Revista Brasileira de Altas Habilidades/Superdotação, 5*, 3–25.

E13 Salgado, A. R. D. (2023). *Protagonismo juvenil e enriquecimento psicopedagógico remoto no ensino de Ciências para altas habilidades com vocação científica* (Tese de Doutorado). Universidade Federal Fluminense.

E14 Salgado, M. L. C. (2024). *A identificação de alunos com AH/SD na perspectiva de professores da Educação Básica* (Dissertação de Mestrado). Pontifícia Universidade Católica de São Paulo.

E15 Nóbrega, L. N. N., & Benite, C. R. M. (2024). A experimentação investigativa no ensino de Química para sondagem de indicadores de AH/SD. *Amazônia, 20*, 191.

E16 Reis, M. dos S., Almeida, A. S., Souza, F. dos S., & Dias, V. B. (2024). A formação inicial de professores de Ciências Naturais e educação inclusiva: Caminhos já percorridos nas pesquisas. *Educação: Teoria & Prática, 34*(67), e11.

E17 Ferreira, A. C. (2024). *Caracterização das ações docentes e discentes em aulas de Química para estudantes com AH/SD* (Tese de Doutorado). Universidade Estadual de Londrina.

E18 Mateus, A. C. R. (2024). *Estudo sobre características da abordagem STEAM como possíveis indicadores de AH/SD na área de Ciências da Natureza* (Dissertação de Mestrado). Universidade Federal de Goiás

3. Results and discussion

The analysis of the 18 eligible files revealed two central dimensions. The first covers four thematic categories: (1) Initial teacher training curriculum in science at the interface with special education; (2) Teachers' conceptions of student with giftedness in science; (3) Pedagogical strategies and resources for student with giftedness; and (4) Training actions in the field of student with giftedness in science, highlighting persistent gaps in teacher training, especially in the area of physics focused on student with giftedness.

The second dimension corresponds to the bibliometric characterization of the studies, including the annual distribution of publications, geographical location, institutional affiliations, graduate programs involved, and areas of knowledge researched. We discuss both dimensions below.

3.1 Thematic categories

3.1.1 Curriculum for the initial training of science teachers at the interface with special education

Inclusive education gained momentum in Brazil in the 1990s, influenced by international documents such as the Salamanca Statement (UNESCO, 1994). However, a comparison of data from recent studies within science degree programs shows that this topic is still treated superficially. In most institutions, discussions on inclusion focus on specific subjects, such as Brazilian Sign Language (LIBRAS), recognized as a second language by Decree No. 5,626/2005, or on elective components, revealing the fragility of the integration of inclusive education in initial teacher training (Rocha-Oliveira et al., 2019; Ferreira, 2023; Reis et al., 2024). This limitation highlights the inertia of undergraduate programs in the face of the demands imposed by the growing presence of students who are the target audience of special education (Pedroso et al., 2013; Vilela-Ribeiro and Benite, 2011b).

Although some current curricula offer some flexibility for undergraduate students to bring the demands of the school to the university, opening space for debates on diversity, they are still far from complying with the provisions of the National Guidelines for Teacher Training (2002 and 2015), which reinforce the need to prepare teachers to act with equity and inclusion. Given these shortcomings, several authors (Adams, 2021; Rocha-Oliveira et al., 2019; Reis et al., 2024) argue that supervised practices, outreach activities, and participation in scientific events constitute privileged spaces for articulating science education with inclusive education, fostering experiences more in line with the diversity present in the school context.

3.1.2 Teachers' conceptions of student with giftedness in science

Research by Shulman, Schön, Fullan, Calderhead, and Borg show that teachers' conceptions and beliefs directly influence their pedagogical decisions, guiding planning, teaching strategies, and the interpretation of classroom situations. In the case of student with giftedness, these conceptions are often steeped in myths and misconceptions, which is one of the main obstacles to identifying gifted students in regular public schools. Among these myths, the idea

that gifted students must excel in all areas stands out (Winner, 1996), leading many teachers to fail to recognize specific talents or cases in which HA/GD coexists with learning difficulties (Pérez, 2011, p. 515).

When analyzing the research by Souto, Castro, and Delou (2021), we perceive that entrenched conceptions continue to negatively influence teaching practice in Brazilian schools. The authors point out that both university students and science teachers have a superficial understanding of HA/GD, even after teaching experiences or additional training. The authors' data indicated that 30% of teachers and more than 55% of university students considered AH/GD to be a rare phenomenon, and about 10% believed it was more common in boys, revealing gender biases (Pérez and Freitas, 2012). In addition, 11% of teachers and 20% of university students associated this condition with psychological problems without scientific support, corroborating the myths pointed out by Winner (1996). The insufficient coverage of the topic in university programs makes it difficult to recognize gifted students, and isolated training courses do not promote significant changes in teachers' conceptions. Therefore, it is argued that training programs should include evidence-based professional development indicators, ensuring a real impact on teaching practice.

Another study that offered relevant insights into how elementary school teachers perceive and address challenges related to HA/GD in the school context was conducted by Ferreira (2023). The author collected the opinions of teachers in the municipal school system responsible for teaching science in the early years of primary school—i.e., pedagogues—and found that, although these professionals had more than ten years of classroom experience and postgraduate training, they still understood giftedness primarily as intellectual abilities associated with academic performance. This perspective corresponds to the type of academic giftedness characterized by "ease of learning"; precisely, the type of skill most valued in traditional schools, which prioritize analytical skills over creative or practical ones (Renzulli, 2004). As a result, teachers dismissed other types of giftedness identified by this author, such as creative-productive giftedness or mixed-profile giftedness.

Knowing that the identification of students with indicators of AH/GD depends directly on the teacher's perception in the daily school routine, Salgado's study (2024) highlights how misconceptions can lead to inaccurate interpretations. In his research with three elementary school teachers, confusion was observed between indicators of potential and characteristics of learning disorders or difficulties: Teacher 1 attributed a student's ease of learning solely to the cultural environment, ignoring innate aspects and reproducing a gender interpretation; Teacher 2 did not recognize the high cognitive and creative potential of a girl with autism spectrum disorder (ASD), even though she was also identified with HA/GD; and Teacher 3 interpreted difficulties related to frustration and symbolic thinking as a sign of autism. These misconceptions reflect myths described by Winner (1998), Renzulli (2004), and Virgolim (2007), such as the false opposition between innate and acquired talent and the belief that inattentive or unmotivated behaviors indicate a lack of ability. These stereotypes end up obscuring potential and reducing opportunities for educational enrichment.

3.1.3 Strategies and pedagogical resources for student with giftedness

International strategies for identifying giftedness follow a multidimensional approach that combines cognitive testing, creativity assessment, portfolios, and systematic observation to reduce bias and recognize different talent profiles (Renzulli, 2004; Sternberg, 2017; Gagné, 2009). Countries such as the United States, Canada, Australia, and the United Kingdom use instruments such as WISC-V, CogAT, Raven, behavior scales (Renzulli et al., 2002), and divergent thinking tests, such as the TTCT (Torrance, 1974). Practices such as universal screening increase inclusion (Peters et al., 2019), while dynamic assessment models, especially in Israel, allow for the identification of learning potential beyond current performance (Feuerstein, 1980). Therefore, the international trend is to adopt continuous and diversified processes carried out by multidisciplinary teams.

In Brazil, although legislation proposes a multifactorial assessment that considers cognitive, creative, and socio-affective aspects (Pérez, 2009), its implementation is still limited and depends on coordination between schools and the Centers for High

Ability/Giftedness (NAAH/S), created in 2005, and which are marked by strong regional inequalities. Despite this scenario, recent research has sought to develop methodological procedures that simultaneously help identify and empower student with giftedness. Among them, Nóbrega (2022) stands out. Based on Renzulli's School Enrichment Model (2004, 2014), she used investigative experimentation in chemistry teaching to track indicators of HA/GD in a public school in Goiás. The analysis of the activities made it possible to distinguish common cognitive skills from higher metacognitive skills. In another study from the same year, the author developed teaching materials aimed at combating fake news on socio-scientific topics, expanding conceptual repertoires, stimulating creative and social skills, and promoting high student engagement, highlighting their potential for talent development in the field.

Similarly, Mateus (2024) investigated the potential of the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach for detecting indicators of HA/GD in science. The author analyzed a challenge applied to high school students that consisted of building a prototype to solve a hypothetical problem: allowing a blind mother to correctly measure the volume of medication to medicate her child. The activity made it possible to assess cognitive and metacognitive skills, as well as the creativity employed in the solutions presented by the students. The results showed that the STEAM approach favors the identification of high potential, although the author highlighted the limitations of inferring indicators of HA/GD from a single assessment activity.

Another initiative identified in the studies analyzed occurred in the context of remote teaching during the pandemic, when Xavier (2023) examined how a Remote Enrichment Mentoring (REM) program met the cognitive and motivational demands of a primary school student with HP/SD who was particularly interested in arthropods. The research, which was qualitative and descriptive in nature, collected data through digital platforms such as WhatsApp and Google Meet, involving the mentored student and three university students who acted as mentors. According to the author, the REM met the student's intellectual needs, compensated for the absence of practical and laboratory activities, ensured individualized support, and even resulted in the creation of a mentoring training course for future teachers and administrators. However, further methodological details could not be explored because the thesis was not available in open access.

Salgado's (2023) research, conducted during the pandemic, investigated the use of playful and technological formats for scientific communication as a strategy to identify signs of HA/GD in students with early scientific aptitude. The author promoted enrichment activities based on gamification and active methodologies, which culminated in the production of an interactive almanac and a digital game. The results showed that teacher mediation encouraged students' active participation in the search for educational and technological resources, in the design of research, and in the development of autonomy and collaboration skills, strengthening their scientific vocation. In combination with other studies analyzed, this research indicates that although Brazil does not yet have comprehensive and formalized identification systems such as those adopted internationally, investigative, active, and technology-mediated methodologies have proven to be promising ways to recognize and stimulate student with giftedness, highlighting the need for structured policies and greater investment in teacher training.

3.1.4 Science training activities at the interface with HA/GD

Although education legislation recognizes student with giftedness as part of the special education population (Brazil, 1996), there remains a significant gap in teacher training, which compromises identification and support practices. The studies analyzed show that training activities—such as courses, workshops, internships, seminars, mentoring, educational products, and the use of technologies—play a central role in providing theoretical and methodological support for identification in childhood and for planning appropriate pedagogical strategies. In the context of initial teacher training, supervised internships have proven to be a strategic space for incorporating discussions about student with giftedness, although they are still under-explored (Salto, 2020; Reis et al., 2024). In this context, Brunetti (2022) implemented a training course for undergraduate students in Biological Sciences, observing conceptual advances after the intervention, while Lima (2023)

used the *Problem-Based Learning* methodology with undergraduate students in Chemistry and Biology, promoting reflections on Special Education. In continuing education, Xavier (2023) developed seminars that resulted in the production of a digital book to enrich scientific practices; Ferreira (2024) conducted a seminar focused on the characterization of teaching and learning actions in Chemistry classes for student with giftedness, indicating that the topic remains underrepresented in training policies; and Nicácio (2019) offered a course on the use of the educational *software HagáQuê,* demonstrating its potential to foster challenging and creative practices with student with giftedness. In a systematized action, Souto et al. (2021) compared the perceptions of university students and practicing teachers in the field of science, concluding that continuous education has not significantly broadened the understanding of giftedness, highlighting the need for greater articulation between school management, teacher training, and the real demands of the classroom, a scenario that has led many teachers to seek training independently.

Even in initial training, Adams (2021) identified low participation by science students in events on special education due to lack of knowledge, although such experiences can broaden debates and strengthen training.

On the other hand, Ferreira (2024) analyzed the actions of teachers and students in chemistry classes, highlighting variations according to the pedagogical strategy adopted and identifying evidence of learning in the interactions that took place. Nóbrega (2022), when interviewing a specialist from NAAH/S-GO, articulated theoretical assumptions to guide interventions in chemistry, highlighting inquiry and experimentation as central strategies for identifying indicators of HA/GD. Finally, Salgado (2023) developed a guidebook with innovative practices in science and biotechnology, illustrating the potential of training actions to improve teaching and empower student with giftedness.

These categories highlight the challenges, but also the possibilities, for recognizing students with this profile in science within public basic education. They reveal difficulties such as the lack of identification and teacher training policies, but also indicate that active methodologies, research, technologies, and qualified mediation can favor this recognition, suggesting ways to strengthen teacher support and training.

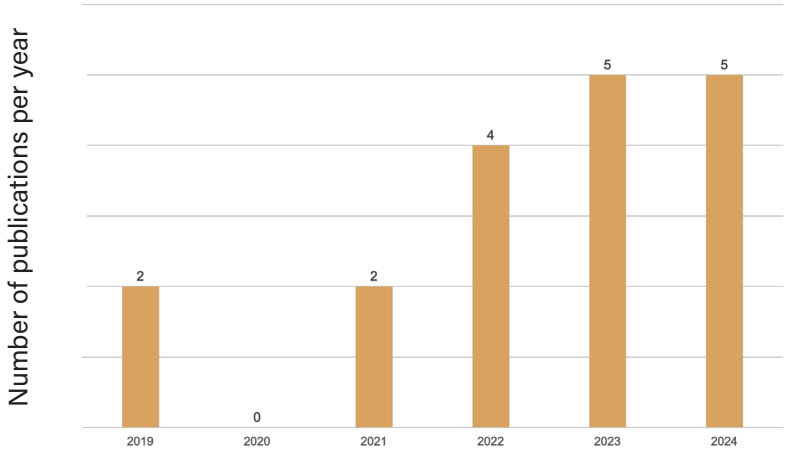
3.2 Bibliometric characterization

Bibliometrics has been used in science as "a statistical technique used to measure aspects of academic production that contribute to the development of science" (Medeiros and Vitoriano, 2015, p. 491), highlighting patterns in the research topic, especially in terms of the temporal distribution of publications, geographical location, and the PPG institutions involved.

3.2.1 Temporal distribution

The distribution presented in Figure 2 illustrates the panorama of scientific production on teacher training in science focused on HA/GD in the period 2019 to 2024. It can be seen that the number of publications decreases in the early years, with only two studies identified in 2019 and no records in 2020, a gap possibly related to the impacts of the COVID-19 pandemic on research and postgraduate activities in the country. From 2021 onwards, a gradual recovery is observed, followed by significant growth from 2022 to 2023 and linear growth from 2023 to 2024. This movement indicates a growing interest in the topic among the academic community, while also revealing the strengthening and consolidation of research at the interface between teacher training and service to the Special Education population, especially in the context of student with giftedness.

Figure 2. *Temporal distribution of academic publications*

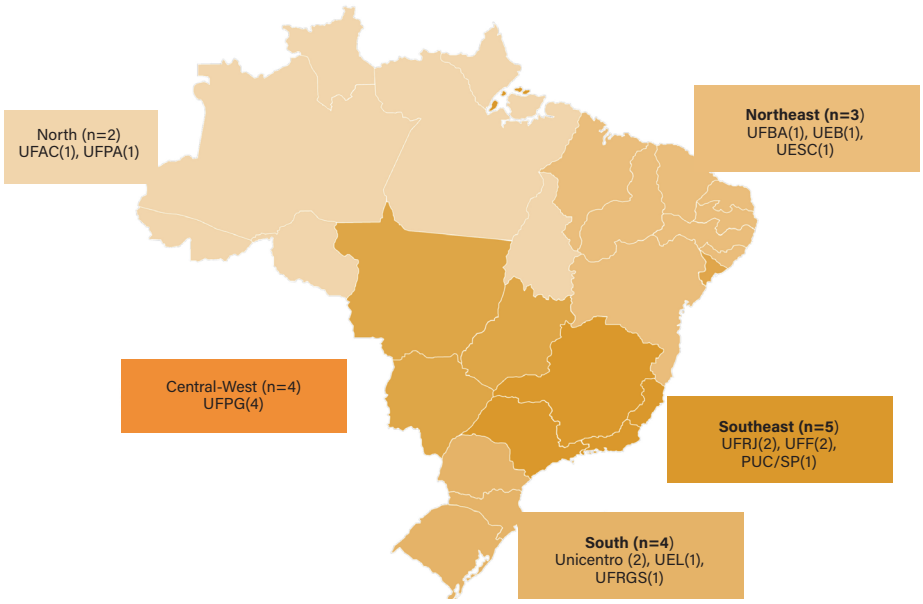


3.2.2 Geographical location of research

Scientific production on HA/GD in Brazil is unevenly distributed, with the highest concentration in the Southeast region, followed by the South and Midwest regions, while the Northeast and North regions have the lowest participation. In the Southeast, institutions such as UFF and UFRJ stand out, developing research focused on diversity and inclusion. Likewise, Unicentro maintains two lines of research focused on educational policies, culture, and diversity, with a strong emphasis on inclusive processes. UFG also stands out for its structured programs and collaborative networks, such as RPEI, linked to the Laboratory for Research in Education and Chemical Inclusion (LPEQI).

In the Northeast, the three studies identified are concentrated in universities in the state of Bahia, while in the North there are only two studies, developed by UFAC and UFPA. This regional concentration reduces theoretical and methodological diversity and limits the visibility of local demands, as well as influencing the formulation of public policies based on the most active academic centers. Despite these asymmetries, there has been an expansion of the topic and the strengthening of new research centers and networks dedicated to HA/GD.

Figure 3. *Geographic location of research*

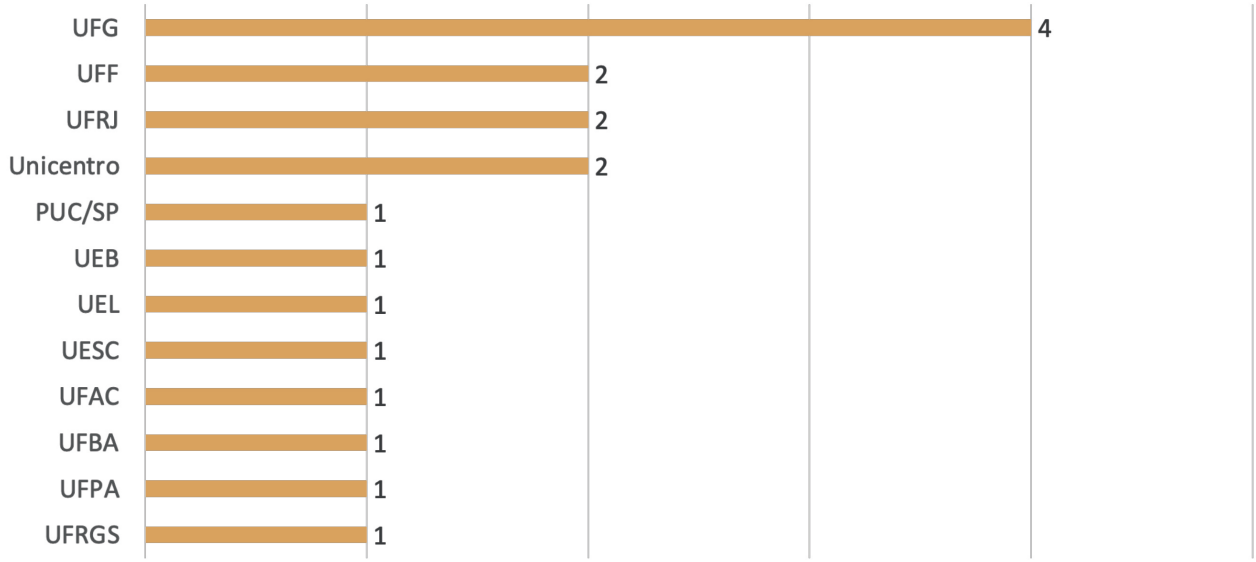


3.2.3 Institutions involved

An analysis of the various institutions and their respective postgraduate programs reveals that scientific output on teacher training in science and HA/GD is concentrated in a few centers, particularly the UFG, which brings together research groups and consolidated lines of research. UNEB/UESC, UNICENTRO, UFF, and IFRJ also play a significant role, forming a diverse institutional landscape, albeit one marked by regional asymmetries. Other universities, such as UFAC, UFPA, UFRGS, PUC-SP, and UEL, act complementarily, contributing to the strengthening of networks and alliances in the area.

The representativeness of these research projects stems from these institutions' commitment to diversity and educational inclusion, as evidenced by the continuing education programs promoted by graduate programs. In this context, PPGECM/UFG, through LPEQI, stands out for its studies focused on accessibility in Science and Mathematics Education; PPGE/UFF deepens research on educational policies and teacher training; PPGE/UNICENTRO emphasizes inclusion and regional development; PECEM/UEL promotes interdisciplinary training in Science and Mathematics; the teaching line of PPGQ/UFRGS improves teaching methods and materials; and the programs of UNEB and UESC reinforce continuing education, the appreciation of diversity, and the qualification of pedagogical practices, as shown in Figure 4.

Figure 4. *Institutions involved and number of projects*



4. Conclusions

This research rigorously and transparently synthesizes the scientific production published between 2019 and 2024 on teacher training in Science (Biology, Physics, and Chemistry) at the interface with Special Education in Brazil, focusing on student with giftedness. The findings indicate that despite the recognition of this population in the National Curriculum Guidelines, weaknesses persist in undergraduate curricula, marked by the absence of consistent training direction. When the topic is addressed, it occurs mainly in elective courses, which perpetuates training gaps and compromises the ability of teachers to identify and adequately serve students with this profile in public schools. In addition, there is a notable shortage of studies focused on the training of physics teachers, since, in the scope of this research, no publications were identified that addressed this curricular component with the demands of special education.

Furthermore, we agree with Rocha-Oliveira (2019) in stating that supervised practices, although still under-explored, constitute a strategic training space capable of promoting conceptual advances and critical reflections on Special Education. Similarly,

participation in scientific events focused on the subject is relevant for expanding teachers' knowledge, as argued by Adams (2021).

With regard to continuing education, understood as a *fertile locus* for addressing gaps in initial training, the analysis of the studies allows us to infer that in order to broaden understanding of student diversity, strengthen more accessible teaching practices, and encourage critical reflection on teaching practice in science, it is essential to establish markers of professional development in training activities that link special education to the topic addressed here, since, in general, such training has not contributed effectively to the advancement of this field (Souto et al., 2021).

Despite these limitations, we identified opportunities for development that come mainly from teachers and students participating in research in Graduate Programs (PPG) focused on monitoring characteristics and caring for this population, particularly in the Southeast and Midwest regions. Among these initiatives, the following stand out: research experimentation (Nóbrega, 2022); the development of teaching materials to stimulate cognitive, creative, and social skills; the application of the STEAM approach to identify high potential in secondary education (Mateus, 2024; Machado, 2025); individualized remote mentoring (Xavier, 2023); and the use of gamification and active methodologies to strengthen students' autonomy, collaboration, and scientific vocation.

However, these actions are still sporadic and fragmented, lacking greater dissemination, effective collaboration between regular classroom teachers and special education specialists, participation by school administrators, and the establishment of networks to share practices with other institutions, which limits their expansion and consolidation. In addition, there is a clear need to establish parameters capable of identifying institutional gaps between public and private universities, providing support for the design of ethical and evidence-based educational policies (Vasco et al., 2025).

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Authors' contribution

Leonora Aparecida Souza dos Santos: conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project management; resources; supervision; visualization; writing—original draft; writing—review and editing.

Lorrana Nara Naves Nóbrega: conceptualization; data curation; formal analysis; investigation; methodology; project management; supervision; visualization; writing—original draft; writing—review and editing.

Cláudio Roberto Machado Benite: conceptualization; funding acquisition; methodology; project management; resources; software; supervision; visualization; writing – review and editing.

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Universal Design for Learning in the configuration of inclusive practices among university lecturers in Ecuador

Diseño Universal para el Aprendizaje en la configuración de prácticas inclusivas del profesorado universitario en Ecuador

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Abstract

The growing diversity of students in university classrooms is a reality that intensifies year after year. This scenario makes the teaching staff a fundamental agent in promoting truly inclusive education that favours meaningful and quality learning. This study aims to identify the educational practices of teachers at a public university in Ecuador and determine whether they are aligned with the Universal Design for Learning (UDL) framework. A quantitative, descriptive-exploratory study was conducted, using a survey to collect data from a sample of 123 teachers at a public university in Ecuador.The results show that the most established practices are related to curriculum planning, the use of participatory strategies, and the use of virtual environments. However, weaknesses were identified in the diversification of content formats, formative assessment, and the creation of affective spaces and openness to dialogue, suggesting opportunities for improvement in the construction of inclusive environments and in teacher training. Teachers' perceptions of institutional preparedness to address diversity are critical, pointing to the need to strengthen inclusive policies and institutional support. It is concluded that the DUA is an effective framework for guiding educational transformation and that teachers and students should be considered key actors in building more inclusive universities.

Keywords: inclusive education, Universal Design for Learning, higher education, educational strategies, diversity; accessibility.

Resumen

La creciente diversidad del estudiantado en las aulas universitarias es una realidad que se intensifica año tras año. Este escenario convierte al cuerpo docente en un agente fundamental para promover una educación verdaderamente inclusiva que favorezca aprendizajes significativos y de calidad. El presente estudio pretende identificar las prácticas educativas que realizan los docentes de una universidad pública de Ecuador, y determinar si se alinean con el marco del Diseño Universal para el Aprendizaje (DUA). Se llevó a una investigación cuantitativa, de tipo descriptivo-exploratorio, utilizando para la recogida de datos la encuesta, con una muestra de 123 docentes de una universidad pública de Ecuador. Los resultados muestran que las prácticas más consolidadas se relacionan con la planificación curricular, el uso de estrategias participativas y el aprovechamiento de entornos virtuales. No obstante, se identifican debilidades en la diversificación de formatos de contenido, la evaluación formativa y la creación de espacios afectivos y de apertura al diálogo, lo que sugiere oportunidades de mejora en la construcción de ambientes inclusivos y en la formación docente. La percepción del profesorado sobre la preparación institucional para atender la diversidad es crítica, lo que señala la necesidad de fortalecer las políticas inclusivas y el acompañamiento institucional. Se concluye que el DUA constituye un marco eficaz para orientar la transformación educativa, y que el profesorado y alumnado deben ser considerados actores clave en la construcción de universidades más inclusivas.

Palabras clave: educación inclusiva, Diseño Universal para el Aprendizaje, educación superior, estrategias educativas, diversidad, accesibilidad.

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1. Introduction

Although there has been some progress in access to education (Ainscow and Viola, 2023), higher education faces the urgent challenge of transforming itself into a truly inclusive space, capable of responding to the growing diversity of students. The inclusive education model involves embracing diversity to achieve the presence, learning, participation, and success of all (Ainscow and Messiou, 2018) and accepting difference. According to Iniesto and Bossu (2023), this diversity manifests itself in multiple dimensions: ethnic origin, socioeconomic status, age, disability, among others, all of which influence access, participation, and outcomes in academic settings (Ortiz Moya et al., 2025).

In countries such as Ecuador, where access to university for rural and indigenous populations remains limited—only 11.85% of the rural population has access to higher education (Stefos and Chávez, 2023)— structural barriers such as discrimination, lack of resources, and academic dropout continue to reproduce inequalities (Antón, 2020), limiting the participation of diversity (Arias García et al., 2024).

The democratization of universities requires not only expanding access, but also ensuring participation and the achievement of meaningful learning. To this end, it is necessary to promote institutional cultures that value equity and inclusion, reflected in educational policies and practices committed to diversity.

Studies such as that by Odame et al. (2021) identify lack of accessibility as one of the main barriers to access. On the other hand, López-Gavira et al. (2021) identify barriers to participation, such as a lack of adaptation in teaching methodologies and rigidity in the assessment process. In this regard, Varela and Dans (2024) highlight the use of different forms of assessment to cater to student diversity.

To promote the development and implementation of inclusive teaching practices, pedagogical work is required from both teachers and teacher trainers. Authors such as Florian (2014) and Gale et al. (2017) conceive pedagogical work as a set of beliefs, knowledge, designs, and actions on which to build what they call a socially inclusive pedagogy. Rouse (2017) and Sánchez-Díaz et al. (2024) specify these designs and actions in accessible teaching designs and actions that are put into practice for the development of teaching. It can therefore be understood that a pedagogical approach that promotes inclusion is essential for designing educational plans that include accessible methodologies, resources, and assessments.

In this scenario, approaches derived from universal design have been developed, such as Universal Design for Instruction (UDI) or Universal Design for Learning (UDL), which represent a practical educational approach to implementing inclusive and equitable practices in higher education.

In the case of Universal Design for Learning (UDL), it is presented as a theoretical and methodological framework that allows for responding to individual learning needs and adapts to different ways of learning by addressing barriers to learning at their source, facilitating flexible and accessible educational environments (Gordon, 2024).

Universal Design for Learning (UDL), initially developed by the Center for Applied Special Technology (CAST) in the 1990s and which has evolved to version 3.0, is aligned with inclusive education and provides a framework for action to guide educational practice that reduces barriers and promotes inclusive learning processes. UDL is articulated through three fundamental principles, each of which identifies guidelines and considerations (CAST, 2024) that can also be supported by the use of technological educational resources. These principles represent multiple means of engagement, multiple means of representation, and multiple forms of action and expression that, when combined, allow the curriculum to be designed with student diversity in mind from the outset (Barrera et al., 2025). This involves designing a curriculum that is flexible in terms of opportunities for students, taking into account both motivational aspects and the ways in which information is accessed and understood or knowledge can be expressed (González-Ramírez et al., 2025). Furthermore, in its latest version, it promotes collaboration between teachers and students in the application of its principles and introduces innovative elements such as "fostering empathy," "promoting joy and play," and "recognizing multiple forms of knowledge," which enrich pedagogical practice and make it more humane.

In the university setting, its implementation has demonstrated concrete benefits: improved aca-

demic performance (Casebolt and Humphrey, 2023), greater interaction with materials (Espada-Chavarria et al., 2023; Reyes et al., 2022), increases motivation and reduces dropout rates (Garrad and Nolan, 2023), improves participation (Barrera and Moliner, 2023), student self-reflection (Thoma et al., 2023), and completion of studies (Healy et al., 2023).

However, its practical implementation requires adequate teacher training to overcome barriers and ensure its application in the classroom (Moriña et al., 2025). As indicated by Hromalik et al. (2024), teachers find its application in the classroom complex and, according to Barrera and Moliner (2023), they do not feel prepared to apply it in the classroom. However, in studies similar to the one presented here, it has been observed that teachers who were unaware that they were designing and implementing their study programs based on UDL were, in practice, compatible with its principles (Carballo et al., 2024), becoming aware that they had already applied this type of strategy before their training (Azam et al., 2021). Similarly, Díaz-Vega et al. (2020) observed the same situation when identifying teaching practices with UDI-based programs.

In this scenario, it is essential to rethink curriculum design and pedagogical strategies in light of student diversity. The incorporation of accessible materials and resources, educational technologies, and flexible assessment systems not only facilitates access but also promotes meaningful learning. Universities must commit to transforming their structures and practices, recognizing that all students can learn and that their characteristics, interests, and needs are unique (UNESCO, 2025).

The public university in Ecuador, the subject of this study, has begun an institutional review process aimed at improving its levels of inclusion. This research is part of that process, with the objective of determining whether university teachers apply inclusive teaching practices based on the principles of UDL in their classrooms. The specific objectives are to analyze: a) the actions used in the planning and presentation of the study program, b) the use of accessible resources and materials, c) the use of various forms of assessment and feedback, d) the application of teaching techniques that promote participation and meaningful learning, and e) the use of virtual spaces for learning.

2. Methodology

2.1 Methodological design

A quantitative research study was conducted, adopting a descriptive-exploratory, non-experimental design, using a survey as a tool (Bisquerra, 2004).

2.2 Participants

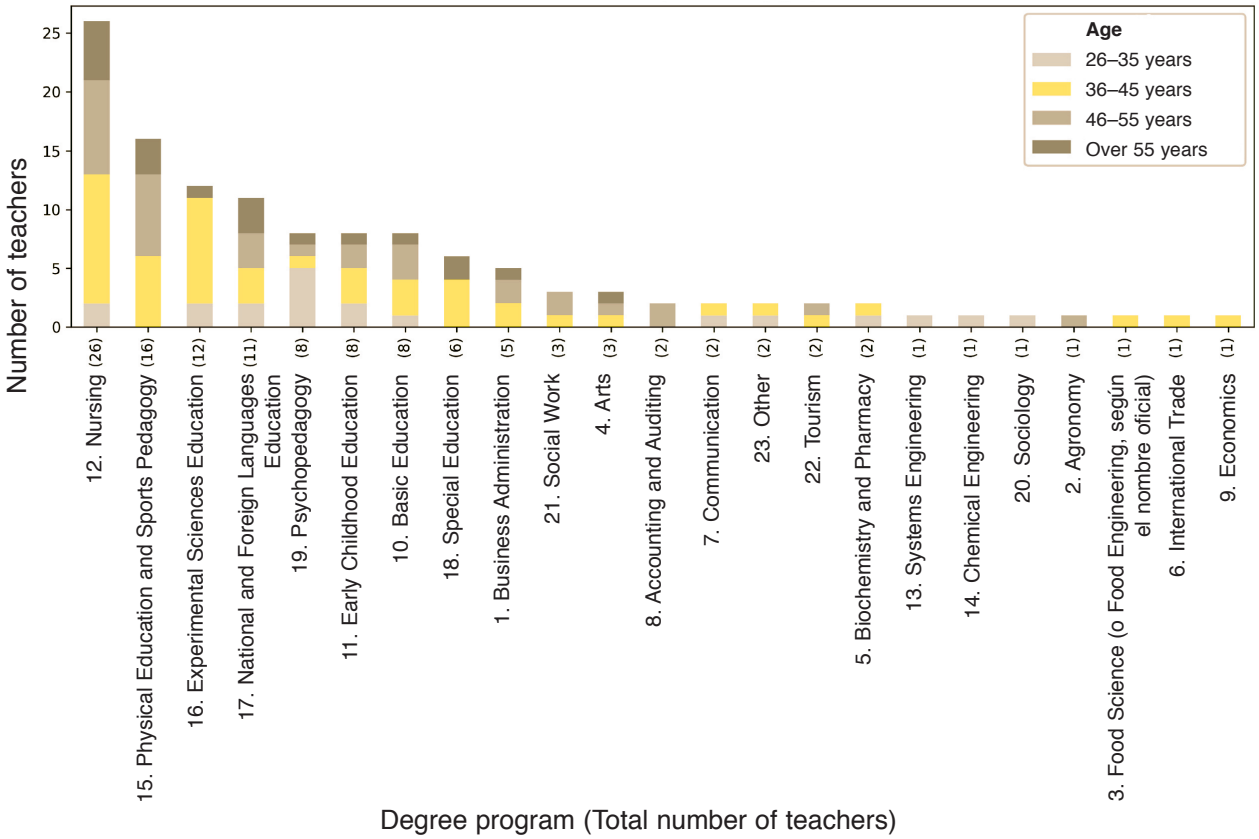
The sample for this study consisted of 123 teachers from a public university in Ecuador, selected through non-probabilistic convenience sampling based on their accessibility and availability during the data collection period. All participants were actively involved in university teaching in one of the institution's faculties.

According to institutional records, a total of 520 teachers were identified during the survey period. For the statistical analysis, a confidence level of 95% was established, and the margin of error corresponding to the population segment under study was calculated, obtaining a value of 7.73%. Given the exploratory nature of the study, this margin is considered methodologically acceptable, as it falls within the commonly accepted range of 5% to 10% for preliminary research, which allows for greater statistical flexibility (Hernández Sampieri et al., 2014).

Teachers from 23 degree programs participated. In terms of the distribution by degree program in which they teach, the most represented were Nursing (21.1%), Physical Activity and Sports Education (13.0%), Experimental Sciences Education (9.8%), and National and Foreign Language Education (8.9%). Teachers were also registered in programs such as Basic and Early Childhood Education (6.5% each), Psychopedagogy (6.5%), Clinical Psychology (4.9%), and Business Administration (4.1%), among others. Regarding gender, 62.3% of participants identified as female and 37.7% as male. One case (0.8%) preferred to omit the answer. In terms of age, most teachers were in the 36-45 age range (41.5%), followed by the 46-55 age group (27.6%). The 26 to 35 and over 55 age groups each represented 15.4% of the sample. This distribution suggests a predominantly adult teaching population, with a significant proportion in the middle stages of their professional careers. In terms of teaching status, the category of non-tenured occasional teacher predominated

(67.5%), followed by tenured associate teacher 1 (10.6%) and tenured assistant teacher 1 (8.9%). Other categories were also identified, such as tenured principal teacher, honorary teacher, guest teacher, and other contractual forms. Finally, in terms of teaching experience, 26.8% of participants had between 7 and 10 years of experience, followed by 22.0% with 4 to 6 years, and 15.4% with 10 to 15 years. Eight point one percent indicated that they had more than 20 years of experience, while 4.9% had less than one year. This distribution shows a sample with a predominance of teachers with intermediate experience. Figure 1 provides a more visual representation of the distribution of teachers by degree program and age group.

Figure 1. *Distribution of the sample by career and age group*



Note. Authors.

2.3 Instrument

The questionnaire by Espada-Chavarria et al. (2022) on effective strategies for more inclusive higher education was used, adapting it linguistically to the local context and validating it using the Delphi method. To assess the reliability of the instrument, it was evaluated using Cronbach's alpha coefficient with a 95% confidence interval, presenting an index of $\alpha = 0.908$, reflecting evidence of excellent reliability (Roco-Videla et al., 2024).

The instrument includes 35 items that correspond to different teaching strategies from the perspective of accessibility, through universal design for learning (UDL) and universal design for instruction (UDI). These strategies are distributed across six dimensions: Curriculum (five items), Multimodal Content (six items), Assessment (three items), Feedback (three items), Teaching Techniques (14 items), and Virtual Learning Spaces (four items), which are assessed using a 4-point Likert scale. The six dimensions correspond to educational actions,

practices, and resources appropriate for teaching programming in a university context.

In addition, to complement the sociodemographic data and contextualize the reality of the teaching staff, nine informative questions were asked. Three of these questions related to their knowledge of the institution's resources for promoting the participation of students with disabilities, as well as the institution's capacity to cater to the diversity of the student body and their own. On the other hand, six questions concerned knowledge of the UDL and UDI, teaching experience with university students with disabilities, and/or experience with other specific educational support needs.

2.4 Study variables

The following variables were established: gender, age, years of teaching experience, teaching role, knowledge of UDL and UDI, teaching experience with university students with disabilities and/or experience with students with other specific educational support needs.

2.5 Procedure

As part of the actions to assess the level of inclusion of the university, support was provided by the governing team and the dean's and career coordination teams of the faculties. On this occasion, the aim was to publicize the project and give a voice to the agents involved at the teaching level. Data was collected virtually through a questionnaire located in Microsoft Forms. Participants were informed of the ethical aspects of the research and of the evaluation and approval of the project by the Research Ethics Committee of Rey Juan Carlos University.

2.6 Data analysis

Descriptive analyses were performed for the questionnaire items (mean, deviation, asymmetry, and confidence interval) and the questionnaire dimensions (mean, deviation, variance, and asymmetry). Subsequently, inferential tests were performed on the items grouped by dimensions and variables. The Kolmogorov-Smirnov test was used to check the normal distribution of the sample. The homogeneity of variances was calculated, assuming different variances, and the null hypothesis was rejected for both tests ($p<.005$). In view of the results obtained, non-parametric tests were performed to establish the existence of statistically significant differences between the dimensions of the questionnaire and the variables, using the Kruskal Wallis H test. Correlation tests between dimensions were performed using Spearman's Rho. Finally, Cohen's *d* test standardized values (0.2 small, 0.5 medium, 0.8 large) were used to calculate the effect size. SPSS Statistics (version 26) was used for data analysis.

3. Results

First, the results of the informative questions about the institution's resources and preparation to address diversity will be presented, as well as knowledge of UDL and UDI and teaching experience with students with educational support needs. Subsequently, the results of the questionnaire items grouped by dimensions and inferential tests will be presented, and finally, the results of the items for each dimension and correlational tests.

When asked whether the University has sufficient resources to encourage student participation, only 30.9% say Yes, 39.8% are Not sure, and 29.3% say No. Regarding the university's preparedness to address student diversity, the majority, 56.1%, responded No, and 43.9% responded Yes. Similarly, when asked if they consider teachers to be prepared to address student diversity, 63.4% responded No, and 36.6% (45) responded Yes.

Regarding knowledge of Universal Design for Learning (UDL), 52.8% responded that they do have this knowledge, 29.3% said they were not sure, and 17.9% said they did not have any knowledge. Regarding Universal Design for Instruction (UDI), 46.3% said yes, 32.5% were unsure, and 21.1% said no. Regarding teaching experience with university students with disabilities, 79% stated that they had had students with disabilities in their classrooms, 17.9% had not had such experience, and 2.4% were unsure. The types of disabilities present in the classroom were 28.5% physical or organic, 25.2% visual, 16.3% intellectual, 13% auditory, and 2.4% mental. Likewise, 14.6% did not respond to what type of disability their students had. When asked if they had students with specific educational support needs in their classrooms, 52.8% of teachers said no, 37.4% said yes, and 9.8% were unsure. Among

the most representative data, 34.1% did not identify the needs of their students, 31.7% responded that they identified specific educational support needs as special conditions (personal or school history), and 22% identified specific learning difficulties (dyslexia, dysgraphia, dyscalculia, among others).

Addressing the results of the questionnaire administered on the strategies teachers use to encourage student participation, as can be seen in Table 1, the dimension with the highest mean is Curriculum (M = 3.90), followed by Multimodal Content (M = 3.85), while the Assessment dimension has the lowest mean (M = 3.71). In all cases, the deviations are less than 0.5 and the asymmetry is negative, indicating a certain tendency for responses to cluster around higher values.

Table 1. *Descriptive results of the questionnaire dimensions*

Dimension	Mean	Standard	Variance	Asymmetry
Study Program	3.906	0.190	0.036	-2.140
Multimodal content	3.856	0.252	0.063	-2.425
Evaluation	3.718	0.418	0.175	-1.494
Feedback	3.846	0.320	0.103	-2.806
Teaching techniques	3.880	0.188	0.035	-2.553
Virtual spaces	3.892	0.220	0.048	-2.178

Note. Authors.

In order to establish the existence of significant differences between the dimensions that make up the questionnaire items and the selected variables, the nonparametric Kruskal-Wallis H test was used to verify that there were statistically significant differences based on knowledge of UDL, knowledge of UDI, classroom experience with students with disabilities, and classroom experience with students with other specific educational support needs.

Table 2. *Kruskal-Wallis H test for significant relationships between dimensions*

	Program of Studies	Multimodal	Practical Assessment activities	Feedback	Teaching	Virtual
Knowledge of the teachers about UDL						
H of Kruskal-Wallis	3,450	3,437	1,327	8,337	5,592	11,864
gl	2	2	2	2	2	2
Asymptotic	,178	,179	,515	,015	,061	,003
Teachers' knowledge of UDL						
H of Kruskal-Wallis	2,517	3,481	,674	4,432	7,912	8,680
gl	2	2	2	2	2	2
Asymptotic	,284	,175	,714	,109	,019	,013
Teaching experience in educating students with disabilities						
Kruskal-Wallis H	9,397	2,628	3,406	1,992	,960	6,175
gl	2	2	2	2	2	2
Asymptotic significance	,009	,269	,182	,369	,619	,046
Teaching experience in educating students with other specific educational support needs						
H of Kruskal-Wallis	6,572	3,343	6,176	4,123	2,557	8,269
gl	2	2	2	2	2	2
Asymptotic significance	,037	,188	,046	,127	,279	,016

Note. Authors.

As can be seen in Table 2, there is a strong relationship between having knowledge of UDL and the use of virtual learning spaces (H (2) = 11.86; p = 0.003), followed by feedback (H (2) = 8.33; p = 0.015). Although the value recorded for Teaching Techniques is close to p=0.05 (H (2) = 5.59; p = 0.061), it cannot be considered a significant relationship.

Regarding knowledge about UDI, relationships are established between Virtual Spaces (H (2) = 8.68; p = 0.013) and teaching techniques (H (2) = 7.91; p = 0.019). On the other hand, with regard to having experience with students with disabilities in the classroom, the second strongest relationship is established with the study program (H (2) = 9.39; p = 0.009) and, to a lesser extent, with the use of virtual learning spaces (H (2) = 6.17; p = 0.046). Finally, experience with students who have other specific educational support needs has a significant relationship with three of the dimensions, the strongest with Virtual spaces (H (2) = 8.26; p = 0.016), followed by Curriculum (H (2) = 6.57; p = 0.037) and Assessment (H (2) = 6.17; p = 0.046).

Next, the structure of dimensions that make up the questionnaire is used to present the results of the items. Table 2 shows the results of the items in the dimensions: Curriculum, Multimodal Content, Assessment, and Feedback.

Curriculum dimension

This relates to the actions taken at the beginning of the course to clarify objectives, assessment, functioning, and support. Analysis of the teachers' responses shows high means between M= 3.98 and M= 3.83. Teachers agree that defining and explaining the objectives, competencies, and content when the course is presented at the beginning of the academic year (Item 1) (M= 3.98, SD=-7.74) is the most common practice in this dimension, followed in importance by Item 2: explaining the assessment criteria at the beginning of the academic year and in each assessment test. The high negative asymmetry suggests that the responses were mostly high. On the other hand, explaining how the virtual space works (Item 3) (M= 3.84, SD=0.40) and establishing welcoming spaces with personal and/or academic needs (Item 5) (M= 3.85, SD=0.45) are the least used practices in this dimension.

Multimodal Content Dimension

This dimension relates to the different formats for presenting content and activities. The means range from M=3.65 to M=3.93. Participants agree on using varied activities in different formats that allow them to practice different skills appropriate to the objectives (Item 8) (M=3.93, SD=0.24), as well as providing and presenting content in different formats to access it: text, video in spoken language, video in LSEC (Item 7) (M=3.92, SD=0.29), while this is not the case with the use of complementary materials in different and meaningful formats (Item 11) (M= 3.86, SD=0.37) and, to a lesser extent, with the production of videos with subject content (Item 10) (M= 3.65, SD=0.63), which is the second lowest mean of all the results.

Table 3. *Results by dimension: Curriculum, Multimodal Content, Assessment, Feedback*

Curriculum	M	SD	CA	%IC
1. Define and explain the objectives, competencies, and content when presenting the course at the beginning of the academic year.	3,98	0,126	-7,74	0,022
2. Explain the assessment criteria at the beginning of the course and in each assessment test.	3,95	0,198	-4,70	0,035
3. Establish welcoming spaces to comfortably discuss topics related to disabilities, educational needs, or any personal situation.	3,83	0,450	-3,41	0,080
4. Provide individualized support based on each student's educational needs, with the help of guidance from the Student Welfare Unit (UBE).	3,90	0,348	-3,84	0,062
5. Explain how the course will work in the virtual classroom, describing the sections and routines that will be followed.	3,84	0,405	-2,65	0,072
Multimodal Content	**M**	**DE**	**CA**	**%IC**
6. That the content presented in the classroom is available in electronic format.	3,87	0,36	-2,74	0,06
7. Provide and present content in different formats for access: text, spoken language video, LSEC video, etc.	3,92	0,29	-4,28	0,05

8. Facilitate varied activities in different formats that allow students to practice different skills appropriate to the objectives.	3,93	0,24	-3,57	0,04
9. Provide online resources for students to use at their own pace when they need them.	3,89	0,34	-3,06	0,06
10. Create videos with content related to the subject.	3,65	0,63	-2,06	0,11
11. Suggest meaningful supplementary materials in different formats.	3,86	0,36	-2,61	0,06
Evaluation	**M**	**DE**	**CA**	**%IC**
12. Design ongoing, progressive assignments with progress reports instead of a final test.	3,70	0,54	-1,94	0,09
13. Have students demonstrate their knowledge through means other than traditional exams.	3,77	0,45	-1,82	0,08
14. Provide rubrics to advance in the subject.	3,68	0,54	-1,83	0,09
Feedback	**M**	**DE**	**CA**	**%IC**
15. Facilitate self-assessment activities in the virtual classroom with immediate feedback.	3,82	0,46	-3,15	0,08
16. Provide continuous feedback and individualized comments for reflecting on skill development.	3,86	0,35	-2,12	0,06
17. Use different means and forms of feedback: email, rubrics, voice notes, written text, video.	3,85	0,44	-3,71	0,08

* M= Mean, SD= Standard Deviation, Skewness Coefficient=SC, Confidence Interval= % CI

Dimension: Evaluation

This relates to the variety and flexibility of assessment. Some of the lowest means of all dimensions are found in this dimension, ranging from M=3.68 to M=3.77. Item 14 reflects that rubrics are used to a lesser extent to advance in the subject (independently) (M=3.68, SD=0.54), followed by item 12 (M=3.70, SD=0.54), the design of ongoing tasks with progress information instead of a final test. Participants show greater consensus on the use of other ways to demonstrate knowledge, as an alternative to traditional exams, reflected in item 13 (M= 3.77, SD=0.45).

Feedback Dimension

It relates to the use, types, and means of feedback. It presents very similar averages ranging from the lowest value, M=3.82 corresponding to item 15, which reflects the use of assessment activities in the virtual learning environment that provide immediate feedback, and the highest value, M=3.86, corresponding to item 16, which shows a preference for providing continuous feedback and individualized comments that encourage reflection on the development of activities. In between, item 17 (M=3.85) shows a preference for the use of a variety of means and forms of feedback.

Table 4. *Results dimensions: Teaching techniques and Virtual spaces*

Teaching techniques	M	DE	CA	%IC
18. Use a variety of learning methods and strategies (cooperative, blended learning, projects, among others)	3,93	0,26	-3,32	0,05
19. Establish work teams in the classroom to encourage collaboration.	3,93	0,26	-3,32	0,05
20. Allow time in sessions for individual and group reflection and joint discussion.	3,92	0,27	-3,10	0,05
21. Hold discussions to encourage teamwork.	3,85	0,38	-2,48	0,07
22. Allow students to express their opinions and/or explore new ideas.	3,99	0,09	-11,09	0,02
23. Not penalizing students for taking initiative and learning from mistakes in everyday activities.	3,85	0,51	-3,94	0,09
24. Share your own research related to the topic of study with students.	3,90	0,32	-3,45	0,06
25. Begin classes with a summary.	3,60	0,65	-1,57	0,12
26. End classes with a summary.	3,80	0,44	-2,14	0,08
27. Give advance notice of the content to be covered in the next session.	3,77	0,52	-2,28	0,09

Teaching techniques	M	DE	CA	%IC
28. Provide practical activities to generalize and experiment with learning.	3,93	0,26	-3,32	0,05
29. Promote student motivation by ensuring that they understand that the content, materials, and activities are appropriate for the objectives.	3,98	0,20	-8,87	0,04
30. Provide guidelines for understanding new content with real or meaningful examples.	3,93	0,26	-3,32	0,05
31. Be willing to assist students (tutorials)	3,95	0,22	-4,24	0,04
Virtual spaces	M	DE	CA	%IC
32. Regular use of virtual teaching spaces (virtual classroom/EVEA)	3,87	0,35	-2,89	0,06
33. That the instructions for preparing or completing assignments are clearly detailed in the virtual classroom.	3,89	0,33	-3,24	0,06
34. Check that virtual spaces (EVEA / Moodle / Teams / Google Meet / Zoom) can be accessed without difficulty	3,92	0,26	-3,32	0,05
35. Students can complete tasks at their own pace and study anywhere because they have access to the virtual classroom from different devices (tablet, cell phone, PC, etc.).	3,86	0,40	-3,28	0,07

Note. Authors.

Teaching techniques dimension

This dimension relates to the use of methodologies, techniques, and attitudes of the teacher. In this dimension, item 22 stands out as the most prominent of the entire questionnaire (M= 3.99, SD=0.09, CA= -11.09), in which teachers show their orientation toward practices that allow students to express their opinions and explore new ideas. In contrast, item 25 (M= 3.60, SD=0.65) reflects the lesser use of techniques such as starting the class with a summary. On the other hand, promoting student motivation by ensuring that they understand that content, materials, and activities are appropriate to the objectives (Item 29) (M= 3.98, SD=0.20), as well as being willing to provide tutoring (Item 31) (M= 3.95, SD=0.22), using a variety of learning methods and strategies (Item 18) (M= 3.93, SD=0.26), or establishing work teams in the classroom to encourage collaboration (Item 18) (M= 3.92, SD=0.26) are the most widely used techniques in this dimension and are also among the 10 most widely used of all those reflected in the questionnaire. To a lesser extent, previewing the content of the next session (M=3.77, SD=0.52), ending classes with a summary (M= 3.93, SD=0.26), or not penalizing initiative and learning from mistakes in day-to-day activities (M= 3.84, SD=0.51) are used less frequently and are among the 10 least used by participants.

Virtual spaces dimension

This dimension assesses the use of these spaces, their understanding, and ease of access. Finally, this dimension has the second highest average score after the Curriculum dimension. Participants show greater interest in verifying that virtual spaces can be accessed without difficulty (Item 34) (M= 3.92, SD=0.26), as well as that the instructions for completing tasks are clearly detailed in the virtual classroom (Item 33) (M= 3.89 SD=0.33), expressing the regular use of virtual teaching spaces (Item 32) (M= 3.87, SD=0.35).

Finally, Spearman's Rho test was performed to determine whether there is a correlation between the different dimensions. Table 5 shows the analysis of correlations between the study variables for the sample of teachers, which shows that there are significant correlations between all the dimensions analyzed. Of particular note is the correlation between Feedback and Assessment (r = 0.697; p=0.01), followed by Feedback and Multimodal Content (r = 0.655; p=0.01), Teaching Techniques and Multimodal Content (r = 0.640; p=0.01), Teaching Techniques and Assessment (r =0.618; p=0.01), Virtual Learning Spaces and Feedback (r = 0.609; p=0.01), and Assessment and Multimodal Content (r = 0.605; p=0.01). However, to facilitate observation and understanding of the results, the strongest correlations are identified in dark gray and the more moderate correlations in light gray.

Table 5. *Spearman's Rho test to identify correlations between the dimensions of the study*

	Coefficient of correlation					
Rho Spearman N=123	**Program Studies**	**Multimodal Content**	**Practical Assessment Activities**	**Feedback**	**Strategies Teaching**	**Virtual**
Study program	1					
Multimodal content	,563**	1				
Practical Activity Assessment	,476**	,605**	1			
Feedback	,512**	,655**	,697**	1		
Teaching techniques	,584**	,640**	,618**	,573**	1	
Virtual spaces	,552**	,497**	,595**	,609**	,518*	1

Note. Authors.

**. The correlation is significant at the 0.01 level (bilateral).

Cohen's *d* test yielded values of 0.34 for the feedback and evaluation dimensions and 0.4 for the evaluation and multimodal content dimension, meaning that the relationships found are close to the intermediate value (d = 0.5).

4. Discussion and conclusions

The results obtained allow us to reflect on the current state of educational inclusion in the university context from the teaching perspective and to identify relevant patterns in inclusive teaching practices within the university institution where the study was conducted, especially in relation to the principles of Universal Design for Learning (UDL). Although there is a favorable attitude towards inclusive practices, such as the use of digital technologies and methodological diversification, there remains a significant gap in the perception of teaching and institutional preparedness to address diversity. The majority of teachers do not consider themselves sufficiently trained to address the needs of students, coinciding with the results of Barrera and Moliner (2023), and express little confidence in the institutional resources available. In addition, widespread ignorance about existing support systems highlights weaknesses in institutional communication and the need to strengthen teacher training in inclusion, both initial and continuing. This perception coincides with that of Moriña et al. (2025), who warn that inclusion requires not only teacher training but also sustained institutional commitment. The leadership exercised by management teams is key to consolidating inclusive educational communities, especially in Latin American contexts where structural barriers that limit the participation of diversity still persist (Arias-García et al., 2024). In this regard, a good place to start would be to clarify what inclusion means for the institution, since inclusive education is associated with thinking about how schools should be and function (Arnaiz et al., 2024).

This situation may reveal a gap between the inclusive principles promoted by the UDL and their actual implementation in the university context. In line with the work of Diaz-Vega et al. (2020) and Espada et al. (2023), there is a need to strengthen teacher training in this area and enable them to work appropriately with all students, as this reduces teachers' feelings of vulnerability when faced with unfamiliar and complex situations that they must manage based on their knowledge (López Bastías et al., 2020). However, although participants say they do not feel prepared to meet the needs of their students, the results show that their practices are aligned with a more inclusive pedagogy oriented towards the principles of UDL, coinciding with the results of Carballo et al. (2024) and Diaz-Vega et al. (2020), although social desirability could also be reflected in the responses.

In relation to the principle of engagement, the teaching techniques dimension shows that teachers apply practices that promote motivation, the expression of ideas, and student participation, aligning with the study by Garrad and Noland (2023).

The highest-scoring strategy in the questionnaire, and the one most widely applied, refers to allowing students to express their opinions and explore new ideas, reflecting an openness to student-centered pedagogical approaches. This orientation is consistent with the postulates of Messiou (2019), who highlights the role of students as agents of change in the construction of inclusive environments.

Regarding the principle of representation, the "Multimodal content" dimension shows a positive trend toward diversification of formats, especially in the presentation of content and activities, which may lead to improved learning, as already reflected in the studies by Espada et al. (2023) and Reyes et al. (2022). However, the production of in-house audiovisual materials still has limitations, possibly associated with a lack of technical training or institutional resources. This situation has been documented by Castellano-Beltrán et al. (2024), who point out that digital accessibility remains a challenge in many universities and is considered a fundamental issue for promoting inclusion in higher education (Porto, 2022).

With regard to the principle of action and expression, there has been a transition towards more formative assessment models, although the use of traditional methods persists. It is therefore necessary to promote greater diversification in the forms of assessment, as this is considered very important in order to cater for the variability of the students (Varela and Dans, 2024). Studies such as those by Florian and Beaton (2018) and Meyer et al. (2014) highlight that formative assessment promotes metacognition, allows students to learn from their mistakes, be more motivated, and be flexible. The incorporation of rubrics and progressive tasks is viewed positively, but it has not yet become widespread practice. Feedback, on the other hand, is presented as an established practice, especially in its personalized dimension. Teachers are willing to offer individualized comments and use various means to do so, which reflects a pedagogical awareness of accompaniment in the learning process and has a very powerful influence on learning (Canabal and Margalef, 2017).

Finally, the use of virtual spaces is widespread and viewed positively. Teachers highlight the clarity of instructions and accessibility from different devices, which indicates good technological adaptation. However, as Okai-Ugbaje et al. (2022) point out, the inclusive potential of digital platforms depends on their coherent pedagogical integration and the removal of technical and cognitive barriers.

Significant correlations between dimensions such as feedback, assessment, multimodal content, and teaching techniques reinforce the idea that inclusive practices should not be addressed in isolation, but as part of a comprehensive approach. Furthermore, statistically significant differences based on knowledge of UDL and UDI, as well as experience with students with disabilities or specific educational support needs, suggest that training and direct experience are key factors in the adoption of inclusive practices, as the level of teacher training determines its effectiveness in the classroom (Navarro and Navarro-Montaño, 2023). These results are in line with studies such as that by González-Ramírez et al. (2025), which found that teachers who receive training in UDL are better able to identify barriers, promoting more inclusive teaching.

Overall, the results reflect a solid foundation on which to build a more inclusive institutional culture, but they also highlight the need to strengthen teacher training, review institutional policies, and encourage dialogue among all educational stakeholders. UDL is reaffirmed as a relevant framework for guiding educational transformation toward more equitable, accessible, and student-centered models. The active participation of students and the recognition of teachers as agents of change are key elements in moving toward a truly inclusive university.

This study provides useful empirical evidence for the design of institutional policies that promote educational justice in the Ecuadorian and Latin American context. However, given its exploratory nature, this study has a number of limitations that should be taken into account when interpreting the results obtained. Although the results are a step forward in promoting more inclusive higher education in the Ecuadorian context, it would be important to have a larger number of participants from both this institution and others in the country. In addition, social desirability may have influenced the responses, so these results should be viewed with caution. It is therefore considered appropriate to conduct further qualitative research to observe the reality of classroom practice. On the other hand, in order to continue exploring the inclusive orientation of teaching practices, it would be important to hear the voices of other stakeholders, the students, in

order to understand their preferences for these strategies, as well as to compare whether both stakeholders are moving in the same direction. In any case, designing curricula that address student diversity and take into account their variability and learning preferences is essential in the process of building more inclusive universities. The incorporation of inclusive teaching strategies, accessible materials and resources, and technology, together with flexible assessments, are the starting point for facilitating not only access to education but also for promoting and achieving the desired learning outcomes.

Authors' contribution

PhD. Rosa Espada-Chavarria: conceptualization, methodology, research, data curation, software, formal analysis, supervision, validation, drafting, writing, and editing.

PhD. Wendy Aguilera Zamora: conceptualization, research, data curation, formal analysis, drafting, writing, and editing.

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Teacher identity in teacher education: validation of interview script

Identidad docente en formación de docentes: validación de guion de entrevista

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Abstract

This article presents evidence regarding the creation and validation process of a semi-structured interview script, aimed at identifying the personal, socio-cultural, and formative components in the meanings of teacher identity that emerge from professional practical experiences of future secondary school teachers. The instrument was submitted to expert judgment during the validation process, considering the criteria of clarity, coherence, and relevance to evaluate all questions and the criterion of sufficiency for each category. Seven experts participated in this process. The review of each validation included the quantitative analysis of the experts' ratings, using content validity analysis, and a qualitative analysis of the experts' comments, using content analysis. An instrument comprising 15 questions was obtained, divided into two categories and six subcategories. The resulting interview can be used in similar contexts, that is, with practicing teachers, or future teachers of basic, preschool or special education, who wish to explore the construction of teacher identity. The validation process by expert judgment gives greater credibility to the data obtained, according to the nature of the study object and adjusted to context. At the same time, it fosters processes of critical reflection in researchers.

Keywords: interview, teacher, training, teacher identity, expert judgment, validation.

Resumen

Este artículo presenta evidencia sobre el proceso elaboración y validación de un guion de entrevista semiestructurada, que tiene como propósito identificar los componentes personales, socio-culturales y formativos en los significados de identidad docente del futuro profesorado de enseñanza media que emergen de las experiencias de práctica profesional. Para el proceso de validación se sometió el instrumento a evaluación por juicio de expertos, considerando los criterios de claridad, coherencia y relevancia para evaluar todas las preguntas, y el criterio de suficiencia para cada categoría, es decir, conjunto de preguntas. Esta instancia contó con la participación de siete investigadores/as. La revisión de cada una de las validaciones incluyó el análisis cuantitativo de las calificaciones de los jueces, mediante análisis de validez de contenido y un análisis cualitativo de los comentarios de los expertos, a través de un análisis de contenido. Como resultado se obtuvo un instrumento compuesto por 15 preguntas, divididas en dos categorías y seis subcategorías. Se concluye que la entrevista resultante puede ser utilizada en un contexto similar, es decir, con docentes en ejercicio, futuros profesores de enseñanza básica o educación parvularia y diferencial que deseen indagar en la construcción de la identidad docente, asimismo, que el proceso de validación por juicio de expertos otorga mayor credibilidad a los datos obtenidos acordes a la naturaleza del objeto de estudio y ajustado al contexto.

Palabras clave: entrevista, profesores, formación, identidad docente, juicio de expertos, validación.

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1. Introduction

Validation by expert judges is valued as an opportunity to design instruments based on a rigorous scientific process. It is considered a relevant and useful method for verifying the reliability of an instrument through evidence that allows for content validation, considering that judges' evaluations allow for adjustments to the relevance of items, both in terms of their relationship to the study's objectives and its theoretical construct (Padilla et al., 2019).

This expert evaluation is particularly relevant when studying a topic with little literature that deals with it specifically. This is the case with the topic addressed in this study, since, especially in Latin America, there is evidence that Initial Teacher Training (ITT) needs to advance and deepen research on the construction of Teacher Identity (ID), given that studies focus on TI as a component of ITT (Cantón and Tardif, 2018; Cuadra et al., 2021; Olave, 2021; Otondo, 2021) and not necessarily on how the process of ID construction develops (Figueroa et al., 2022).

In this sense, it is considered relevant to have the validation of a qualitative instrument, as it is a process that allows not only for its development but also for the accounting of a scientific procedure by which its external validation was achieved. In other words, it is a basis that allows decisions to be made with the purpose of optimizing the design and objective of the instrument according to the context in which it will be used.

The validation process by expert judges has several advantages, including the ability to adequately relate theory and empirical evidence, supported by a specific context (Bandalos, 2018; Pedrosa et al., 2013). Likewise, this process allows for obtaining accurate information on "difficult, complex, and novel or little-studied content and topics" (Cabero and Llorente, 2013, p. 14).

Likewise, there is greater evidence of validation of quantitative instruments (Gómez et al., 2018; Jara and Mayor-Ruiz, 2019; Sarceda Gorgoso, 2017; Torres, 2022), to the detriment of the development of qualitative instruments (Balderas, 2014; Falcón and Arraiz, 2020; Sayago et al., 2008). Quantitative studies show the predominant use of Likert scales and questionnaires. Meanwhile, qualitative studies mainly use life stories and biographies to investigate the development of ID, the image that professionals have of themselves, and social relationships. In contrast, this research will approach ID from a multidimensional perspective, covering both the meaning that future teachers attribute to it and the relevance of their university and practical experiences in their training.

In line with the above, the semi-structured interview script, validated by expert judges, aims to identify the personal, socio-cultural, and educational components in the meanings of teacher identity that emerge from the professional practice experiences of future secondary school teachers. a compulsory school stage in Chile that lasts four years and is divided into Scientific-Humanistic, Technical-Professional, and Artistic Secondary Education. For the purposes of this study, future teachers in the scientific-humanistic area (Language and Literature, Mathematics, English, History or Social Sciences, Biology, Chemistry, and Physics) have been considered.

Considering that the theoretical construct of the instrument submitted for validation is ID, it is pertinent to indicate that one of its main characteristics is the polysemy of the concept, due to its dynamic nature and its roots in social and cultural changes (Ávalos, 2013; Pillen et al., 2013). This study understands teacher identity as the core of the teaching profession, providing teachers with a framework for constructing their own ideas about how to be, act, and understand teaching and their role in society. In this sense, ID is not fixed or imposed, but rather negotiated, configured, and reconfigured through the experiences and meaning that teachers give them (Sachs, 2015).

Furthermore, it is considered that "it has fundamental basic ideas such as the image of oneself as a teacher, the role of the teacher, the image of the teacher in society, and life experiences as elements that condition professional identity" (Bajardi and Álvarez, 2015, p.113). Therefore, it is a construct that is conditioned by the interaction between teachers' cultural and social environments and personal experiences (Van der Berg, 2002). In line with the above, it is important to study the construction of ID in the academic context and educational centers, given the multiple formative experiences that could influence its construction.

As mentioned, the three components that this research aims to identify are personal, socio-cultural,

and formative in the meanings of teacher identity that emerge from the experiences of future secondary school teachers. In this study, these components are understood as those significant experiences that involve a change in beliefs, attitudes, and habits related to teaching. They enable the emotional and cognitive reconstruction of pre-existing models of the teaching role (Pérez, 2019).

Similarly, training activities are considered to be those experienced at university, understood as theoretical training, or in practice centers, conceived as practical training, which influence future teachers' views on the teaching role. Guided by questions such as: who is the teacher as a person and a professional, and who does he/she want to become, considering social, cultural, and emotional dimensions (Valero, 2019).

Based on a review of the literature, it has been identified that studies related to ID have focused mainly on practicing teachers (Aristizábal, 2019; De Souza and De Medeiros, 2023; Otondo et al., 2021). An explanation for this is offered by Woitek (2020) and Donaghue (2018), who argue that the construction and reconstruction of ID during the exercise of the profession is stronger when confronted with the reality of education. It is also important to note that the studies analyzed are located in Europe, especially in Spain and the Netherlands, and, to a lesser extent, studies from the Middle East (Bellido and Hernández, 2023; Blanchard and Procópio, 2021; Cantón and Tardif, 2018).

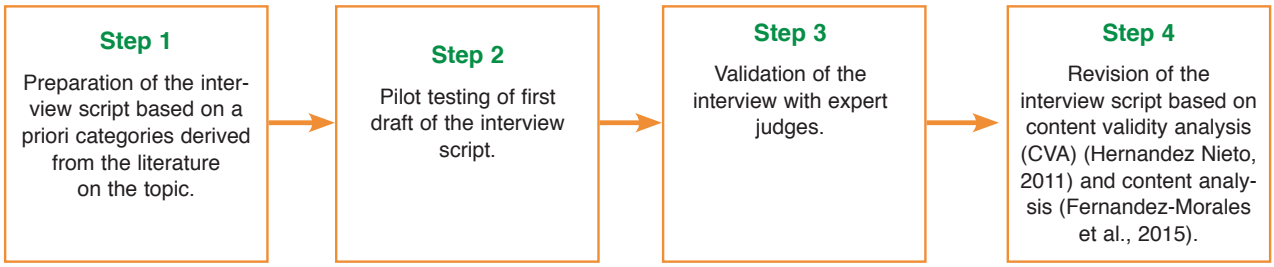
Consequently, there is a need to delve deeper into the aspects involved in the construction of ID through research based in the ITT and in Latin America, especially in Chile. Furthermore, it is important to understand how experiences in the context of university education, and particularly those in practice centers, influence its construction.

2. Methodology

The work carried out responds to a mixed research design. On the one hand, to obtain evidence of content validity, a content validity coefficient (CVc) analysis was performed (Hernández Nieto, 2011) and, on the other hand, a qualitative analysis of the observations of expert judges was performed using the content analysis technique (Fernández-Morales et al., 2015). In this way, both processes allow the semi-structured interview script to be optimized.

The process of developing and validating the interview was carried out in four stages (Figure 1). The first stage involved developing the instrument according to *a priori* categories based on the specialized literature on teacher identity and initial teacher training. In the second stage, the instrument was piloted with participants who met the inclusion requirements determined in the study. The third stage involved validation by expert judges, in which ten academics from Chilean and foreign universities were contacted, from whom seven responses were obtained. The fourth focused on reworking the semi-structured interview script, based on the analysis of the CVc coefficient (Hernández Nieto, 2011) and content analysis (Fernández-Morales et al., 2015).

Figure 1. *Process of developing and validating the semi-structured interview script*



2.1 Stage 1: Development of the semi-structured interview script

The initial version of the interview was constructed based on theoretical references related to teacher identity and initial teacher training, which allowed for the definition of *a priori* categories and subcategories.

Table 1 describes the categories and subcategories that guided the design of the instrument, and Table 2 presents their definitions.

Table 1. *A priori categories and subcategories for the semi-structured interview script*

Categorías	Subcategorías
Teacher identity	Meaning of the teaching profession
	Situations that transformed the meaning of being a teacher
Significant experiences at the university (theoretical training) and at school (practical training)	University-school experience that allows the questioning of teaching identity
	University/school experience that generates a transformation in the construction of teaching identity
	Experience with the university trainer/mentor teacher and teaching identity
	Conditions for the construction of teaching identity

Table 2. *Theoretical definition of categories and subcategories*

Categories	Definiciones
Teaching identity	It is a dynamic process of personal and collective construction and reconstruction, which results from socialization and is strengthened through teaching practice (Bolívar et al., 2014).
Significant experiences at the university (theoretical training) and in practice centers (practical training)	Significant experiences at university (theoretical training): process of acquiring specific and standardized knowledge, carried out in specialized institutions, during an explicitly defined period of time (Cox and Gysling, 1990). Significant experiences in practice centers (practical training): a line of training that links the university/academic space with the school/practice center space. It also includes any activity indicated in the training curriculum that allows future teachers to relate to the reality of education (Turra and Flores, 2019).
Meaning of the teaching profession	A set of attributes that future teachers attribute to themselves as professionals, resulting from the interaction of personal characteristics with those of the profession. It is a process that involves a transformation of the way in which a person defines themselves as a professional, based on social, cultural, contextual, and personal factors (Cuadra et al., 2021).
Situations that transformed the meaning of being a teacher	Significant experiences that involve a change in beliefs, attitudes, and habits related to teaching. They enable the emotional and cognitive reconstruction of pre-existing models of the teaching role (Pérez, 2019).
University-school experience that allows for the questioning of teaching identity	Significant experiences at university (theoretical training) or in practice centers (practical training) that impact future teachers' perceptions of the teaching role. Guided by questions such as: who is the teacher as a person and a professional and, above all, who do they want to become, considering social, cultural, and emotional dimensions, among others (Vaillant, 2013).
University/school experience that generates a transformation in the construction of teaching identity	Teaching transformation involves a series of personal and professional changes, mainly related to professional vocation. It considers a paradigm shift regarding previous experiences of the teaching role and confrontation with educational reality. It focuses especially on conflictive experiences originated in the ITT, as a result of reflection on their experience and understanding of teaching (Morales et al., 2020).
Experience with the university trainer/mentor teacher and teaching identity	Significant situations experienced at the university or practice center with the university professor and mentor, respectively, which influence the future teacher's vision of the teaching role. The university professor guides the actions and decisions of the teacher in training based on the guidelines of the university institution. Meanwhile, the mentor does so from the practice center. The role of both is to accompany the teacher in training, taking into account their classroom experiences and theoretical references, which are complemented by the actions associated with their role (Vanegas and Fuentealba, 2019).
Conditions for the construction of teaching identity	There are three levels that facilitate or hinder the construction of teaching identity. The first is the future teacher's position towards the teaching process, where self-image and self-esteem allow them to explore different dimensions to successfully achieve the teaching process. The second is determined by social relationships and how they influence the identity of the future teacher, which vary according to the contexts in which they are involved. Finally, the cultural level where the university organization (theoretical and practical) is relevant, since it must meet the demands of future teachers from the influence on their work motivation to the future perspective of their teaching development (Jara and Mayor, 2019).

With this theoretical basis, the initial design of the instrument considered a total of six questions. The script developed from the categories and subcategories detailed above is presented below.

Table 3. *Semi-structured interview script submitted for expert validation*

Category	Subcategory	Question
Teacher identity	Meaning of the teaching profession	What does being a teacher mean to you?
	Situations that transformed the meaning of being a teacher	What do you consider to be the essential characteristics of a teacher?
Significant experiences at university (theoretical training) and at school (practical training)	University-school experience that allows the questioning of teaching identity	What situation at university or in the workplace can you recall in which you questioned what being a teacher means to you?
	University/school experience that generates a transformation in the construction of teaching identity	Did that experience transform the meaning of being a teacher for you? Can you elaborate on that process you went through?
	Experience with the university trainer/mentor teacher and teaching identity	What experience with a trainer and mentor teacher led you to question or transform what being a teacher means to you?
Conditions for building teacher identity		In your university education and teaching experience, what hinders or helps you build your idea of what it means to be a teacher?

2.2 Stage 2: Pilot testing of the first version of the semi-structured interview

The interview was conducted with five teachers in training for secondary education programs, chosen according to the inclusion criteria established in the research, namely: 1) that they belong to an initial teacher training program for secondary education and a regional university, and 2) that they are enrolled in professional practice.

2.3 Stage 3: Interview validation by expert judges

The validation by judges was carried out considering the following characteristics for selecting the panel of experts: a) doctorate or master's degree, and b) university academic who teaches practical or related subjects, or who has experience in initial teacher training. A total of twelve academics from Chilean and foreign universities were contacted by email, out of which eight responded. Of these, seven were considered, as one expert did not complete the entire form and therefore could not be subjected to content validity analysis.

A document was sent to the panel of experts that included the theoretical definition of each category and subcategory to contextualize them in accordance with the study being conducted. In addition, the panel of experts was invited to provide a rating (from 1 to 4) of the interview script according to the parameters of clarity, coherence, and relevance, as well as the adequacy of the categories and subcategories.

For the assessment, it was indicated that 1 corresponds to the question being unclear, unrelated, or needing to be eliminated; 2 corresponds to the question requiring significant modification or being related to the category in only one aspect; 3 corresponds to the question requiring a specific modification or the need for additional questions; and 4 corresponds to the question being clear, having appropriate semantics and syntax, being relevant, and measuring the category. A comments section was also added for the experts to record their suggestions for each question, category, and subcategory.

2.4 Stage 4: Rewriting the interview script based on suggestions from expert judges

Based on the suggestions of the panel of experts, the interview script was optimized, focusing on incorporating questions that would make the instrument sufficient and improving the wording of existing questions. The result of this process is detailed below.

3. Analysis of the results

The analysis of the results of this process was divided into two parts. First, a quantitative analysis of the assessment provided by the expert judges was carried out based on the proposal by Hernández Nieto (2011). Each of the parameters is evaluated by each expert using a Likert scale (or estimation scale), in which the possible values can be represented by numbers, according to the following scale:

Table 4. *Hernández Nieto's content validity coefficient scale (2011)*

Deficiency	Equal to or less than 0.6 and less than 0.7 inefficient and deficient validity and agreement
Fair	Higher than 0.71 and less than or equal to 0.8, acceptable validity and agreement.
Good	Higher than or equal to 0.8 and higher than 0.9, excellent validity and concordance.
Excellent	Higher than 0.9, excellent validity and concordance

Note. Prepared by the author based on Hernández Nieto (2011).

The above values allow us to measure the degree of agreement among experts regarding the design of each item (clarity, consistency, and relevance) and the instrument in general (sufficiency), since once the CVCs are obtained, their value is interpreted using the scale in Table 2. This initial analysis allows us to determine whether an item or question should be retained or eliminated. For this study, it was decided to keep questions with an excellent or good rating.

In a second stage, a qualitative analysis of the expert panel's suggestions was carried out, taking into account three areas: i) appropriate use of words, ii) adequacy of the meaning of the questions so that they measure only one objective, and iii) incorporation of an item to strengthen the adequacy of a particular dimension (Fernández-Morales et al., 2015).

The results obtained from this process are shown below.

3.1 Quantitative analysis of the instrument

Table 5. *Content validity coefficient (Hernández Nieto, 2011)*

Question	Judges							Sum of scores	Sum value and number of judges	Content validity coefficient
	1	2	3	4	5	6	7			
	Scores									
1	9	12	12	12	12	12	8	77	6,4	0,92
2	9	11	6	12	12	12	8	70	5,8	0,83
3	12	12	6	12	11	11	9	73	6,1	0,87
4	12	10	9	12	12	11	11	77	6,4	0,92
5	9	12	10	12	11	11	10	75	6,3	0,89
6	9	10	7	12	11	11	9	69	5,8	0,82
	Category									
1	2	4	1	4	3	4	3	21	2,6	0,38
2	3	3	3	4	4	3	4	24	3,0	0,43

The table shows the total scores assigned by the seven experts to each of the questions and categories. According to the scale of values established for interpreting the CVc, all questions have an index higher than 0.8, which means that validity and agreement are considered good to excellent. However, regarding the categories and subcategories, an index of less than 0.6 was obtained, which is interpreted as inefficient and deficient validity and concordance. This result is directly related to what the judges

expressed in their suggestions, namely, to increase the number of questions to give greater sufficiency to the categories and subcategories, which will allow for a more in-depth study of the topics related to the subject under study.

3.2 Qualitative analysis of the instrument

To perform the qualitative analysis, the proposal by Fernández-Morales et al. (2015) was considered, in which three criteria are proposed: a) appropriate use of words, b) adequacy of the meaning of the questions so that they measure only one objective, and c) incorporation of an item to strengthen the sufficiency of a given dimension.

In accordance with the first criterion, "appropriate use of words," the panel of experts proposes that some linguistic aspect of all questions should be modified so that they can be understood by participants. For example, for question 1, it is indicated that "it leaves little room to understand whether they have been constructed from experience or refer to theoretical knowledge" (judge 2). Similarly, for question 3, the following wording is suggested to facilitate the interviewee's understanding: "What situation you experienced at university or practice center that made you question what it means to you to be a teacher?" (judge 5).

As for question 4, the panel's suggestions were taken into account and a question was considered that would allow participants to establish a "before" and "after" in the construction of the meaning of teaching identity and its relationship with their experiences at university and in practice centers. Similarly, the wording was optimized so that the question would contribute appropriately to the category and subcategory.

Therefore, the decision was made to review the wording of all questions and ensure that they were understandable to respondents. The experts' suggestions for wording were also accepted.

In the second criterion, "appropriateness of the meaning of the questions so that they measure only one objective," the panel of experts suggested that all questions be reworded so that they contributed directly to the category or subcategory to which they belonged. For example, for question 2, the following is indicated: "This question, as it is posed, does not ask for information about the situations that transformed the meaning of being a teacher for him. There is no consistency with the subcategory. Is it suggested to change the question, the topic, or the subcategory?" (judge 7). In this case, it was considered to modify the wording of the question so that it would contribute directly to the category and subcategory, as well as to relate to question 1.

For question 6, as mentioned, the judges agreed that it was necessary to divide it so as not to confuse the interviewees about the educational setting referred to, such as school or university. For example, "I recommend revising the question, as it addresses two different levels. The first focuses on the pre-written curriculum from the university, the study plan, while the second focuses on practical experience within the school setting. Therefore, it would be advisable to separate it" (judge 5). It was therefore considered appropriate to separate the wording of the questions in such a way that it was understandable to the participants. In this way, one question focused on obstacles at university, the next on obstacles in practice centers, another question on facilitators at university, and finally, on facilitators in practice centers.

Regarding the last criterion, "incorporation of an item to strengthen the adequacy of a particular dimension," the judges' comments were unanimous, suggesting that in both categories it was necessary to add or divide the questions, either to distinguish the training spaces referred to or to give greater adequacy to the category and subcategory. For example, it was suggested that "I recommend differentiating the contexts in the questions, as the experiences are clearly not the same at the university as at the practice center. At university, it is assumed the role of a student, while at the practice center, it is assumed, to some extent, the role of a teacher or professional. This duality of roles can have an impact on the construction of your professional identity. I recommend revising the wording" (judge 3). Therefore, it was decided, on the one hand, to modify the wording of all the questions and, on the other, to add nine questions to strengthen the adequacy of the instrument.

As with the quantitative analysis, a review was conducted by question and category. In this case, the judges' suggestions are oriented toward the latter criterion, i.e., to strengthen the categories, it is necessary to add questions that provide sufficiency. In their words, "the category is fundamental for obtaining information about the meaning of the tea-

ching profession. I find two topics or two questions insufficient, as the data required below are related to these definitions. I would give it greater relevance. Furthermore, I think that the data requested from the subject need to be placed in a temporal and spatial context" (judge 3).

Consequently, according to the experts' comments, it is necessary to increase the number of questions and strengthen their wording so that they contribute adequately to the category.

Finally, it is worth mentioning the general comments of the panel of experts, which corroborate the above, for example: "Firstly, I suggest increasing the number of questions (10 to 12) and opening up space for emerging topics. Likewise, "improve the thread between the question, subcategory, and category, since this aspect is only clearly observed in questions 3 and 4 (judge 4). In addition, "I recommend reviewing the questions and their relevance to the defined categories, as in some cases they are not relevant. On the other hand, I suggest that the definitions established for each category be taken into account when defining the question script" (judge 1).

Based on the suggestions of the panel of experts and the results of the content validity analysis, it was decided to modify the semi-structured interview script by adding nine questions that would allow for an in-depth discussion of the different topics related to ID and ITT. However, the categories and subcategories were maintained because, according to the experts, they were considered relevant to the objective of the study. Similarly, the relevance of the interpretations of the experts' observations (content analysis) and the adequacy of the questions with the categories and subcategories were reviewed in conjunction with two academic experts in the area of initial teacher training and teacher identity.

The interview script optimized according to the suggestions of the expert panel is presented below.

Table 6. *Semi-structured interview script optimized based on suggestions from the expert panel*

Categories	Subcategories	Questions
Teacher identity Significant experiences at university (theoretical training) and at school (practical training)	Meaning of the teaching profession Situations that transformed the meaning of being a teacher University-school experience that allows the questioning of teaching identity University/school experience that generates a transformation in the construction of teaching identity	1. Based on your experiences, what does be a teacher in the Chilean school system mean to you? 2. How does this meaning project itself in your professional practice? 3. What characteristics did you consider essential to being a teacher before entering the teaching profession? 4. Based on your experiences during your training in the teaching degree program, what characteristics do you now consider essential for being a teacher? 5. What situations or experiences during your training transformed (or did not transform) those characteristics that you consider essential to being a teacher? 6. What situation at university do you remember that made you question what being a teacher means to you? 7. What situation at the practice center do you remember that made you question what being a teacher means to you?
Significant experiences at the university (theoretical training) and at school (practical training)	University/school experience that generates a transformation in the construction of teaching identity	8. Do you think the experiences described above bring about a change in the meaning of "being a teacher"? What are the characteristics of these changes?
		9. How did you experience the process of change? 10. Throughout your training, what experience with a university trainer brought about a transformation in what "being a teacher" means to you?
	Experience with the university trainer/mentor teacher and teaching identity	11. Throughout your educational career, what experience with a mentor or teacher guide at the practice center brought about a transformation in what "being a teacher" means to you?
	Conditions for the construction of teaching identity	12. In your university education, what has facilitated the construction of your meaning of being a teacher? 13. In your university training, what has hindered the construction of your meaning of being a teacher? 14. In your practical experiences in educational centers, what has facilitated the construction of your meaning of being a teacher? 15. In your practical experiences in educational centers, what has hindered the construction of your meaning of being a teacher?

4. Discussion

The process of evaluation by expert judges has several advantages. On the one hand, it allows the data collection instrument to be assessed by specialists in the field and, on the other, it optimizes it in accordance with its objective and the context in which it will be used. In this sense, the process is considered rigorous, as it constitutes the specialized point of view of people who have experience in the subject and are therefore qualified to give their opinion and assessment (Escobar and Cuervo, 2008). It is therefore important to establish relevant criteria for selecting the academics who will be chosen for the process, whether on the basis of their knowledge in the area, their academic background, or their availability to validate the instrument.

Regarding the same process, Cabero and Llorente (2013) mention that the quality of the experts' responses allows for a deeper understanding of topics that are little studied or complex and that are also novel. Along the same lines, accurate and detailed information can be obtained from the judges' assessments.

According to the above, expert judgment allows us to gather the views of specialists in the field of study and also to recognize the degree to which these reasoned assessments agree or disagree, as it allows irrelevant elements to be disregarded, essential elements to be incorporated, and relevant modifications to be made (Robles and Rojas, 2015). In other words, it is possible to identify the strengths and weaknesses of the data collection instrument.

However, the decision was made to use the Validity Coefficient proposed by Hernández Nieto (2011), which allows for the assessment of the degree of agreement among experts. The author recommends 3 to 5 judges; however, in this process, responses were obtained from seven academics, which led to a variety of reasoned points of view on the instrument and, consequently, its optimization in line with the context and requirements. The author indicates that three events are necessary to determine whether the content validity of the instrument is true or excellent. First, the agreement between the judges on the values assigned to each item or question; second, the consistency in the values assigned by the judges; and third, evidence of agreement corresponding to at least 80% of the range used (Hernández Nieto, 2011).

Regarding the above, all the tasks required by the method proposed by the author were carried out, resulting in excellent validity, consistency, and agreement (above 0.8) for the questions. However, about the categories, an index of less than 0.6 was obtained, which is interpreted as inefficient and deficient validity and agreement. This result is consistent with the opinions of the judges, who indicated, for example, "First, I suggest increasing the number of questions (10 to 12) and opening up space for emerging topics. On the other hand, improve the thread between the question, subcategory, and category, since this aspect is only clearly observed in questions 3 and 4" (Judge 1). They also suggested that "in the fundamental category of obtaining information about the meaning of the teaching profession, two topics or two questions seem insufficient to me" (Judge 7) and "I suggest considering at least two questions per subcategory" (Judge 2). In consideration of the suggestions made, decisions were made to reformulate the instrument, increasing the number of questions to make the categories and subcategories more sufficient.

5. Conclusions

This study aimed to describe the process of developing and validating a semi-structured interview script that is part of doctoral research. The purpose of this research is to identify the personal, socio-cultural, and educational components in the meanings of teaching identity among future secondary school teachers that emerge from their professional practice experiences. This process showed that validation by expert judgment made it possible to refine the instrument in accordance with the objectives set for the study.

In this regard, reasoned opinions were obtained from the expert judges and numerical assessments of the instrument were made, both of which allowed for reliable interpretation to respond to all suggestions. Therefore, it was decided to add nine questions to supplement the *a priori* categories and subcategories, as well as to improve the wording of the questions so that their language would be understandable to the study participants and would give rise to reflection on the experience of constructing ID at the university and in educational centers.

Expert validation lends greater scientific rigor to the process of developing a qualitative instrument

and its subsequent revision, given that the optimization parameters are based on a thorough review by specialists in the field, allowing researchers to make relevant decisions. Likewise, as this is qualitative research, it highlights the importance of constructing an instrument that is appropriate to the reality or context in which it will be used, and therefore useful as a source of reference for researchers in the field. In this vein, this instrument is considered valid for application in different contexts of initial training, whether for teachers in primary, secondary, special education, and early childhood education, as well as for practicing teachers, given the significance and cross-cutting nature of the subject matter.

Finally, it is important to mention that, given the limited evidence that exists on the validation of qualitative instruments, it is necessary to make progress in this area, with the aim of giving greater credibility to the data obtained in accordance with the nature of the subject matter and adjusted to the context. In this way, processes of critical reflection are generated among researchers, not as an idea of approaching absolute truth (which is far from the qualitative approach), but as a scientific exercise that leads to the consensus of a community of experts to "refer to what is real, what is useful, and what is meaningful" (Santaella, 2006, p. 36).

5.1 Recommendations

Although the instrument has been revised and optimized, it is important to bear in mind that it is a semi-structured interview, and therefore, when using it, it is possible to incorporate new questions according to the needs of the context and the participants' responses. In no case does this exercise respond to an intention to standardize the instrument; on the contrary, it is intended to reflect a rigorous process by which the semi-structured interview script was improved to meet the objectives of the study.

5.2 Limitations

One possible limitation of this study is that the final script was not resubmitted for validation by the same group of experts and a pilot test. However, this step is not considered a requirement for its application, but rather an opportunity to optimize the instrument.

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Authors' contributions

PhD. María José Manosalba Torres: responsible for managing and coordinating the planning and execution of the research activity. Management activities to record (produce metadata), clean data, and maintain research data (including software code, when necessary to interpret the data itself) for initial use and subsequent reuse. Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data. Acquisition of financial support for the project leading to this publication. Development or design of methodology; creation of models. Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computer resources, or other analysis tools. Preparation, creation, and/or presentation of the published work, specifically data visualization/presentation. Preparation, creation, and/or presentation of the published work, specifically writing the initial draft (including substantive translation). Preparation, creation, and/or presentation of the published work by the original research group, specifically critical review, commentary, or revision—including pre- and post-publication stages.

PhD. María José Seckel: responsible for managing and coordinating the planning and execution of the research activity. Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computer resources, or other analysis tools. Responsible for supervising and the leadership in the planning and execution of the research activity, including mentoring and external the core team. Verification, either as part of the activity or separately, of the replication/reproducibility of the results/experiments and other research products. Preparation, creation, and/or presentation of published work, specifically writing the initial draft (including substantive translation). Preparation, creation, and/or presentation of published work by the original research group, specifically critical review, commentary, or revision—including pre- and post-publication stages.

PhD. Maite Otondo Briceño: responsible for managing and coordinating the planning and execution of the research activity. Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computer resources, or other analysis tools. Responsible for supervising and the leadership in the planning and execution of the research activity, including mentoring outside the core team. Verification, either as part of the activity or separately, of the overall replication/reproducibility of results/experiments and other research outputs. Preparation, creation, and/or presentation of published work, specifically writing the initial draft (including substantive translation). Preparation, creation, and/or presentation of published work by the original research group, specifically critical review, commentary, or revision—including pre- and post-publication stages.

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Pedagogical support and the need for parenting tools

Acompañamiento pedagógico y necesidad de herramientas parentales

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Abstract

Educational support is understood as a comprehensive process that involves the active participation of families in their children's learning outside of school, incorporating the organization of learning environments, guidance with homework, educational mediation, and the socio-emotional dimension. This process is closely related to children's emotional development and the socio-emotional skills of mothers and fathers, which directly influence the quality of educational support provided at home. It is emphasized that teachers are also part of this process, as it is necessary to align families' needs with adequate parental training. The purpose of the study is to examine the relationship between the level of pedagogical accompaniment provided by parents and the need for parental tools, along with other relevant variables. Using a descriptive approach with quantitative analysis, interviews were conducted with 332 parents, and the data were processed through absolute and relative frequencies for qualitative variables, employing Spearman's correlation coefficient. The results include information on parents' emotions, their responsibilities, the educational environment, and their perception of those responsibilities, among other links between variables. The main finding highlights the importance of considering the emotions present during homework and of providing support resources to families.

Keywords: family involvement, early childhood, pedagogy, emotional development, education.

Resumen

El acompañamiento pedagógico se entiende como un proceso integral que implica la participación activa de las familias en el aprendizaje de sus hijos fuera del centro educativo, incorporando la organización de los ambientes de aprendizaje, la orientación en las tareas escolares, la mediación educativa y la dimensión socioemocional. Este proceso mantiene una estrecha relación con el desarrollo emocional infantil y con las competencias socioemocionales de madres y padres, las cuales influyen directamente en la calidad del apoyo educativo brindado en el hogar. Se subraya que el profesorado forma parte también de este proceso, ya que es necesario articular las demandas de las familias con una adecuada formación parental. El propósito del estudio es examinar la relación entre el nivel de acompañamiento pedagógico que ofrecen los progenitores y la necesidad de herramientas parentales, junto con otras variables de interés. A partir de un enfoque descriptivo con análisis cuantitativo, se aplicaron entrevistas a 332 padres y madres; y se procesaron los datos mediante frecuencias absolutas y relativas para las variables cualitativas, recurriendo al coeficiente de correlación de Spearman. Los resultados recogen información sobre las emociones de los padres, sus responsabilidades, el entorno educativo y la percepción sobre dichas responsabilidades, entre otros vínculos entre variables. Como principal hallazgo, se destaca la importancia de considerar las emociones presentes durante las tareas escolares y de proporcionar recursos de apoyo a las familias.

Palabras clave: implicación familiar, primera infancia, pedagogía, desarrollo emocional, educación.

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1. Introduction

Since the COVID-19 pandemic, the various difficulties faced by parents in providing educational support at home have been apparent. Schools are no longer solely responsible for their students' academic development, and caregivers have taken on a more active role, following the guidelines provided by the institution to be applied in their homes. However, this scenario has highlighted various difficulties in providing educational support at home. Among these, parental overload in helping with schoolwork and a lack of clear guidance from educational institutions have been identified.

This study arose from the need to identify the main shortcomings of parents in providing educational support at home. To this end, a descriptive-correlational study was conducted with 332 parents in Mexico and the United States to identify their main shortcomings in providing educational support, the relevance of spaces and their structure during homework, and to highlight the importance of emotional control, parental responsibility, and the development of training and strengthening tools by educational institutions to promote adequate educational support. The objective of this study is to understand how these associations, together with other variables included in the study, influence the management of emotional and social skills in the family environment during educational support.

In this study, educational support is conceived as a comprehensive process through which families actively participate in their children's learning at home, beyond the mere supervision of schoolwork. This support includes the organization and structuring of learning environments, mediation and guidance during academic activities, the transmission of values, the establishment of educational routines, and constant communication with the school. It also integrates the socio-emotional dimension in a cross-cutting way, understood as the ability of parents to regulate their own emotions, act with empathy, promote self-awareness, and create a safe emotional climate that facilitates learning and child well-being. From this perspective, pedagogical support articulates educational, relational, and emotional components that are fundamental to the comprehensive development of children.

The results highlight the need to develop parental training tools that promote appropriate pedagogical support, helping parents to better manage emotions, fostering the development of self-awareness, empathy, and social skills, as well as the need to identify their children's learning difficulties. Within this framework, pedagogical support is the central focus of the study, integrating organizational, educational, and socio-emotional aspects that influence families' participation in their children's learning.

1.1 Related works

1.1.1 The family and the school, both influential institutions in children's development, share the responsibility of educating students academically, emotionally, and socially.

Various studies show that when families actively participate in their children's education, with teacher support, better results are achieved in cognitive and socio-emotional development (Cosso et al., 2022). To achieve quality education, it is necessary for the institutions involved to collaborate and participate jointly; it is essential to recognize both the needs and strengths of each family to strengthen learning processes. In this regard, the variables analyzed in the research, such as parents' emotional management, the organization of spaces for learning, and the way in which parental responsibility is assumed in the development of school habits within the home, are particularly relevant. The active presence of the family in the educational and support process is associated with comprehensive social, emotional, cognitive, and creative development in children (Fan et al., 2024). In this sense, the adults responsible for their care play a crucial role in strengthening emotional bonds through secure attachment and providing support characterized by security, empathy, and emotional regulation (Morris et al., 2007). Being active participants in their children's educational processes, it is therefore vitally important that schools provide training spaces for families that promote continuous learning at home, the development of healthy school habits, and the management of emotional skills, while also establishing a two-way relationship by providing resources and opportunities for families to actively participate in the educational process (Kaspar and Massey, 2023).

1.1.2 The impact of the pandemic on home education: since the COVID-19 pandemic, a significant change has been observed, highlighting the shortcomings and needs that parents may have experienced during educational support. Families carried out support, following, to a greater or lesser extent, the guidelines provided by educational centers during the process.

However, it was the parents who actually carried out the educational activities at home (Soto et al., 2020). This did not necessarily mean that they directly performed the educational tasks, but rather that they assumed a role of supervising their children's behavior during virtual classes and attending to their needs while they did their homework (Wilder, 2013). It is essential that they have the support of teachers (Padilla and Madueño, 2022; Morris et al., 2007), since, for this process to be viable, teachers must accompany families and offer them the necessary support, not only through materials, but also by providing emotional support. It is essential and necessary for parents to maintain emotional control for the educational development and growth of children, which also affects their emotional well-being. This control will provide them with security and support, especially when they are involved as educational companions. With the help of teachers or tutors, parents can be better prepared to support their children by implementing interventions at home through routines and guided activities. Children who receive educational support at home, especially when guided by teachers, tend to perform better academically in remote learning contexts (González et al., 2020).

1.1.3 Educational support and emotional well-being: in this study, the emotional dimension is approached from the perspective of parental social-emotional competencies, understood as the set of skills that enable parents to recognize, regulate, and adequately express their emotions, as well as understand and respond empathetically to their children's emotions.

These competencies are fundamental to developing a coherent and conscious educational intervention at home, as they guide the type of interactions that take place during pedagogical support. Thus, emotional control and regulation are not conceived as isolated processes, but as central elements that directly affect the quality of support and the emotional well-being of children (Lunkenheimer et al., 2023). This has an impact on the emotional management of parents, as well as that of their children, as the latter learn by observing their parents' behavior, as shown by the results of this research. In this regard, more fluid communication and closer support at home are strengthened when adults receive guidance and support from teachers, which has a positive impact on the quality of their educational participation (Dettmers et al., 2019). Families need the support, guidance, and instructions of teachers or tutors to provide effective educational support to their children. It is essential that teachers get involved and offer resources and activities to work on at home, ensuring that they have a defined methodology and objectives. Teachers must provide clear guidelines on how to carry out these activities at home in order to promote children's learning and avoid limiting them to a purely instructional practice. It is also essential to promote programs that strengthen social skills, emotional management, and the adaptation of domestic spaces. Likewise, coordination and joint work between families and schools is key to carrying out this support at home and articulating common efforts (Alonso-García et al., 2019). This shows how families are integrated into the educational system and, with the support of teachers, the educational process is promoted. In this way, the bond between families and teachers is strengthened (Dettmers et al., 2019), as reflected in the results of this study, which highlights parents' demand for tools for this purpose.

1.1.4 Parental training as an educational prevention strategy: the involvement of families should not be limited to specific actions but should be framed as a program of continuous training strategies that strengthen their communication, emotional, and pedagogical skills and competencies.

Parental training is a key tool for preventing emotional risk factors and possible general difficulties in students' acquisition of academic skills, improving family life, promoting children's emotio-

nal well-being, and enhancing their academic success (Madrid et al., 2019; Lara and Saracostti, 2019). Working with families in the school context is a task that requires evaluation, dedication, sensitivity, and interpersonal skills on the part of the teaching team and specialists at the center to identify their needs, concerns, and realities (Hernández, 2018). In this sense, the school takes on a fundamental role as a space for guidance and support for families, providing resources and methodologies that allow the school's learning processes to be applied and extended to the family environment, without neglecting fundamental aspects when carrying out this task, such as emotional control, the organization of content and spaces, and active participation based on understanding and empathy for the learning processes of children. Various studies have substantiated and demonstrated that when parents receive relevant training in emotional skills, pedagogical support strategies, and educational practices consistent with the needs and realities of their children, they create favorable conditions for the academic and personal development of children (Ansar et al., 2024; Roy and Giraldo-García, 2018). This preventive dimension of parental training not only responds to individual needs, but also strengthens the family-school relationship, increasing family involvement and creating a shared educational culture, favoring preventive practices that strengthen the family-school bond and the parenting skills necessary to support learning at home (Smith et al., 2022).

2. Methodology

2.1 Methodological design

This study adopted a descriptive-correlational design, with a complementary quantitative and qualitative approach, aimed at examining the relationships between the level of educational support provided by parents and the need for parenting tools. It also sought to analyze how these relationships influence the management of their children's emotional and social skills during school support at home. The descriptive component addressed the characterization of pedagogical support, parental emotions, and the perception of educational responsibilities, while the correlational component allowed us to determine the strength and direction of the relationships between the variables.

2.2 Participants

The sample consisted of 332 mothers and fathers, selected through intentional, non-probabilistic, and convenience sampling. Of the total, 292 were women (88%) and 40 were men (12%), aged between 25 and 55 years. Most of the participants live in Mexico (97.6%), while 2.4% live in the United States. The inclusion criteria considered parents with children enrolled in basic education who had actively participated in educational support processes at home during the academic cycle corresponding to the study. Cases with incomplete information or those who had not given their informed consent were excluded.

2.3 Techniques and instruments

Data were collected through a questionnaire, supplemented by semi-structured interviews, developed specifically for the purpose of this research. Both instruments allowed us to explore educational support at home, the emotions experienced by parents, their perceptions of their educational responsibilities, and the need for parenting tools to improve their work. The questionnaire included open-ended and closed-ended Likert-type questions to obtain both quantitative and qualitative data that reflected the experiences and attitudes of the participants.

2.4 Procedure

The fieldwork was carried out over a period of three months. Participants were contacted through educational centers and virtual parenting networks. Once informed consent was obtained, the instruments were administered through face-to-face interviews and self-administered questionnaires in digital format. Subsequently, the data were coded, classifying the open-ended responses based on thematic categories. Quantitative analyses were performed using Microsoft Excel and SPSS version 26, applying descriptive statistics and Spearman's correlation tests.

Table 1. *Frequency distribution and percentages of variables (n=332)*

Variables	Categories	n	%
Family composition	Nuclear	93	28
	Extended	239	72
Number of children	1 to 3	281	84,6
	4 to 6	49	14,8
	More than 7	2	0,6
Educational support	Little or none	40	12
	Partial	53	16
	Full	239	72
Doing chores	Not daily	44	13,3
	Daily	288	86,7
Home learning environment	No structure	75	22,6
	Semi-structured	142	42,8
	Structured	115	34,6
Perception of parental responsibility	Not very committed	66	19,9
	Moderate	16	4,8
	Compromised	250	75,3
Acceptance of emotions	Does not accept	27	8,1
	Accepts	305	91,9
Perception of emotional education quality	Absent	13	3,9
	Present	319	96,1
Detection of possible learning difficulties	No difficulties	264	79,5
	With difficulties	68	20,5
Emotion management	No tools required	26	7,8
	Requires tools	306	92,2
Empathy	No tools required	278	83,7
	Requires tools	54	16,3
Self-awareness	No tools required	242	72,9
	Requires tools	90	27,1
Social skills	No tools required	248	74,7
	Requires tools	84	25,3

The data in Table 1 show that most participants belong to extended families (72%), while the rest belong to nuclear families (28%). In terms of the number of children, 84.6% of families have between 1 and 3 children, 14.8% have between 4 and 6 children, and only 0.6% have more than 7 children. Regarding educational support, 72% report full support, 16% report partial support, and 12% report little or no support. Regarding the frequency of homework, 86.7% indicate that it is done daily, while 13.3% indicate that it is not done daily.

The learning environment at home varies, with 42.8% reporting a semi-structured environment, 34.6% a structured environment, and 22.6% an unstructured environment. Perceptions of parental responsibility and commitment show that 75.3% of parents consider themselves committed, 4.8% moderately committed, and 19.9% not very committed. Regarding the acceptance of emotions, 91.9% say they accept them, while 8.1% do not. The perception of the quality of emotional education in the sample is high, with 96.1% considering it to be present and only 3.9% perceiving it to be absent. The detection of

possible learning difficulties indicates that 79.5% do not identify them in their children, while 20.5% do perceive them.

The data reveal that 92.2% recognize the need for tools for managing emotions, while only 7.8% consider that they do not need them. In contrast, 83.7% do not require tools to develop empathy in their children, compared to 16.3% who do consider them necessary. Similarly, 72.9% do not require tools to promote self-awareness, compared to 27.1% who do. In terms of social skills, 74.7% indicate that they do not require tools, while 25.3% do.

Table 2 below shows the correlations found between the variables in the study. Given the nature of the variables, we chose to use Spearman's correlation coefficient, whose non-parametric approach was the most appropriate.

Table 2. *Spearman's correlation matrix*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender	1													
2. Family composition	-,016	1												
3. Number of children	-,018	,052	1											
4. Educational support	-,003	-,010	,004	1										
5. Doing homework	-,019	,033	-,042	,135*	1									
6. Learning environment	,000	-,012	-,033	,151**	,134*	1								
7.Perception of parental responsibility	,015	,194**	-,112*	,121*	-,034	,041	1							
8. Acceptance of emotions	-,059	-,038	,086	,007	-,051	,087	,011	1						
9. Quality of emotional education	-,021	-,022	,007	,094	,013	,057	-,049	-,033	1					
10.Emotion management	,039	-,007	-,057	-,050	-,048	-,085	,011	,118*	,115*	1				
11. Empathy	,113*	,057	,127*	-,011	-,044	,002	,078	,071	,047	,128*	1			
12. Self-awareness	-,059	-,057	-,011	-,124*	-,041	-,082	-,014	,057	,018	,178**	-,104	1		
13. Social skills	,104	,070	,089	-,011	,064	-,069	,038	,046	,010	,170**	,551**	-,043	1	
14. Learning difficulties	-,073	-,066	,009	-,118*	-,088	-,111*	-,041	-,040	-,013	,092	-,001	,093	-,021	1

* The correlation is significant at the .05 level
** Correlation is significant at the .01 level

In analyzing the correlations observed in Table 2, several significant relationships between variables were identified. First, there is an association between gender and empathy (*rho= .113**), where being a woman is related to a greater need for these tools. It was also observed that a more comprehensive perception of parental responsibility is associated with extended family composition (*rho= .194***) and with families that have fewer children (*rho= – .112**). On the other hand, doing homework on a daily basis is related to a more structured learning environment (*rho= .134**).

In addition, more comprehensive educational support is associated with daily homework completion (*rho= .135**), a more structured learning environment (*rho= .151***), and a more committed perception of parental responsibility (*rho= .121**). Likewise, greater pedagogical support is also associated with a lower requirement for self-awareness tools (*rho= – .124**) and less detection of learning difficulties in children (*rho= .111**).

On the other hand, it is observed that recognizing the need for tools for emotion management is associated with greater acceptance of these tools (*rho= .118**) and a greater perception of the quality of emotional education at home (*rho= .115**). Likewise, the need for tools for emotion management is related to the need for self-awareness management (*rho= .178**), and the development of empathy (*rho= .128**) and social skills (*rho= .170**).

4. Discussion and conclusions

4.1 Emotion management and improvement in the students' learning environment

The results of this study show a significant correlation between the orderliness of the home learning environment and parents' emotional management. Families who reported having a structured study environment also demonstrated a greater ability to accept and manage emotions, which has a positive impact on educational support. This relationship suggests that the development of emotional skills in adults not only promotes their well-being but also creates conditions more conducive to their children's learning, strengthening the emotional bond and willingness to study, as mentioned by Pardo-Patiño et al. (2023), highlighting "the importance of including the family in the process of early childhood development, including aspects of communication and family relationships as the focus of intervention programs" (p.10). In this sense, emotional management becomes a key component of the educational climate at home, as pointed out by Zimmer-Gembeck et al. (2022), who demonstrate that parental emotional regulation directly influences the emotional environment at home and the child's willigness toward learning.

Although the home learning environment and the emotional environment are closely related, they should not be understood as equivalent concepts. The learning environment refers to the organization of spaces, routines, materials, and conditions that facilitate school activities, while the emotional environment refers to the affective climate generated by family interactions. The results of this study show that adequate parental emotional management favors the creation of more structured learning environments; however, it is the interaction between both factors that enhances more effective pedagogical support.

4.2 Potential to contribute to understanding how family structure and learning environment can influence perceptions of educational quality and the need for emotional tools

Analysis of sociodemographic variables reveals that family composition and number of children also influence how parental responsibilities are perceived and assumed. Extended families, for example, tend to have higher levels of parental involvement, which could be related to internal support networks and greater experience in educational support, as confirmed by the following studies (Jaeger, 2012; Bunijevac, 2017; Roldán Ramírez et al., 2016). Similarly, a structured learning environment and a positive perception of emotional education seem to be related to a lower need for additional tools, indicating that families with these strengths are more autonomous in the process (Li et al., 2023). Understanding these relationships allows for the design of differentiated interventions tailored to family realities.

This type of analysis encourages reflection not only on the aspect of family composition, but also on the parenting models associated with each context: in extended families, involvement can be distributed among several members, fostering a more emotionally stable environment with diverse shared strategies, which promotes both academic support and emotional regulation in children and adults (Pribesh et al., 2020). The existence of structured learning environments not only indicates effective domestic planning, but also higher levels of family resilience and parental self-efficacy (Weis and Trommsdorff, 2021). Such conditions tend to reduce the need for external resources, but do not eliminate the need for a school

to guide, orient, and strengthen these processes from a perspective of shared responsibility. Hence, training proposals need to take into account the structure of the family, considering not only procedural needs but also focusing on social-emotional skills, establishing guidelines for families with a more solid support network, and also for those more vulnerable families where support can make a substantial difference, not only in the processes carried out during homework preparation but also in reducing the psychosocial risks of the family (Rodrigo et al., 2009).

4.3 Why should we develop training tools for families?

One of the most consistent findings is the high proportion of families who recognize that they need tools to manage emotions (92.2%), which highlights a significant gap in parenting skills in this area. This same need is expressed in the following studies related to children's social skills and self-regulation processes (Cárdenas and Escobar, 2022; Montroy et al., 2016; Morris et al., 2007; Paley and Hajal, 2022). Although many families do not identify the need for training in empathy, self-awareness, or social skills, correlational analyses show that those who require emotional support could also benefit from these complementary skills. This reinforces the idea that parenting training should not be limited to offering practical advice on schoolwork but should also include the personal and emotional development of the adults who accompany children's learning. This assertion is also evidenced in the following studies: Ansar et al. (2024); Saracostti et al. (2019), which reinforce the need to recognize that parental involvement in supporting their children's schoolwork should not be limited to instrumental aspects such as homework support. Instead, they highlight the importance of addressing the personal and emotional development of the caregivers who accompany children in their educational process. Evidence shows that when families strengthen their social-emotional skills, not only does their well-being improve, but so does the overall development and academic performance of their children.

4.4 Practical implications for households

Based on these results, several practical recommendations can be derived. Educational institutions should design parenting training programs focused on emotional development, structuring the educational environment at home, and strategies for identifying educational needs. These programs could take flexible and accessible formats, such as virtual workshops, interactive guides, family tutoring, emotional regulation workshops, use of simple rubrics for tasks, and video capsules, always with the support of teachers and specialists as key figures who take into account the reality of the natural family environment and the skills of the primary caregivers. In addition, it is suggested that a school culture be fostered that values shared responsibility and ongoing dialogue between families and schools, promoting environments of mutual trust that enhance student learning and comprehensive development. As noted in the study by Gavilánez Villamarín et al. (2021), there is a close relationship between the need for family training and the process of pedagogical support, highlighting the importance of integrating the adults responsible for care into their children's learning processes. The study mentions that 70% of mothers took on the main responsibility for the care and education of their children during the COVID-19 pandemic, highlighting the importance of promoting greater participation by fathers and mothers in this task, encouraging shared responsibility for educational support.

For this reason, several successful parental training programs in the educational context are taken into consideration, among which the Triple P (Positive Parenting Program) stands out as one of the most internationally recognized. This program includes five levels of intervention, ranging from general actions to more personalized processes aimed at parents, as noted by its authors Sanders et al. (2002). The program has also been applied in various studies, such as those by Nowak and Heinrichs (2008), Prinz et al. (2009), Whittingham et al. (2009), and Sanders (2012), which show favorable results even in a variety of cultural and population contexts. These findings highlight the importance of implementing parenting programs that consider the specific needs of families and promote the development of social-emotional skills.

Another parenting program that strengthens caregivers' social-emotional skills is *The Incredible Years*, designed by clinical psychologist Dr. Carolyn Webster-Stratton. This program consists of addres-

sing behavioral problems in infants with the involvement of parents, teachers, and children, developing social-emotional skills in the adults responsible for their care. Some authors who have applied these programs with positive results in improvements in parenting practices, reduction of parental stress, as well as the identification of active parental involvement, highlighting the importance of adapting the program to the individual needs of families, are Arruabarrena et al. (2022); Leijten et al. (2018); Gardner et al. (2010).

5. Conclusions

The results obtained in this research allow us to affirm that pedagogical support at home cannot be understood in isolation, but rather in close connection with emotional, structural, and relational factors in the family environment. The study confirms that adequate emotional management by parents is directly related to the creation of structured learning environments and greater involvement in schoolwork.

It was also found that although most families are committed to their children's education, they lack the tools to manage their emotions appropriately, which limits effective support in educational processes. This finding highlights the urgent need for intervention by educational institutions, not only to support students, but also to train the adults responsible for providing support at home. In this regard, parental training programs should focus not only on providing practical strategies for educational support, but also on developing social skills and emotional competencies, such as empathy, effective communication, and emotional self-regulation. It is also essential to promote the strengthening of family support networks and the equitable distribution of parental responsibilities between both primary caregivers. To this end, schools must take on an active role, not only through teaching staff, but also through a transdisciplinary approach that integrates the work of counselors, educational psychologists, and other professionals, enriching these programs with psychological support and the intervention of specialists who respond to the real needs of families.

Another significant finding was the relationship between the perception of quality emotional education and lower demand for tools, indicating that families with greater emotional awareness feel more capable of supporting their children's learning. However, this self-perception of competence does not exclude them from the need for ongoing support from educational institutions, as new needs and challenges may arise in the process, taking into account that the reality of families can vary depending on the variations that may arise in the various systems of interaction. This reinforces the importance of incorporating emotional content into parental training, beyond academic aspects, and of maintaining follow-up that allows for the adjustment of support to each family's reality.

In summary, the findings of this research confirm that pedagogical support is a central axis in the educational processes developed at home, integrating academic, organizational, and socio-emotional dimensions. The need expressed by families for training tools highlights that pedagogical support cannot be limited to supervising tasks but requires the strengthening of parental socio-emotional skills and systematic guidance from educational institutions. This reinforces the shared responsibility between family and school as an essential condition for promoting the emotional well-being and meaningful learning of children.

Authors' contributions

Carmen Cecilia Roz-Faraco: conceptualization, data curation, formal analysis, research, methodology, software, supervision, validation, visualization, writing—original draft, writing—revision and editing.

Nazaret Martínez-Heredia: conceptualization, data curation, formal analysis, research, methodology, software, supervision, validation, visualization, writing—original draft, writing—revision and editing.

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Knowledge management and artificial intelligence in higher education

Gestión del conocimiento e inteligencia artificial en la educación superior

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Abstract

Artificial Intelligence (AI) has a transformative potential in education, generating benefits and challenges. Considering the numerous debates due to the rapid advance of AI, this study is part of a master's research with the objective of identifying the state of the art of research on Artificial Intelligence in Education (AIED), organizing and categorizing information to support researchers, teachers and managers in decision-making through knowledge management. A scoping review was carried out with studies published between 2021 and 2025, following up on previous reviews. The articles selected from the Web of Science database are indexed in the Social Sciences Citation Index, which guarantees the quality of the works analyzed. After the selection process, 230 articles were included in the study from a total of more than 700 works in the area of education. The methodology adopted is qualitative and exploratory, using content analysis and descriptive statistics of some data from the articles. The results show significant progress in AIED research, including its implementation with its ethical use and impacts on higher education. There is a need for awareness and proper guidance of students, as well as regulation of the use of AI, ensuring data security and mitigation of algorithmic biases in the educational context.

Keywords: artificial intelligence, higher education, AIED, education, knowledge management, tools.

Resumen

La inteligencia artificial (IA) tiene un potencial transformador en la educación, generando beneficios y desafíos. Considerando los numerosos debates debido al rápido avance de la IA, este estudio forma parte de una investigación de maestría con el objetivo de identificar el estado del arte de las investigaciones sobre Inteligencia Artificial en la Educación (IAED), organizando y categorizando información para apoyar a investigadores, docentes y gestores en la toma de decisión a través de la gestión del conocimiento. Se realizó una revisión de alcance con estudios publicados entre 2021 y 2025, dando continuidad a revisiones previas. Los artículos seleccionados de la base *Web of Science*, son indexados *en el Social Sciences Citation Index*, lo que garantiza la calidad de los trabajos analizados. Tras el proceso de selección, se incluyeron 230 artículos a partir de un total de más de 700 trabajos en el área de la educación. La metodología adoptada es cualitativa y exploratoria, utilizando el análisis del contenido y estadísticas descriptivas de algunos datos de los artículos. Los resultados muestran un avance significativo en las investigaciones sobre Inteligencia Artificial en la Educación (IAED), incluyendo su implementación con su uso ético y sus impactos en la educación superior. Es necesaria tanto la concienciación y la orientación adecuada de los estudiantes, así como la regulación del uso de la IA, garantizando así la seguridad de los datos y la mitigación de sesgos algorítmicos en el contexto educativo.

Palabras clave: inteligencia artificial, educación superior, IAED, educación, gestión del conocimiento, herramientas.

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1. Introduction

The digital age has driven intense and accelerated technological advances, often associated with the Fourth Industrial Revolution, also called Industry 4.0. This phenomenon has given rise to the emergence of a new model of social organization, characterized by interconnectivity and intelligent automation, known as the digital society (Dobrinskaya, 2020; Fonseca, 2018; Lasi et al., 2014).

Technological revolutions occur when multiple disruptive innovations emerge simultaneously, causing structural changes in society. These periods of transformation affect various aspects, such as the environment, available resources, interpersonal relationships, health, and culture (Gabriel, 2022). In the current scenario, one of the main drivers of these changes is artificial intelligence (AI).

AI can be defined as the development of advanced systems capable of autonomously processing and analyzing large volumes of data (Vyas, 2019). In addition, it is often described as the ability of machines to simulate the functioning of the human brain, performing intellectual tasks typical of humans, such as decision-making and continuous learning (Vyas, 2019).

The development of AI-related projects began in the period after World War II, driven by the publication of Alan Turing's article "Computing Machinery and Intelligence" (1950). In this seminal work, Turing introduced the famous Turing Test and presented a debate on objections to the idea that machines could think, refuting various criticisms with logical and experimental arguments.

Russell and Norvig (2022) point out that, over time, researchers have adopted different approaches to understanding AI. While some associate it with the ability to mimic human performance, others interpret it more abstractly, linking it to the concept of rationality, i.e., the ability to make correct decisions. In this context, Gabriel (2022) draws an analogy between AI and the human brain, suggesting that the more advanced a system's processing capacity, the more agile and efficient its reasoning will be.

In the development of AI, two main theoretical approaches stand out: symbolism and connectionism (Hoffmann, 1998). The symbolic approach is based on mathematical logic and the abstract formulation of the cognitive processes that lead to intelligent behavior. Connectionism, on the other hand, is based on the physiology of the human brain, assuming that intelligence arises from the organization and functioning of neural networks, reflecting how the biological brain processes information (Gabriel, 2022).

AI systems are often described as autonomous agents, capable of operating independently, learning from new information, identifying patterns, and making decisions based on the evaluation of different contexts (Sousa et al., 2019). These agents use large volumes of data and advanced algorithms to continuously improve their performance, becoming essential tools in various areas of knowledge.

According to Kaugman (2022), AI is present in our daily lives in countless ways. Applications such as Waze help plan routes, while search engines such as Google facilitate access to information. Streaming platforms such as Netflix and Spotify use algorithms to recommend personalized content, and Amazon analyzes user habits to suggest products based on their interactions. In addition, virtual assistants such as Siri and Alexa enable voice commands, making information retrieval more convenient and accessible. In recent decades, education has been profoundly impacted by the incorporation of technology, transforming teaching methodologies and redefining student learning processes (Hughes and Hughes, 2005; Akour and Alenezi, 2022). To increase student engagement and motivation, various digital solutions and educational applications are continually being developed (Karaoğlan Yılmaz, 2022). Furthermore, Pence (2019) highlights that AI will have a significant impact in three main areas: (1) administration in higher education; (2) digital learning management systems (LMSs) and teaching and learning methods; and (3) the conduct and management of academic research.

Dennis (2018) highlights that AI has been applied to optimize various activities in the educational context, from student recruitment and enrollment to tracking academic progress. The technology helps formulate student recruitment strategies, manage enrollment processes, monitor course progress, and implement actions to improve retention and completion rates. In addition, AI plays a key role in strengthening relationships with alumni. Khare et al. (2018) highlight that its application can cover all phases of the academic experience, from the admis-

sion process to graduation and the continuation of the relationship with the institution after graduation.

Advances in AI are driven by techniques such as machine learning (ML), which allows computer programs to learn from experience without the need for explicit programming (Bishop, 2006). These systems analyze data, identify patterns, and make predictions to perform tasks autonomously. Within this field, deep learning (DL) stands out, using neural networks organized in multiple layers to process information in a more sophisticated way. This approach is widely applied in areas such as image recognition, machine translation, and speech synthesis (Russell and Norvig, 2022).

Chatbots, which combine ML and DL techniques to process natural language, have great potential in the educational context. Also known as conversational agents, these systems simulate human interactions, facilitating communication between users and automated platforms. In education, their use enables more personalized and interactive learning experiences for students (Clark and Mayer, 2016).

Natural language processing (NLP) tools, such as ChatGPT, have demonstrated a positive impact on personalized learning and increased user engagement. These platforms can process large volumes of data, adapt to interactions, and offer dynamic support to students, improving their educational experience (Rudolph and Tan., 2019; Rezaev and Tregubova, 2023). Barcaui and Monat (2023) highlight that tools such as chatbots use generative artificial intelligence (GAI) techniques, an emerging branch of AI focused on process creation and optimization. This technology enables machines to perform tasks traditionally associated with human intelligence, expanding its impact to various sectors (Jose et al., 2024).

In the literature, the most analyzed AI tools in learning are those that directly assist students. Intelligent tutoring systems (ITS), for example, offer personalized instruction, while advanced technologies analyze students' emotional and physical states, integrating virtual and augmented reality. Also noteworthy are automatic writing evaluation (AWE) tools, such as Grammarly and Turnitin's Revision Assistant, which provide feedback on text style and structure. Likewise, conversational agents (chatbots) and adaptive pedagogical agents, represented by virtual characters in online environments, are used to offer support and guidance (Cox, 2021).

AI in higher education offers benefits such as personalized learning, challenging academic environments, administrative automation, and enhanced research quality (Ivanov, 2023). However, advances in generative AI, such as ChatGPT, raise questions about academic authorship, requiring institutions to innovate in their assessment practices (Choi et al., 2023). There are also ethical challenges, such as algorithmic bias, privacy risks, and over-surveillance, as algorithms with inadequate data can reproduce discrimination (Ferrer et al., 2021; Mikalef et al., 2022). Mass data collection raises concerns about storage and access, requiring mitigation mechanisms (Ivanov, 2023). The rapid evolution of conversational AI has fueled debate about its role in personalized learning, instructional design, and academic integrity (Jensenb et al., 2024). Despite these advances, there is still a discrepancy between the capabilities of AI and the pedagogical demands of higher education, highlighting the need for further research on the topic (Barreto and Abarca, 2025).

Barreto and Abarca (2025) reported mixed results regarding the impact of ChatGPT on the SECI model, highlighting its effectiveness in certain stages of learning, but also its limitations. In the socialization phase, an increase in student involvement and participation was observed, indicating that AI can contribute to idea generation and collaborative discussions (Barreto and Abarca, 2025). However, Saude et al. (2024) acknowledge the benefits of ChatGPT for academic performance and feedback, but emphasize the importance of pedagogical support to foster the development of critical and ethical skills. While tools such as ChatGPT facilitate educational activities, studies (Damaÿseviÿcius, 2024) point to limitations in contextual understanding and personalization, which reduce their impact at advanced levels of learning. Prolonged use can lead to dependency, affecting critical thinking and creativity (Bonsu et al., 2023; Castro et al., 2024; Lelepary et al., 2024), indicating difficulties in promoting deep thinking and knowledge internalization. Akpan et al. (2025) analyze educational transformation through GAI, without delving into the quality of knowledge acquisition.

AI is part of various tools and techniques designed to capture, encode, and share knowledge, many of which originated in fields other than knowledge management (Dalkir, 2017). KM is based on three fundamental pillars: People, Processes, and Technology.

The People pillar refers to culture, values, and behaviors; the Processes pillar refers to the infrastructure that supports the KM cycle; and the Technology pillar refers to the connection between people and knowledge sharing (Neves et al., 2018).

KM technological tools play an essential role in capturing, organizing, and disseminating knowledge within institutions and can be classified according to their participation in the phases of the knowledge cycle (Dalkir, 2017; Ruggles, 1997). The knowledge cycle comprises: capture/creation, sharing/transmission, and acquisition/application (Dalkir, 2017). They are divided into two categories: one that facilitates the generation, codification, and transfer of knowledge, creating new knowledge (such as data mining), and another that organizes and structures knowledge, making it accessible to other users (Ruggles, 1997).

In education, KM applies tools and techniques to create, organize, and disseminate knowledge, with a focus on knowledge acquisition, which promotes the joint construction of knowledge through interaction between teachers and students (Forno et al., 2023). AI tools enhance this process, promoting socialization and collaborative learning, thus optimizing teaching through personalization and supporting decision-making by analyzing large volumes of data and identifying relevant patterns (Dalkir, 2017).

AI in higher education not only facilitates the storage and retrieval of information, but also promotes the continuous improvement of knowledge, making KM more strategic within institutions. Therefore, this study seeks to identify, organize, and map, through information management, the landscape of AIED research in higher education, highlighting recurring themes, tools used, and the most active centers and journals. This allows administrators, researchers, and teachers to continue relevant studies and make more informed decisions.

Based on the ideas of Wiig (1993), who argues that knowledge drives the ability to act intelligently and that KM makes institutions smarter by facilitating the creation, accumulation, and use of quality knowledge. Organizing knowledge about AIED allows for deeper discussions and helps higher education institutions effectively apply the best available knowledge, addressing important and relevant issues for society.

2. Methodology

This scoping review is part of a master's thesis and is intended to serve as a comparative basis, continuation, and adaptation of the study "*Towards a Tripartite Research Agenda: A Scoping Review of Artificial Intelligence in Education Research,*" published in the book *Artificial Intelligence in Education: Emerging Technologies, Models, and Applications* by Cheng et al. (2022). This qualitative, exploratory, and descriptive approach seeks to identify and categorize relevant research. The review seeks to update the landscape of AIED research, organizing and storing the results in an accessible format to facilitate information retrieval, knowledge sharing, and decision-making support for researchers and university administrators.

According to Wiig (1993), KM seeks to make organizations smarter through the creation and effective application of quality knowledge. From this perspective, the review allows for an analysis of recent advances in this field, in contrast to the scenario presented by Cheng et al. (2022). By structuring and systematizing the information, the study contributes to KM in AI applied to education, supporting more informed and strategic decision-making by researchers and managers.

This scoping review adopts the same methodology as Cheng et al. (2022), with the main difference being the time frame—focusing on the period after 2021—and the exclusive emphasis on higher education, in line with the objectives of this master's research. According to Arksey and O'Malley (2005), a scoping review is a form of literature review that allows for a quick and comprehensive mapping of the main topics and studies on a given subject. It is useful for identifying gaps in the literature and guiding future systematic reviews (Munn et al., 2018). The steps include: defining the research question, selecting and analyzing studies, mapping the data, and synthesizing the results.

The research followed the methodological steps proposed by Arksey and O'Malley (2005). The guiding question defined by Cheng et al. (2022) was: "What are the key topics of research in AIED over the last two decades?" To identify relevant studies, the search was conducted in the *Web of Science database*, considering only articles indexed in the *Social Science Citation Index (SSCI)*, which guarantees high-quality research. The selection criteria included only peer-re-

viewed articles published in English between July 2021 and 2025. The survey was conducted in January 2025. The search strings were formulated based on the reference study, as shown in Table 1.

Table 1. *Terms and combinations used in the research*

Topic	Search terms
Artificial intelligence	artificial intelligence" OR "machine intelligence" OR "intelligent support" OR "intelligent virtual reality" OR "chatbot*" OR "machine learning" OR "automated tutor" OR "personal tutor*" OR "intelligent agent*" OR "expert system" OR "neural network" OR "natural language processing
Education	higher education" OR college* OR undergrad* OR graduate OR postgrad* OR "K-12" OR kindergarten* OR "corporate training*" OR "professional training*" OR "primary school*" OR "middle school*" OR "high school*" OR "elementary school*" OR "vocational education" OR "adult education

Note. Cheng et al., 2022, p. 7.

For the search, the same strings presented in Table 1 were used on the Web of Science platform, except for terms related to education that did not fit the context of higher education. Additionally, to facilitate the selection of articles, the text strings had to be present in the title, abstract, plus keywords, and author keywords fields. The search yielded 738 articles. For the selection, an initial screening (filter) was performed based on titles and abstracts, considering the relevance to the topic of AI in Education and the presence of debates on the subject. Articles focused exclusively on the technical development of AI were excluded from the analysis. After this stage, 230 articles were selected for further analysis and inclusion in the results. Data mapping was performed in Microsoft Excel, which was used to organize and analyze the information collected. Following the approach of Cheng et al. (2022), the data were categorized into general information about the articles, the AI technologies used, and the ways in which AI tools were applied. For the collection, summary, and presentation of the results, descriptive statistics were used to synthesize the data in a clear and objective manner.

3. Results and discussions

3.1 Journals and distribution of publications

Of the 227 articles reviewed on AIED, 72 different journals were identified as publication outlets, as shown in Table 2. The interdisciplinary open-access journal "Sustainability" stood out as the most frequent, with 29 publications. These data indicate significant growth in scientific production on AIED, as well as an increase in the diversity of journals addressing the topic, compared to the 20 journals identified in the study by Cheng et al. (2022).

This increase suggests a growing academic interest in the intersection between AI and Higher Education, reflecting the expansion of research and scientific dissemination in the field. The growth may be explained by the significant technological advances AI has undergone in recent years, as well as by the increasing incorporation of technology into education over the past decades, which has substantially reshaped teaching methodologies and redefined students' learning processes (Hughes & Hughes, 2005; Akour & Alenezi, 2022).

Table 2. *Distribution of journals*

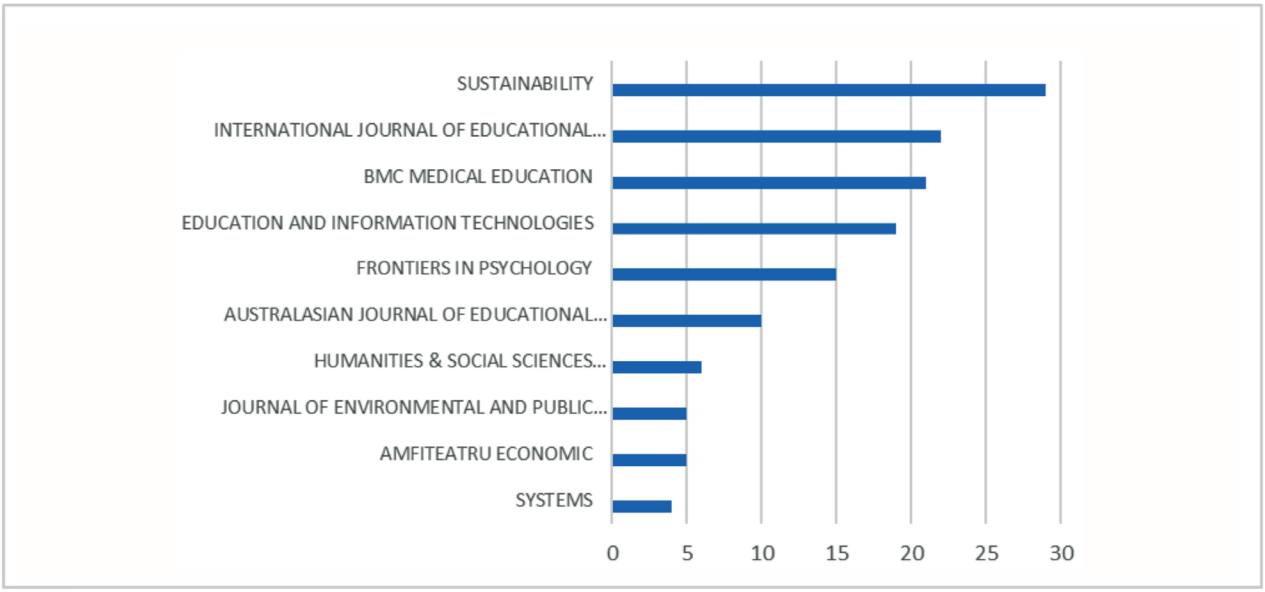
N.O	N0	Revistas	N0
Frontiers in Psychology	29	English for Specific Purposes (ESP)	1
Australasian Journal of Educational Technology	22	Ethics and Information Technology	1
Humanities & Social Sciences Communications	21	ETR&D-Educational Technology Research and Development	1
Amfiteatru Economic	19	Frontiers In Public Health	1
Journal of Environmental and Public Health	15	Health Education Journal	1
Behavioral Sciences	10	Healthcare	1

N.O	N0	Revistas	N0
BMC Psychology	6	Higher Education	1
British Journal of Educational Technology	5	IEEE Access	1
Innovations in Education and Teaching International	5	Information Technology and Libraries	1
Studies in Higher Education	4	Interactive Learning Environments	1
Systems	4	International Journal of Computer-Supported Collaborative Learning	1
Assessment & Evaluation in Higher Education	4	International Journal of Entrepreneurial Behavior and Research	1
Higher Education Research & Development	4	International Journal of Human-Computer Interaction	1
Journal of Computing in Higher Education	4	International Journal of Management Education	1
Sage Open	4	Internet and Higher Education	1
Digital Health	3	Jama Network Open	1
European Journal of Education	3	Journal of Computer Assisted Learning	1
International Journal of Environmental Research and Public Health	3	Journal of Healthcare Engineering	1
International Journal of Stem Education	3	Journal of Innovation and Knowledge	1
Journal of Science Education and Technology	2	Journal of Psycholinguistic Research	1
Wireless Communications and Mobile Computing	2	Journal of the American Medical Informatics Association	1
Acta Psychologica	2	Learning and Instruction	1
Applied Sciences-Basel	2	LIBRI: International Journal of Libraries and Information Studies	1
Behavior & Information Technology	2	Mobile Information Systems	1
BMC Nursing	2	Physical Review Physics Education Research	1
Cognitive Research-Principles and Implications	1	Information Professional	1
Computer Systems Science and Engineering	1	Reading Research Quarterly	1
Computers and Education	1	Recall	1
Computers in Human Behavior	1	Research In Social and Administrative Pharmacy	1
Convergence—The International Journal of Research into New Media Technologies	1	RIED-Ibero-American Journal of Distance Education	1
Distance Education	1	Science and Education	1
Economic Computation and Economic Cybernetics Studies and Research	1	Scientific Programming	1
Computers In Human Behavior	1	System	1
Convergence-The International Journal of Research into New Media Technologies	1	Teachers College Record	1
Distance Education	1	Teaching Of Psychology	1
Economic Computation and Economic Cybernetics Studies and Research	1	ZDM-Mathematics Education	1

Note. The authors.

Continuing with the analysis of the journals presented above, Figure 1 highlights the ten journals that have published the most studies on AIED. Sustainability tops the list with 29 publications, followed by the International Journal of Educational Technology in Higher Education (22) and BMC Medical Education (21). These data indicate a growing dissemination of research on AIED in journals from various fields, such as educational technology, psychology, and social sciences, demonstrating the interdisciplinary nature of the topic.

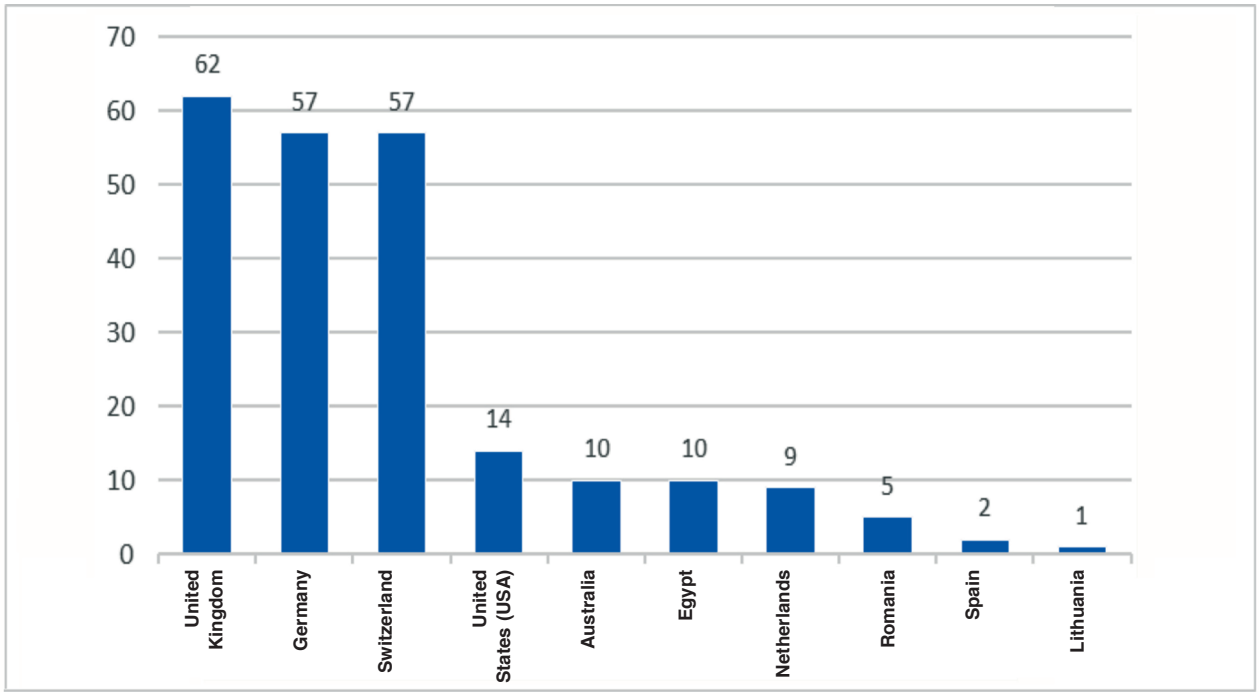
Figure 1. *Top 10 journals*



Note. The authors.

In addition to the analysis of journals, Figure 2 shows the geographical distribution of publications, indicating the countries of origin of the journals that published most of the research on AIED. Germany, the United Kingdom, and Switzerland stand out, together accounting for more than 50% of indexed publications. These data suggest that these countries play a central role in the production and dissemination of knowledge on AI applied to higher education.

Figure 2. *Countries with the most publications per journal*

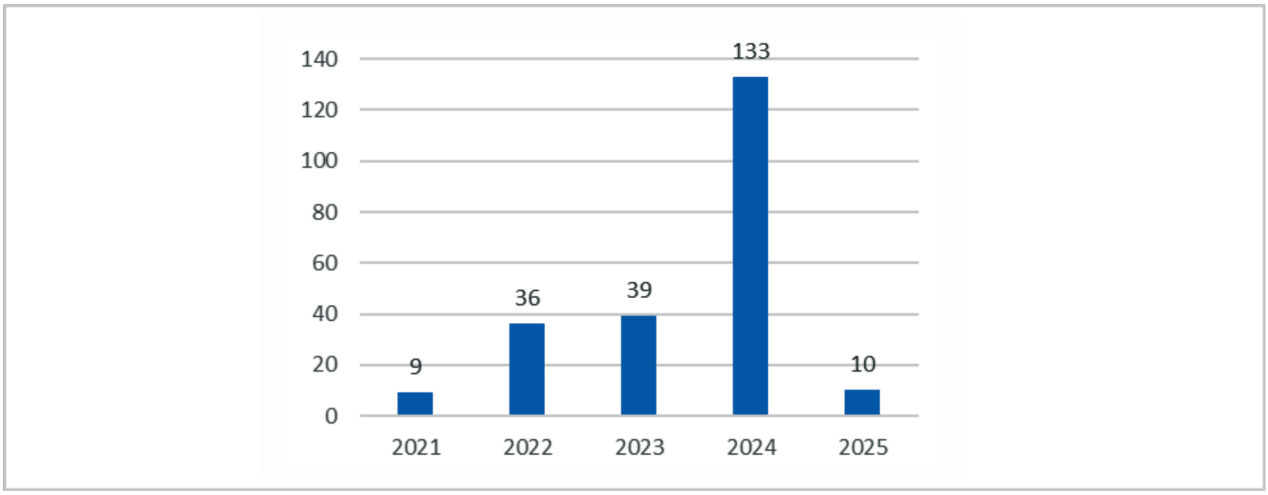


Note. The authors.

In terms of the temporal evolution of publications, the analysis covers articles published between July 2021 and January 2025. However, only 2022, 2023, and 2024 were considered complete for comparison purposes. Figure 3 reveals that the year 2024 stands out significantly, accounting for more than half of the publications analyzed (133 articles).

This significant growth may indicate increasing academic interest in the topic, driven by recent technological advances in society and by the expanding application of AI in higher education (Gabriel, 2022; Pense, 2019; Hughes & Hughes, 2005; Akour & Alenezi, 2022).

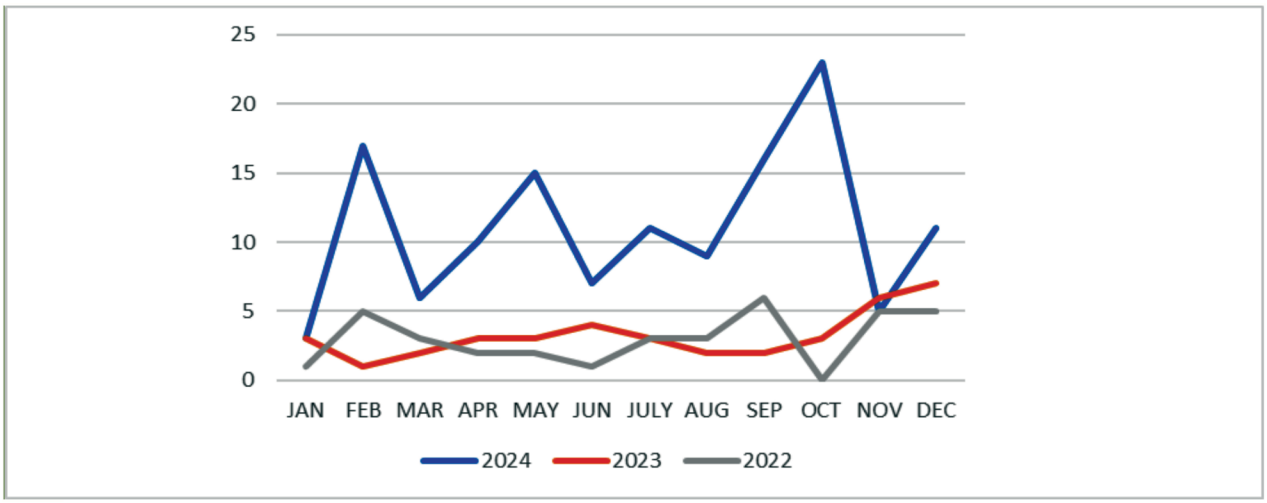
Figure 3. *Publications by year*



Note. The authors.

The year 2025 also shows potential for a high volume of publications, given that, although the analysis was conducted in January, ten articles have already been identified. This figure exceeds the total number of publications recorded in 2021, suggesting continued growth in AIED research. Considering the years analyzed in their entirety, Figure 4 presents the distribution of publications by month. Note that 2024 stands out significantly, with a high volume of publications, especially in October, which recorded 23 articles, the highest monthly figure in the series analyzed.

Graph 4. *Proportion of publications over the years*



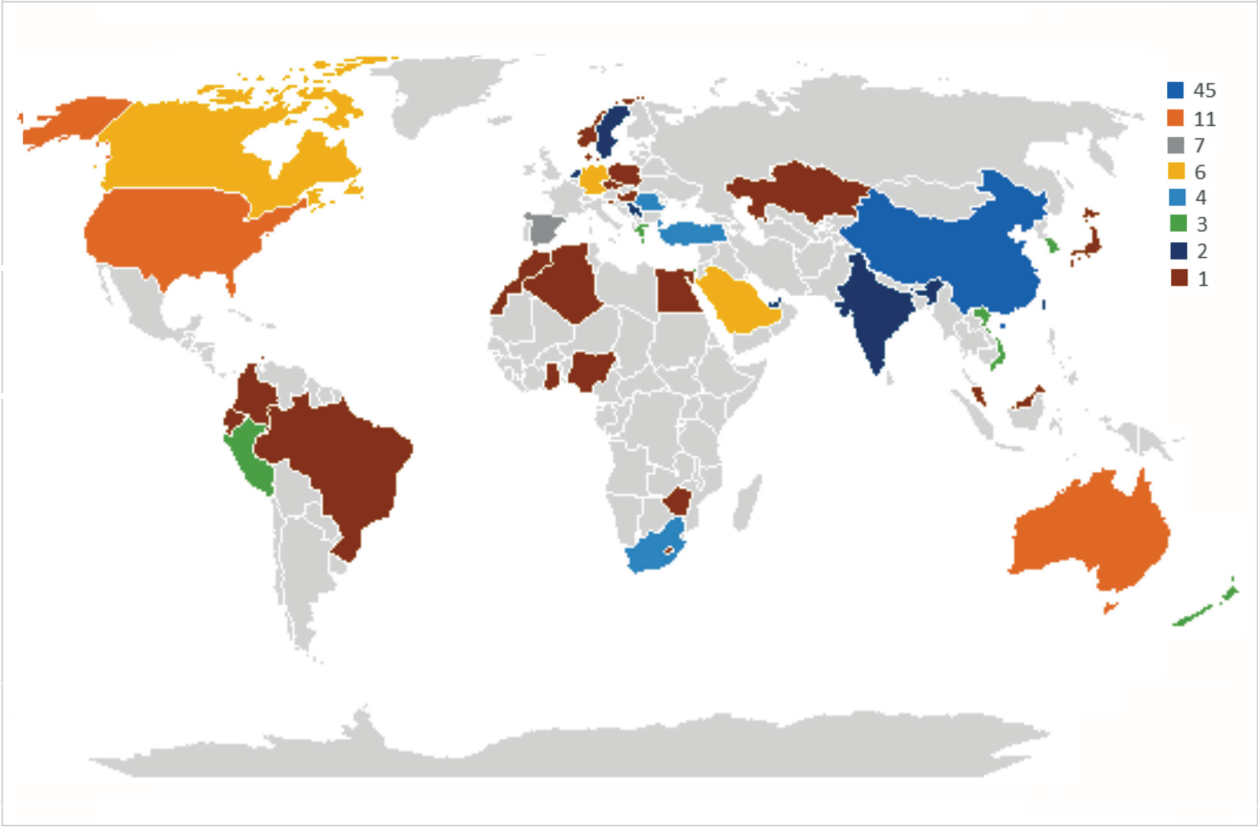
Note. The authors.

Looking at Figure 4, it is not possible to identify a clear trend in periods of higher or lower publication volume, as the variation appears to occur randomly between years. This behavior could be related to factors such as deadlines for submitting articles to journals, academic events, and research funding cycles in the field.

3.2 Distribution by study

The geographical distribution considered the location of each study when the affiliation of the authors was unclear. Figure 5 shows that China leads as the main research center in this area. However, when compared to Figure 2, it is evident that, despite the volume of studies, most Chinese publications appear in international journals, not national ones.

Figure 5. *Geographic distribution of studies*



Note. The authors.

Figure 6, compared with Table 3, clearly shows that although China is a country with solid research in the field of AIED, research conducted in more than one geographical region leads the ranking, with 66 publications within the research period.

Figure 6. *Percentage of studies*

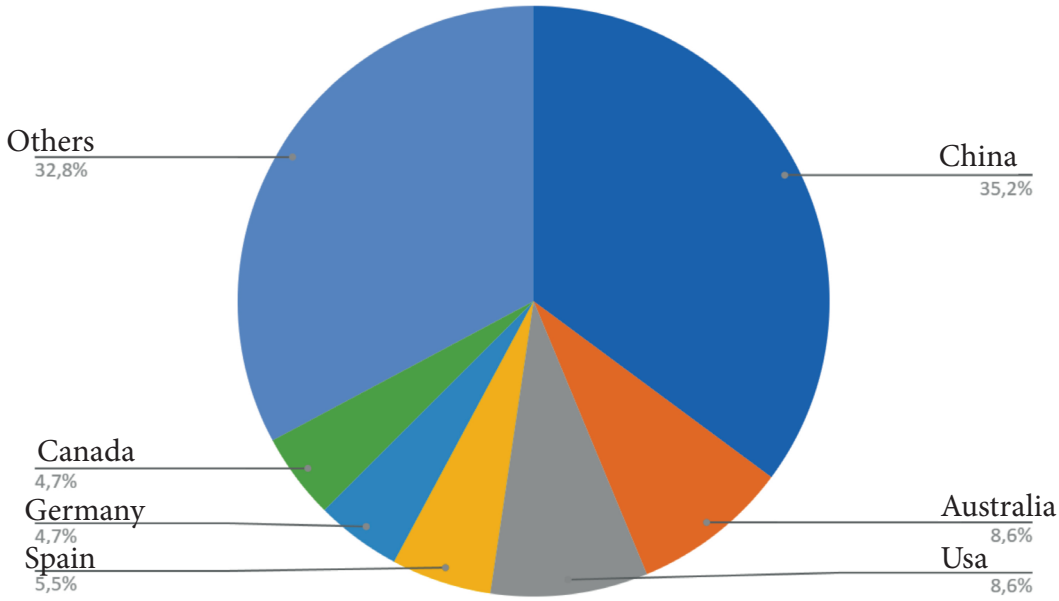


Table 3 also shows an expansion in the number of countries researching AIED, in line with the results of increased interest in the topic.

Table 3. *List of studies by region*

Country	n°	Country	n.°
Multicenter	66	Taiwan	2
China	45	Algeria	1
Australia	11	Brazil	1
USA	11	Kazakhstan	1
Spain	7	Colombia	1
Germany	6	Denmark	1
Saudi Arabia	6	Egypt	1
Canada	6	Ecuador	1
South Africa	4	Slovenia	1
Romania	4	Fiji	1
Turkey	4	Ghana	1
South Korea	3	Hungary	1
Greece	3	Japan	1
Hong Kong	3	Lesotho	1
Israel	3	Malaysia	1
New Zealand	3	Morocco	1
Peru	3	Nigeria	1
Vietnam	3	Norway	1
United Arab Emirates	2	Netherlands	1
Netherlands	2	Palestine	1

Country	n°	Country	n.°
India	2	Poland	1
Serbia	2	Czech Republic	1
Singapore	2	Zimbabwe	1
Sweden	2		

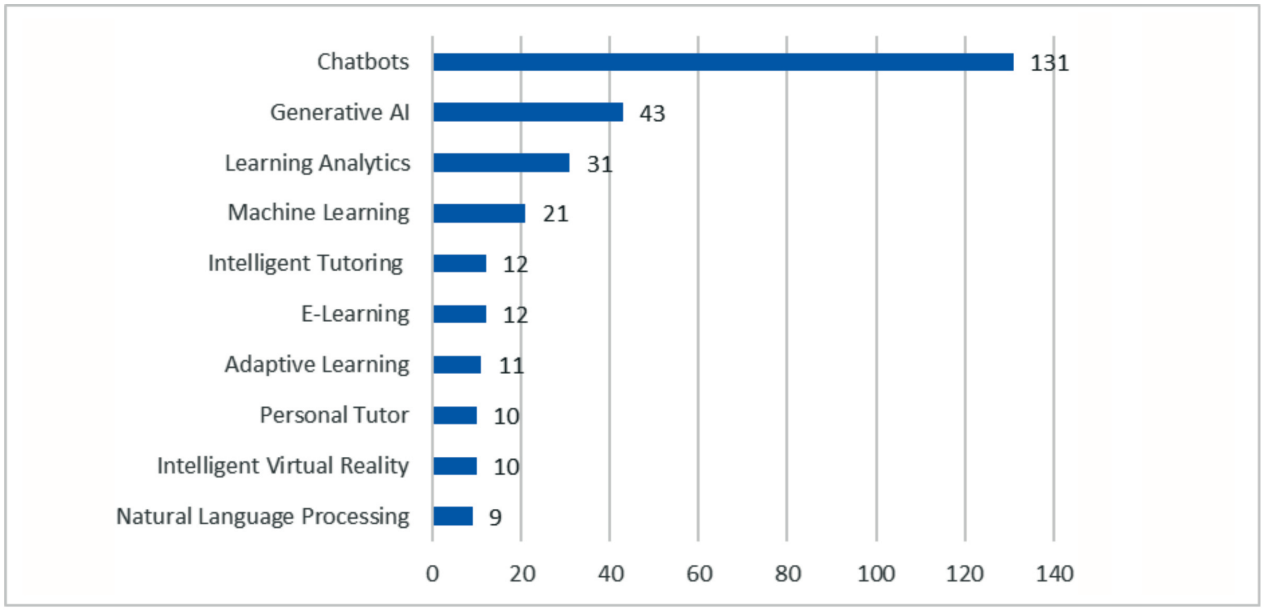
Note. The authors.

Table 3 summarizes 47 countries that have conducted at least one study on the subject, slightly higher than the 35 presented by Cheng et al. (2022). China significantly increased its output due to its extensive participation in multicenter studies conducted across various countries or regions. Australia published one study less than in the previous study; however, considering the period analyzed, its publications are relatively higher. Germany, Saudi Arabia, Sweden, and Vietnam also expanded their research activity, demonstrating growing interest and geographic diversification in scientific production related to the topic.

3.3 Analysis of tools

As a final result, the most cited tools in the articles studied were analyzed. Figure 7 clearly shows that chatbot tools occupy a prominent place in AIED research, being cited in 57.7% (131 articles out of 227) of the articles reviewed. Of the 131 articles describing chatbots, 60 referred to Chat GPT. These results explain the increase in studies since Chat GPT was made public in 2022.

Figure 7. *Tools used*



Note. The authors.

After analyzing the tools and their context, it was observed that most of their applications focus on content generation, learning analysis, and personalized or classification tutoring. In addition, Figure 7 clearly shows that generative AI, e-learning, and tutoring tools are also relevant to this topic. Since 2023, academic interest in AI has grown significantly, leading to an increased number of publications on generative AI.

AI has various applications in education, notably in mental health (with ML-based tools for identification and treatment), medicine and nursing (with intelligent tutoring and diagnosis), and language teaching. These results corroborate those of Cheng

et al. (2022). However, many articles do not specify specific areas, focusing on ethics and other aspects of AI in education. There is also confusion in the definitions of chatbots, ChatGPT, generative AI, NLP processing, and machine learning.

4. Discussions

4.1 Journals and distribution of publications

The significant growth in scientific production on AIED and the expansion of the diversity of journals addressing the topic suggest greater academic interest in the intersection between AI and higher education, reflecting the expansion of research and scientific dissemination in this field. This increase is explained by the significant technological advances that AI has undergone in recent years and by the fact that, in recent decades, the incorporation of technology has significantly impacted education, reformulating teaching methodologies and redefining student learning processes (Hughes and Hughes, 2005; Akour and Alenezi, 2022). The results presented in Graph 03 reveal the high density of publications for the year 2024. This significant growth may indicate an increase in academic interest in the subject, driven by recent technological advances in society and the expansion of AI applications in higher education (Gabriel, 2022; Pense, 2019; Hughes and Hughes, 2005; Akour and Alenezi, 2022).

4.2 Distribution by study

The results in Table 3 and Figure 6 highlight the growing importance of AIED and the need for continued research and development in this field. Given technological advances, it is essential to make multiple efforts to ensure the quality of education. The rapid evolution of conversational AI has sparked debate about its influence on personalized learning, instructional design, and academic integrity, highlighting the mismatch between its capabilities and the demands of higher education, which reinforces the need for further study on the topic (Jensenb et al., 2024; Barreto and Abarca, 2025).

4.3 Analysis of tools

Figure 7 demonstrates the significant focus on chatbots, particularly ChatGPT. These results reflect concerns about the positive or negative impacts of these tools on education, especially learning. In addition to influencing the educational process, chatbots such as ChatGPT raise questions about academic authorship, requiring new forms of assessment and presenting ethical challenges such as algorithmic bias, data privacy, and surveillance (Ferrer et al., 2021; Mikalef et al., 2022; Choi et al., 2023; Ivanov, 2023). Ethical and pedagogical issues are evident in most of the studies analyzed.

Studies such as those by Barreto and Abarca (2025) indicate that the impact of ChatGPT on the SECI model varies, being effective in early stages of learning, such as socialization, by promoting participation and collaborative discussions. However, Saúde et al. (2024) emphasize the need for pedagogical support for the development of critical and ethical skills, in addition to recognizing the positive impact of the feedback provided by the tool. Research such as that by Damaÿseviÿcius (2024) points to limitations in personalization and contextual understanding, which reduces its impact in advanced stages of learning. Furthermore, over-reliance on ChatGPT can compromise students' critical thinking and creativity (Bonsu et al., 2023; Castro et al., 2024; Lelepary et al., 2023). These criteria are so relevant that they are considered parameters that influence whether or not these students intend to use the tool (Pereira-González et al., 2025). Technologies such as ChatGPT, Google Gemini, and Microsoft Copilot exemplify this area, using deep learning to generate synthetic content such as text, graphics, videos, and audio from training data (Humble et al., 2024).

Chatbots and adaptive pedagogical agents also stand out in this scenario, being widely used to offer support and guidance to students in online environments. Represented by virtual characters, these agents can personalize interactions with students, thus contributing to the learning process (Cox, 2021). These results reinforce the growing integration of AI in education and the challenges related to its impact on the personalization of teaching, the quality of learning, and the adaptation of institutions to this new reality. After identifying the confusion in the definitions surrounding chatbots (Chat GPT, Generative AI,

PLN, and machine learning), the relationship between chatbots (such as ChatGPT), machine learning, deep learning, IAG, and PLN can be understood from the hierarchy and interconnection of these technologies.

AI is the broad field of computer science that develops systems capable of simulating human capabilities, such as learning, reasoning, and decision-making (Vyas, 2019). ML is a subset of AI that allows algorithms to learn data patterns and make decisions without the need for explicit programming (Bishop, 2006). Deep learning is an approach within machine learning that uses deep neural networks to process information in a more complex and sophisticated way, and is used in image recognition, machine translation, and speech synthesis (Russell and Norvig, 2022).

GAI is an emerging branch of AM focused on creating new content, such as text, images, videos, and audio, using advanced models such as deep neural networks to generate synthetic artifacts (Jose et al., 2024). NLP is a field within AI that enables machines to understand, interpret, and generate human language (Rudolph et al., 2019; Rezaev and Tregubova, 2023). Therefore, chatbots, such as ChatGPT, are NLP applications that use AM, AP, and GenAI techniques to interact with users in a conversational manner. These tools analyze and generate natural language to provide coherent and context-appropriate responses and are widely used in personalized learning and educational support.

5. Conclusion

This study contributed to organizing and mapping the state of research on AIED in higher education, offering a structured overview of the most discussed topics, the most widely used tools, research centers, and the most relevant journals in the field. In this way, it identified trends and challenges, providing support to institutions, administrators, researchers, and faculty to deepen their studies and make more informed decisions.

The analysis showed that AI has been widely explored as a complementary resource for pedagogical practices, but still faces conceptual and practical challenges to its full integration as a pedagogical tool. The need for greater clarity in the distinction between technologies and approaches is highlighted, as terms such as ChatGPT, chatbots, IAG, PLN, and AM have been used interchangeably. Additionally, there is concern about its impact on the quality of learning, especially in the development of skills such as critical thinking and decision-making.

The research has limitations, such as its restriction to higher education, which prevents information from being obtained on other educational levels. The rapid evolution of the field may also affect the updating of the study, requiring continuous monitoring. The choice of keywords may have influenced the scope of the analysis. Future research should cover basic and vocational education, explore the personalization of teaching, reduce inequalities, and address challenges such as privacy and algorithmic bias. In addition, research on hybrid models that integrate AI and traditional approaches can contribute to a more efficient and responsible use of technology in education.

Authors' contributions

Ariane Simarco Scarci: data curation, formal analysis, research, methodology, visualization, writing – original draft.

Marcelo Henrique Fonseca: data curation, methodology, resources, visualization, writing – original draft, software.

Dr. Thaise Moser Teixeira: conceptualization, supervision, validation, writing – review and editing

Dr. Letícia Fleig Dal Forno: project management, writing – review and editing

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Satisfaction in a Spanish international and interdisciplinary doctoral studies: the impact of motivation, critical thinking, and academic engagement

La satisfacción en un doctorado español internacional e interdisciplinar: el impacto de la motivación, el pensamiento crítico y el engagement académico

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Abstract

This paper explores the factors that affect the satisfaction of doctoral students, making a special emphasis and focus on subjective variables such as motivation, critical thinking and academic engagement, aspects that have been scarcely addressed in previous literature. In the context of the growing significance of doctoral studies for academic and institutional development, this study aims to identify the motivations underlying the pursuit and choice of a doctoral program and the different types of critical thinking that students possess. Additionally, it seeks to explore how these factors interact with each other and how they impact the academic experience of doctoral students in a differentiated way. The research was conducted at a public Spanish university using a mixed-method approach that included semi-structured interviews and surveys administered to doctoral students. The findings reveal that learning motivation and academic engagement are crucial determinants of students' satisfaction with their doctoral studies. Furthermore, and while most critical thinking dimensions do not have a direct impact on the doctoral student's satisfaction, perceived utility does exert a notable effect on satisfaction. Results provide valuable practical implications for doctoral program managers, who may implement strategies to enhance students' experience, thereby contributing to the improvement of doctoral training.

Keywords: doctoral studies, student satisfaction, motivation, academic engagement, critical thinking, interdisciplinary.

Resumen

El presente trabajo explora los factores que inciden en la satisfacción de estudiantes de doctorado, con especial atención a variables subjetivas como la motivación, el pensamiento crítico y el *engagement* académico, aspectos escasamente abordados en la literatura previa. En un contexto de creciente importancia de los estudios de doctorado para el desarrollo académico e institucional, este estudio tiene como objetivo identificar las motivaciones que subyacen en la realización y elección de un doctorado y en los distintos tipos de pensamiento crítico que poseen los estudiantes. Asimismo, se busca explorar cómo estos factores interactúan entre sí y cómo impactan de manera diferenciada en la experiencia académica de los doctorandos. La investigación se llevó a cabo en una universidad pública española, utilizando un enfoque metodológico mixto que incluyó entrevistas semiestructuradas y encuestas aplicadas a estudiantes de programas de doctorado. Los hallazgos revelan que la motivación de aprendizaje y el *engagement* académico son determinantes cruciales para la satisfacción del estudiantado con el doctorado. Los análisis muestran que, si bien la mayoría de las dimensiones del pensamiento crítico no tienen un impacto directo en la satisfacción, sí lo tiene la dimensión de utilidad percibida. Estos resultados ofrecen implicaciones prácticas para la gestión de los programas de doctorado, ya que permiten diseñar estrategias orientadas a mejorar la experiencia del estudiantado y, con ello, fortalecer la calidad de la formación doctoral.

Palabras clave: doctorado, satisfacción de estudiantes, motivación, *engagement* académico, pensamiento crítico, interdisciplinar.

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1. Introduction

Doctoral studies are a career path for many students who decide to continue their university education or become more involved in an academic career. However, the process of completing a doctorate is often accompanied by various challenges, both personal and academic, which can significantly influence their progress and completion. One of the fundamental elements is the degree of satisfaction with their academic experience, as this factor not only reflects their assessment of the quality of the program, but also influences their commitment, motivation, and overall well-being. Recent literature has shown that such satisfaction cannot be separated from structural factors such as institutional support, the quality of supervision, the organization of the curriculum, and mental health and academic belonging (De la Vega, 2024). Added to this is the need for strategic planning consistent with the academic and professional demands of those pursuing these studies, as Fabara (2012) emphasizes in his analysis of postgraduate education. Understanding which elements influence doctoral satisfaction is therefore essential not only to guide improvements in programs but also to reinforce their role as strategic training elements within contemporary university systems.

1.1 Academic satisfaction

Academic satisfaction can be defined as students' evaluation of their educational experiences and their environment (Astin, 1993) and involves an affective response to the educational institution (Yeh and Li, 2009). This assessment integrates cognitive, affective, and contextual components and is mediated by factors such as the perception of quality, the fit between expectations and experience, and the emotional well-being of the student throughout the educational process (Nogueira et al., 2019; Cheng et al., 2016). In the field of higher education, and specifically in doctoral studies, academic satisfaction is a key indicator of educational quality, not only because it reflects students' evaluation of their programs, but also because it is related to their commitment, performance, and psychological well-being during the doctoral process (Cheng et al., 2016; Nogueira et al., 2019). As De la Vega (2024) has pointed out, this variable lies at the intersection between institutional conditions and individual trajectories, acting as a critical measure of educational effectiveness at advanced levels. Likewise, understanding the factors that affect student satisfaction has important implications for universities, as they serve as a basis for implementing improvement measures, increasing the university's effectiveness and competitive advantage. In addition, this understanding allows for progress toward more sustainable and inclusive learning environments that are sensitive to student diversity and their commitment to knowledge (Barrientos de Bojórquez, 2024). In this vein, some studies have analyzed how graduates' assessments contribute to reviewing the educational relevance of graduate programs (Perales-Mejía, 2020).

The literature has shown that satisfaction with a doctoral program is influenced by multiple factors, some related to the context in which it is developed. Thus, it has been observed that satisfaction can vary throughout the stages of the doctorate, decreasing as the program progresses (Cheng et al., 2016), although there do not appear to be significant differences between the satisfaction shown in different academic disciplines (Barnes and Randall, 2012). Other studies point to the type of supervision (Zhao et al., 2007), the training received and the flexibility of the program (Bolliger and Halupa, 2012), interaction with other peers, and even the support that students receive from the academic institution as key aspects that influence satisfaction (Dericks et al., 2019). These structural dimensions are linked to more subjective aspects that also affect the academic experience.

In addition to contextual factors, there are student-related elements that have a crucial impact on satisfaction with the doctoral program but have been studied to a lesser extent. These include motivation, critical thinking, and academic *engagement*, which, although intrinsic to the student, can have a direct impact on academic satisfaction. Despite their relevance, there is little literature exploring how these factors jointly influence satisfaction with doctoral programs, specifically in the Spanish university setting.

1.2 Academic motivation

The first aspect, motivation, has been defined as any factor that drives and affects human behavior in relation to the achievement of clear objectives (Renata et al., 2018). Among the theories used to

analyze the motivations or benefits sought by individuals in their behavior are the Uses and Gratifications Theory (Katz et al., 1973)—which posits that individuals choose and decide the media and messages they receive in order to satisfy their own needs and goals— Maslow's Hierarchy of Needs (1954)—which uses a hierarchy of needs that motivate people, from the most basic, such as physiological needs, to the highest, such as social, esteem, or self-actualization needs—and McClelland's Motivation Theory (1961)—which identifies the main needs that drive human behavior: achievement, power, and affiliation. All three theories suggest that human motives are primarily oriented toward gratification and satisfaction of the individual. Since Katz et al. (1973) uses and gratifications theory, cognitive, affective, and personal integration motivations have been studied and applied to the study of media use (Ruggiero, 2000). From the perspective of Maslow's needs, doctoral studies would appeal to self-actualization needs. Finally, following McClelland's (1961) theory of motivation, there are motivations for achievement, power, and affiliation.

In the academic context, motivation (MA) can be divided into two main types: intrinsic motivation refers to the desire to learn for the pleasure of knowledge itself, while extrinsic motivation is linked to external rewards such as better job opportunities or social recognition (Deci and Ryan, 2000). Both forms of motivation play a crucial role in doctoral students' satisfaction, as they influence their commitment to the program and how they perceive their academic experience (Mueller et al., 2015). In any case, a motivated student is expected to be engaged in the program and have greater autonomy to manage and make decisions about their academic progress (Mason, 2012). This relationship between motivation, self-regulation, and performance has also been highlighted in recent studies, which analyze how variables such as self-efficacy and procrastination directly influence the academic experience of students (Zumárraga-Espinosa and Cevallos-Pozo, 2022).

In operational terms, four types of motivation have been identified that reflect different aspects of the decision-making process for pursuing a doctorate, which align with the dimensions of the Academic Motivation Scale (AMS) (Vallerand et al., 1992). On the one hand, there is learning-related motivation, which reflects an intrinsic desire to learn and acquire new skills. Those who study for the pleasure of knowledge and a genuine interest in learning show a strong commitment to their studies and tend to experience greater academic satisfaction. Secondly, motivation for professional improvement (extrinsic) can be distinguished. In this case, extrinsically motivated individuals would see the doctorate as a means to achieve employment benefits or better professional opportunities, which may be motivated by the desire for recognition, financial rewards, or better positions in the job market (Berrio-Calle et al., 2022; Smith et al., 2016). Thirdly, motivation for self-improvement and self-actualization has been differentiated. Those who pursue a doctorate as a form of self-improvement and to fulfill self-actualization goals of achieving meaningful goals in their personal and professional lives. Finally, there is the absence of motivation or doubts, "amotivation" or demotivation, a state in which students find no value or purpose in academic activity. According to theAMS, demotivation is related to a lack of interest or the perception that academic activities will not lead to the desired results (Vallerand et al., 1992). However, few studies have explored how the type of motivation impacts satisfaction with a doctoral program in Spanish universities. Recent studies have pointed out that motivation acts as a mediating factor between the demands of the academic environment and the perception of satisfaction, especially when students interpret their efforts as valuable and aligned with their personal and professional goals (De Clercq et al., 2021). This perspective reinforces the need to consider not only the predominant type of motivation, but also its consistency with institutional conditions and the individual trajectories of doctoral students.

1.3 Critical thinking

The second factor analyzed is critical thinking (CT), defined as "the art of analyzing and evaluating thinking with a view to improving it" (Richard and Elder, 2011), which is essential in doctoral programs. Previous studies have highlighted that those who perceive an improvement in their critical thinking skills during their doctoral studies experience higher levels of satisfaction, as they feel they are acquiring valuable tools for their professional future (Stubb et al., 2011). Critical thinking, in addition to being a key cognitive skill in academic research, is also linked to a sense of

autonomy and control over the learning process. In this sense, critical thinking is not limited to an instrumental skill, but rather constitutes a component of academic identity that allows students to actively position themselves in relation to knowledge. As highlighted in the literature, the development of critical thinking skills allows students to question, analyze, and critically reflect on the complex problems they face in their doctoral research, fostering greater confidence in their own abilities (Pinto and Olson, 2008).

In this regard, doctoral programs not only foster technical skills, but also promote attitudes such as curiosity, open-mindedness, and constructive skepticism in students, which is essential for doctoral students to develop the ability to reflect independently and improve their performance. In studies with university students, the dimensions of argumentation, analysis/evaluation, and problem solving have been identified (Vendrell-Morancho et al., 2024). Kobylarek et al. (2022) developed a critical thinking questionnaire with different dimensions, although not for university students, and found dimensions of recall, understanding, application, analysis, evaluation, and creation. For their part, Zipp and Olson (2008) demonstrated how effective mentoring in doctoral studies favored different skills related to critical thinking, such as the development, understanding, analysis, synthesis, and evaluation of information. These contributions allow us to consider critical thinking as a cross-cutting competence that not only favors the quality of research but also the construction of a more satisfying, meaningful, and sustained doctoral experience.

1.4 Academic engagement

Academic engagement (AE) has been defined as the dedication of students to incorporating, understanding, and mastering the knowledge imparted by professors (Lawson and Lawson, 2013). It has also been linked to performance in the learning process and academic success (Korobova and Starobin, 2015). The effects of AE extend to the institution itself, as it generates greater commitment from those most involved in the educational process—particularly students and teaching staff—contributing to its recognition and quality (Grocia, 2018). Studies that have analyzed *engagement* in doctoral studies have pointed out that it is related to the student's own motivation and determination (Cavazos and Encinas, 2016), and may therefore vary depending on the stages or courses of the doctoral program and the type of commitment of the student, for example, when it is combined with another professional activity. Other studies have shown that *engagement* not only improves academic performance but also emotional well-being, an aspect that significantly affects student satisfaction (Stubb et al., 2011). In this sense, the interaction between motivation, the ability to manage learning, and academic satisfaction cannot be analyzed in isolation: the characteristics of the program and supervision directly condition the extent to which motivated students manage to maintain their commitment and well-being throughout the process (De la Vega, 2024). Furthermore, when this commitment is sustained and properly channeled, academic *engagement* becomes a driving force for educational innovation, fostering collaborative networks, a sense of belonging, and active transformation of the learning environment (Barrientos de Bojórquez, 2024).

1.5 Objectives and research question

The objective of this exploratory work is twofold: first, to investigate the types of motivations and critical thinking of doctoral students and, second, to identify the factors that influence the satisfaction of university students other than those specific to the student profile. Although most research on academic satisfaction has focused on variables such as academic performance, institutional support, or student demographics, there is a lack of studies analyzing how more subjective factors, such as motivation, critical thinking, or academic *engagement*, which can also influence satisfaction and whose complexities have yet to be investigated, as indicated by Vendrell-Morancho et al. (2024) in the case of critical thinking.

In this paper, we analyze the role played by these factors, which have been less addressed in the literature, in their impact on doctoral student satisfaction. The central question guiding this work is: how *do* motivation, critical thinking, and *academic engagement influence satisfaction with doctoral studies?*

2. Methodology

The methodology used is a sequential mixed method that combines both qualitative and quantita-

tive approaches (Hamui-Sutton, 2013). First, a qualitative analysis using semi-structured interviews was used to identify the key factors that influence doctoral students' academic satisfaction. These interviews also served to validate the questionnaire used later in the quantitative analysis. Subsequently, a statistical analysis of the data obtained through surveys was carried out, which allowed us to identify significant relationships between the proposed variables and student satisfaction.

This sequential mixed-method methodology was chosen because it combines both qualitative and quantitative approaches to capture not only the richness and depth of individual opinions, but also to statistically verify the patterns observed in the broader sample (Hamui-Sutton, 2013). Thus, the methodology used in this study combined qualitative methods, with semi-structured interviews, and quantitative methods, through a survey of doctoral students at a Spanish public university that offers personalized treatment, scholarships for students to present papers at conferences, thesis progress in doctoral workshops with feedback, facilities for research stays, the possibility of presenting the thesis in different languages, and obtaining international recognition. Although the program does not have an explicit international orientation, it does allow doctoral theses to be written in English, which facilitates the participation of international students and, in part, promotes its international profile. Founded in the 1990s, the institution has experienced remarkable growth in its academic offerings, infrastructure, and recognition both nationally and internationally. In this context, doctoral programs represent a fundamental pillar for the university, as they promote advanced research, innovation, and the training of highly qualified researchers. There are currently eight active doctoral programs in different areas, in addition to seven inter-university programs. Most of them are characterized by their diversity and interdisciplinary and international approach, covering areas of knowledge ranging from experimental and technical sciences and education to the humanities and social sciences.

2.1 Participants

In the first phase of the study, qualitative information was collected through semi-structured interviews with 11 doctoral students and 13 professors in the legal, social, and economic fields, seeking a balanced representation among them. In the case of the students, four doctoral students from the economic field, three from the legal field, and four from the social field were included, among whom was one foreign student. The professors were distributed as follows: five from the economic field, four from the legal field, and four from the social field, three of whom were from abroad. Diversity was also sought in the doctoral program in which they were enrolled: four students were in advanced stages of the process, close to submitting their theses; four were in intermediate courses (second year or later); and three were in their first year. Their level of dedication was also taken into account: four of the 11 doctoral students were pursuing their doctorates full-time and the remaining seven were pursuing them part-time. This sample allowed for a rich exploration of the motivations, difficulties, and satisfaction factors associated with heterogeneous doctoral trajectories. In the second phase of the study, a structured questionnaire was distributed online to doctoral students with the aim of investigating the key dimensions identified in the qualitative phase, as well as their relationship with academic satisfaction. The instrument allowed for an empirical approach to the theoretical variables and an initial validation of the patterns observed.

2.2 Data collection procedure

In the case of qualitative interviews, participants were contacted by email and/or telephone, and the purpose of the research and the confidential treatment of their data were explained to them. Students and teachers from the different fields of knowledge that make up the doctoral program analyzed (economics, politics, sociology, law) were contacted, taking into account both disciplinary diversity and their availability to participate on the scheduled dates. Although initially the possibility of conducting the interviews in person was considered, in the end they were all conducted via the TEAMS platform, which facilitated the participation of people with different levels of commitment and teaching loads. The sample was selected based on convenience criteria, as a large number of potential participants were invited, but only some of them could be interviewed within the established period. The interviews were recorded with the express consent of the stu-

dents and faculty. Subsequently, all interviews were transcribed and anonymized. The interviews were conducted between June and July 2023 and followed a similar script for teachers and another for students. However, due to their semi-structured nature, the interviews differed in terms of duration, ranging from 15 to 40 minutes, and also in terms of the depth and development of the responses. In addition to their flexibility, semi-structured interviews offer greater freedom in responses and the possibility of adapting to the specific context of the interviewees, which allows for the collection of very detailed information (Cohen et al., 2018).

In the case of quantitative surveys, a structured survey was prepared using Google Forms and sent via link to the 71 students who make up the Doctoral Program for its completion. Specifically, 63 valid surveys were obtained from interdisciplinary doctoral students at the UBU, of whom 49% were men and 48% were women (3% other), 9.5% were aged 18 to 24, 38% were aged 24 to 35, 17.5% were aged 35 to 44, 15.9% aged 45 to 54, 14.3% aged 54 to 64, 5% over 64, 77.8% without a scholarship to pursue their studies, and 73.8% working. The scales used were 5-point Likert scales (with 1 being totally disagree with the item in question and 5 being totally agree) and were based on the literature and reviewed and adapted in accordance with the previous qualitative analysis carried out with teachers and experts. Table 1 provides a detailed summary of the data collection.

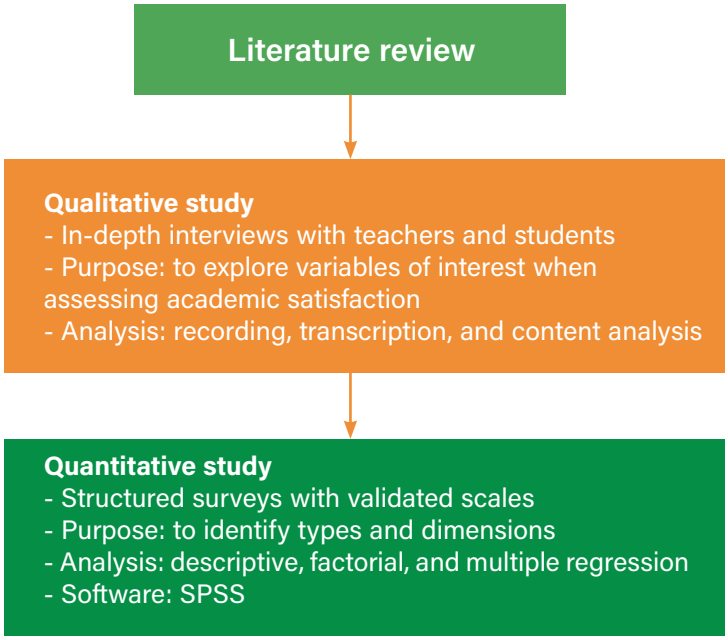
2.3 Data analysis techniques

In the case of the interviews with faculty, the questions were open-ended and focused on the advantages of studying an interdisciplinary doctorate versus a specialized one, as well as the perceived involvement and satisfaction of the students. Based on advantages such as the development of critical thinking, the enrichment derived from the interdisciplinarity of certain doctoral programs, and the factors that influence their choice, interviews were conducted with the students. In this case, the interviews focused on their general perception of the advantages and disadvantages of studying an interdisciplinary doctorate, the motivations and reasons that led them to enroll in the program, their level of academic *engagement*, and their degree of satisfaction with the program.

These qualitative interviews made it possible to identify the relevant factors and key variables that were subsequently integrated into the structured questionnaire used in the second phase of the study, which was quantitative in nature. In both cases, the interviews were analyzed using an inductive approach based on content analysis (Braun and Clarke, 2006). Two expert researchers independently coded the interviews based on an in-depth reading of the transcripts and developed an initial categorical matrix based on three dimensions: motivation, satisfaction, and cross-cutting skills. Discrepancies were discussed until interpretive consensus was reached. Using the variables noted in the interviews, measurement scales were sought in the literature to develop the structured questionnaire to be used in the next, quantitative phase. In this case, the reliability of the scales used was analyzed, along with factor analyses to verify the dimensions of each key variable and a subsequent linear regression to identify the factors influencing academic satisfaction using IBM-SPSS v.27 statistical software.

Everything mentioned in this section is summarized in Figure 1.

Figure 1. *Summary of the empirical study phases*



3. Results

3.1 From the qualitative analysis

The first factor analyzed in the interviews was the motivation to study for a doctorate. The responses revealed two main types of motivation: for some students, the motivation is related to the intention to pursue an academic career: "I decided that this was the way to get in, to start this long-distance career (ent_2), "it was clear to me almost from the moment I finished my degree that I wanted to do a PhD" (ent_6). For other students, who were already working, the doctorate represented an opportunity for professional advancement, as several interviewees expressed: "The reason I started the doctorate was mainly because I have been working professionally in a certain field for many years and I wanted to culminate it with a doctoral thesis" (ent_7). "I had already been at the university for a few months, I liked what I was doing, and I knew that in order to continue and be eligible for a position, the path was a PhD" (ent_8).

A minority of interviewees highlighted a motivation related to the need to continue their education: "I like to continue learning... my personal desire is to expand my knowledge a little" (ent_6), or as part of their constant interest in learning: "Well, my main motivation is to continue in the field of education, to continue learning, because I have always been interested in learning a little more" (ent_9). Finally, there were those who did not indicate a clear or specific motivation: "Well, I didn't really know what to do, but I liked research at the university and they encouraged me to follow this path" (ent_10).

In relation to academic *engagement*, the student interviews highlighted the influence of personal circumstances that cause this commitment to vary. In several cases, greater commitment was recognized at the beginning of the program, when students have to meet mandatory attendance requirements for courses and seminars: "I think my commitment has increased. Even though I have less time, my involvement has increased over time" (ent_11). "I think it has evolved into greater involvement. In other words, in the early years, my involvement was less. ... I think so, it has been increasing because I became more and more interested in what I was seeing" (ent_7). Some interviews revealed a constant commitment over time: "In general, my *engagement* has been quite stable and quite strong" (ent_6).

However, as the literature highlights, aspects such as the availability of funding contribute to greater commitment to doctoral studies (Cavazos and Encinas, 2016): "My involvement really came when I got funding and I started working full-time at the

university" (ent_4). "I would say that I have been very involved from the beginning, mainly because I am here at the university on a scholarship and can participate in activities" (ent_10). In addition, there are aspects such as age, personal/family situation, or the fact of working at the same time that condition the level of academic *engagement* of students: "Well, due to personal circumstances... my commitment could be medium-low, but my goal from now on is to increase my involvement" (ent_5). "I'm not totally focused on the PhD, but I'm very involved... I just try not to disengage too much, because if I detach myself too much, it's hard to get back into it and keep up the pace" (ent_9). "In my case, my commitment is moderate, because I have to balance it with my job... & I think that's why it hasn't been higher until now." (ent_3). "Considering that it's part-time, because I also have a job outside" (ent_8).

Given that we are not aware of any doctoral studies that investigate variables that seemed essential in the previous interviews, we will address satisfaction, motivations, critical thinking, and academic *engagement* in the quantitative study.

3.2 From the quantitative analysis

In order to verify the unidimensionality of the scales (AE and satisfaction) and obtain factors in the multidimensional ones (critical thinking and academic motivations), an exploratory factor analysis of principal components with varimax rotation was performed on the critical thinking indicators (Table 1); a second analysis was performed on the academic motivation indicators (Table 2); another exploratory factor analysis with the AE indicators (Table 3) and satisfaction (Table 4). In this way, we obtained four dimensions of critical thinking, four types of motivations for studying a doctorate, one factor for academic *engagement* (involvement), and one factor for satisfaction.

First, in the analysis of motivations (mo1 to mo26), four factors were also obtained. Factor F1, called learning motivations, allows us to differentiate between individuals who feel pleasure and excitement when reading and learning new things and those who do not. Factor F2, professional motivations, measures precisely the search for a better salary, job promotion, or position. Factor F3, called motivations for self-improvement/self-actualization, reflects the individual's desire to improve themselves, feel continuous improvement and progress, and succeed in their studies. Finally, factor F4 is mainly related to doubts about why one should be studying for a doctorate and even whether it is a waste of time, so we define this factor as a lack of motivation to continue (the latter would include *reverse-coded* items). Some of these types of motivations have been studied in the Academic Motivation Scale (applied by Vallerand et al. (1992) in the context of master's studies).

Table 1. *Factor analysis of academic motivations (mo)*

Dimension	Explained variance	ITEM	Item name	Weight or factor loading
F1. Learning motivations	36.309	Mo15	For the pleasure I get from learning more about topics that interest me.	0,936
		Mo8	For the pleasure I get from discovering new and unknown things.	0,920
		Mo23	For the great excitement I get from reading about interesting topics.	0,873
		Mo10	For the pleasure I get from reading interesting researchers.	0,816
		Mo21	Because studying will allow me to continue learning many things that interest me.	0,810
		Mo2	Because I find satisfaction and enjoy learning new things.	0,802
		Mo16	Because I like to feel completely absorbed by what some authors have written.	0,761
		Mo18	Because I enjoy doing difficult activities.	0,692
F2. Professional motivations	22,806	Mo7	To subsequently obtain a more prestigious and higher-level job.	0,866
		Mo20	To earn a better salary in the future.	0,826
		Mo14	Because I want to live comfortably later in life.	0,801
		Mo9	Because it will allow me to choose a job in the field I like.	0,721
		Mo1	Because without the degree, I won't find a well-paid job.	0,693

Dimension	Explained variance	ITEM	Item name	Weight or factor loading
F2. Professional motivations	22,806	Mo22	Because I believe that more years of study will improve my professional qualifications.	0,508
F3. Motivations for self-improvement/ self-fulfillment	7,661	Mo26	Because I want to prove that I can pass and succeed in my studies.	0,799
		Mo6	To prove to myself that I can get a doctorate.	0,796
		Mo19	To prove to myself that I am an intelligent person.	0,744
		Mo25	Because it gives me personal satisfaction when I try to get good grades in my studies.	0,701
		Mo13	Because succeeding and passing at university makes me feel important.	0,623
		Mo3	Because it allows me to communicate my ideas to others, and I like that.	0,550
		Mo5	Because I like to see myself excel in my studies.	0,491
		Mo12	Because it allows me to feel the pleasure of surpassing myself in some of my personal achievements.	0,400
F4. Lack of motivation to continue	5,552	Mo17	I'm not sure why I'm studying for a doctorate, and honestly, I don't really care.	0,898
		Mo24	I don't know, I can't understand what I'm doing.	0,868
		Mo4	Honestly, I don't know; I feel like I'm wasting my time here.	0,816
		Mo11	I was excited before, but now I wonder if I should continue.	0,808

Secondly, in order to condense the information provided by the set of measures proposed as critical thinking variables (pc1 to pc24), a principal component analysis was performed, which allowed four factors to be extracted. Factor F1 separates individuals who use information to compare opinions, discuss them, and create debate and their own opinion from those with opposite traits, hence the name creation or development of information. Factor F2, understanding of information, measures the degree to which the individual is able to comprehend information, understand it, and use it to justify the points of view. Factor F3 relates to the use of various sources of information—hence the name information analysis. Finally, factor F4, recall, differentiates between individuals who value and remember information and those with opposite traits. These four dimensions of critical thinking are in line with the work carried out by Zipp and Olson (2022) and Kobylarek et al. (2022).

Table 2. *Factor analysis of critical thinking (CT)*

Dimension	Explained variance	ITEM	Item name	Weight or factor loading
F1. Information creation	40,582	Pc24	When I read the text, I look for a relationship between the information it contains and other texts I have read.	0,784
		P21	I like to compare different opinions and contrast them with each other.	0,768
		Pc8	I form my impression based on different pieces of information that I connect with each other.	0,694
		Pc7	I can understand texts from various fields.	0,692
		Pc16	When I am interested in a piece of information, I try to check if it is true.	0,649
		Pc20	I like to discuss new meanings in texts I already know.	0.638
		Pc25	I pay attention to the contexts and nuances of statements.	0.618
		Pc6	The same content can be expressed in many different ways.	0.548
		Pc11	In the discussion, I pay attention to justifying my position on the issue and understanding the other party at the same time.	0.541
		Pc23	I try to use the information I have learned in everyday life.	0.464

Dimension	Explained variance	ITEM	Item name	Weight or factor loading
F2. Understanding information	9,619	Pc14	When debating, I try to use practical examples to justify my position on the issue.	0,761
		Pc15	If necessary, I can recall information that I have read about.	0,742
		Pc13	I can see the structure of the text and could change it.	0,691
		Pc10	When I speak, I give many examples.	0,669
		Pc12	I like to find coincidences/relationships between seemingly different phenomena.	0,562
		Pc11	In discussions, I pay attention to justifying my position on the issue and understanding the other party at the same time.	0,531
		Pc17	I can extract the most relevant parts of a text.	0,517
F3. Information analysis	6,472	Pc1	After reading, I review important information, even if it appears to be true.	0,791
		Pc3	I am willing to share newly obtained information.	0,668
		Pc5	After reading it, I can repeat the important aspects of the text.	0,600
		Pc2	I like to combine information from different texts.	0,566
		Pc18	To evaluate information, I review many sources.	0,510
F4. Recall of information	6,017	Pc19	I don't remember much of what I learned in my previous studies.	0,862
		Pc9	Everything already exists, so nothing completely new can be created.	0,713
		Pc22	I have difficulty paraphrasing.	0,702
		Pc4	In-depth analysis of reality are a waste of life.	0,482

Thirdly, the analysis carried out using academic *engagement* or involvement indicators indicates a single variable, which reflects enthusiasm for studying a doctorate, perceived immersion in studies, and the happiness and energy this brings to the student. This variable and its measurement correspond to those previously used by other authors in an academic setting (Portalanza et al., 2017; Coelho-Martinho and Conde Pérez, 2013), based on the original UWES-S9 designed for the workplace.

Table 3. *Factor analysis of academic engagement*

Variable	Explained variance	Item	Item name	Weight or factor loading
EA	74,074	Ea2	I feel strong when I am studying for my doctorate.	0,954
		Ea4	I am enthusiastic about my PhD.	0,951
		Ea3	When I wake up in the morning, I feel like studying for my doctorate.	0,930
		Ea7	I am happy when I am doing tasks related to my doctorate.	0,922
		Ea1	My tasks as a student make me feel full of energy.	0,823
		Ea5	My doctorate inspires me to do new things.	0,786
		Ea6	I am proud to be doing this doctorate.	0,704
		Ea8	I am immersed in my doctorate.	0,600

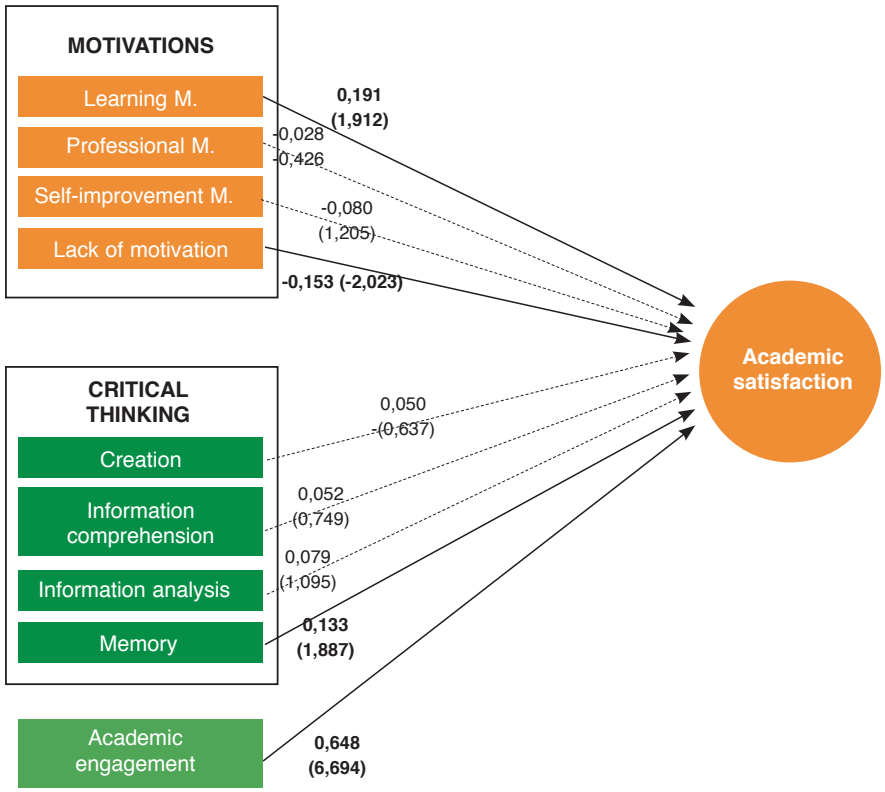
Finally, the factor analysis performed with the satisfaction indicators shows enjoyment, enthusiasm, and satisfaction with the decision to study for a doctorate. This is a variable that has been studied extensively in the literature and measured as Lent et al. (2007) and Vergara et al. (2018).

Table 4. *Factor analysis of satisfaction*

Variable	Explained variance	Item	Item name	Weight or factor loading
SATIS	76,982	Sat4	Overall, I am satisfied with this academic experience.	0,917
		Sat6	I am enthusiastic about the content taught in this doctoral program.	0,884
		Sat5	I enjoy being intellectually stimulated in this doctoral program.	0,879
		Sat3	I enjoy my doctoral program most of the time.	0,876
		Sat7	I like what I have learned in this doctoral program.	0,823
		Sat1	I am satisfied with my decision to pursue this doctorate.	0,807
		Sat2	I feel comfortable with the educational environment created in this doctoral program.	0,798

Reliability using Cronbach's alpha meets the minimum requirements, as it is above 0.7 on all scales (Hair et al., 2017). With these factors, a multiple linear regression was performed (Hair et al., 2017), which shows that academic *engagement*, two dimensions of motivation (learning and lack of motivation to continue), and a type of critical thinking (memory/usefulness) influence student satisfaction with their doctoral studies (Figure 2). Thus, the higher the AE, the greater the motivation to learn, the lower the lack of motivation to continue studying for a doctorate, and the greater the desire for recall and the perceived usefulness of learning, the greater the student's satisfaction with their doctoral studies. The adjusted R2 coefficient is high, at 0.741, F of 20.660*** (p <0.001).

Figure 2. *Results of the linear regression on academic satisfaction*



Note: The lines show the standardized Beta coefficient and, in parentheses, the Student's t-statistic corresponding to the relationship between each independent variable and the dependent variable academic satisfaction (significant relationships appear in bold and non-significant ones in regular font and on a dotted line).

4. Discussion and conclusions

The study of satisfaction among doctoral students has become increasingly relevant in recent years due to its direct influence on academic success, student retention, and future employment (Dericks et al., 2019; Cheng et al., 2016; Vergara et al., 2018). This study has addressed the role of motivation, academic *engagement*, and critical thinking in such satisfaction. This study is one of the few empirical investigations that address critical thinking and motivation in doctoral studies and explore their possible influence on satisfaction with studies. As indicated by Vendrell-Morancho et al. (2024), critical thinking is key to the success of university students.

In addition, this study on doctoral studies, which has an international and interdisciplinary focus, has used a mixed empirical method. A first qualitative phase with teachers and students provided an initial impression of the essential variables when it comes to analyzing academic satisfaction, and the second phase identified types of motivation and critical thinking and explored which factors have the greatest impact on student academic satisfaction. As for the dimensions or types of motivation obtained, the first is related to learning, the second to the professional improvement that can be achieved after studying a PhD, the third to the desire for personal improvement and self-fulfillment, and the last indicates a lack of motivation to continue or doubt or uncertainty about the decision to study a PhD. Thus, the motivations that appeal to the higher levels of Maslow's hierarchy (1954) stand out. Regarding the dimensions of CT for doctoral studies, the creation or development of information has been found, which includes the aspects of debate, criticism, comparison of documents, evaluation and processing of information, comprehension of information, and memory. While academic *engagement* and two types of motivation contribute to the satisfaction of doctoral students, only critical thinking has an impact on such satisfaction.

Academic *engagement* is the most important factor in generating satisfaction among doctoral students. Not surprisingly, the relevance of this variable has been highlighted in previous studies with students (Portalanza et al., 2017; Coelho-Martinho and Conde-Pérez, 2013). In light of the results obtained, it is key to foster the AE of doctoral students through a community of students who share their experiences and progress. A high level of academic *engagement* not only improves student well-being but can also become a driving force for educational innovation processes by facilitating the development of collaborative networks, the appropriation of the educational environment, and the adaptive transformation of institutional practices (Barrientos de Bojórquez, 2024).

In addition, efforts should be made to prevent motivation from declining during the development of the doctoral thesis, as this can clearly reduce satisfaction with studies and perhaps encourage students to drop out, something that could be investigated in future work. This exploratory work also indicates that critical thinking is not related to satisfaction with studies, except for the dimension of perceived usefulness or memory. Furthermore, mere professional motivation and the desire to excel do not seem to affect satisfaction as much as learning motivation. Further investigation of the results obtained is needed in the future, but it is possible that some of the types of critical thinking and motivations that do not directly generate satisfaction are considered by students to be mere hygiene factors, following Herzberg's motivation-hygiene theory (1954) and that doctoral students acquire and develop them during the study of a doctoral thesis (e.g., the first three types of CT), while the fourth is truly a factor that generates satisfaction.

As *limitations* of the study, the sample size is small, but it should be noted that enrollment in doctoral programs is low, even more so in the case of interdisciplinary doctorates, whose analysis is relevant due to their unique characteristics and the little attention they have received in the literature, despite their recognition in the academic sphere.

Likewise, it should not be ignored that students' previous trajectories, in particular their socioeconomic background and expectations of social mobility, also shape their perception of the doctorate. In contexts where this level of education is perceived as a mechanism for social advancement or professional legitimization, academic satisfaction may be conditioned by extrinsic expectations that go beyond the educational process itself (Murphy et al., 2025). As Fabara (2012) has shown, the absence of structural planning in the provision of postgraduate programs can lead to training that does not adequately respond to the needs of those who place their expectations of recognition or stability on

the doctorate. Incorporating this dimension would allow for a more critical and inclusive view, one that is not limited to individual variables but also considers the structural conditions that affect the academic experience of students. As future lines of continuation and improvement of this exploratory work, it would be interesting to incorporate the analysis of the recommendation of doctoral studies, the abandonment of them, variables such as student anxiety during their doctorate, differences by student profile, and even to design a complete causal model to analyze, through structural equations, the prescription pathways of one doctoral program versus others. It would also be relevant to move towards a deeper understanding of the structural role of doctoral studies in scientific, economic, and social development, exploring the contribution of doctoral students through processes of knowledge transfer, innovation, patent generation, or strengthening of the productive fabric. Finally, it would also be advisable to compare the views of other decision-makers, such as program managers and coordinators, and even organizations and companies.

Authors' contribution

Sonia San Martín: conceptualization; data curation; formal analysis; research; methodology; project management; software; supervision; validation; writing—original draft, writing—review and editing.

Patricia Otero-Felipe: conceptualization; data curation; formal analysis; investigation; methodology; resources; validation; visualization; writing—original draft; writing—review and editing.

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Network addiction and nomophobia in youth. Social, educational aspects and their incidence

Adicción a las redes y nomofobia en jóvenes. Aspectos sociales, educativos y su incidencia

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Abstract

This study analyzes the presence and characteristics of nomophobia in high school and university students at the University of Guadalajara. The research is framed within a quantitative approach, through the application of the NMP-Q questionnaire to a sample of 776 students during the 2024 B calendar. The results indicate a general prevalence of nomophobia in moderate degree, with a mean of 77 points on the test scale, being slightly higher among females and young people of both genres aged 17 and 18 years. Minimal differences were identified according to educational level, region or employment status, although certain factors, such as the type and edition of device (mainly iPhone) and isolated cases of poor academic performance, showed a greater association with high levels of nomophobia. The main functions of the cell phone were the use of social networks, calls and consumption of multimedia content. It is concluded that nomophobia is a widespread phenomenon among young people, with relevant educational and social implications, which requires institutional attention and psychological support, due to the addictive behaviors that can occur when trying to stay connected to mobile devices. Future research on psychosocial factors associated with problematic cell phone use, the social context of those with high levels of nomophobia, and the creation of effective prevention policies and norms should be further investigated.

Keywords: nomophobia, adolescents, high school students, smartphone use, social media addiction, digital dependence.

Resumen

Este estudio analiza la presencia y características de la nomofobia en estudiantes de bachillerato y universitarios de la Universidad de Guadalajara. La investigación se enmarca en un enfoque cuantitativo, mediante la aplicación del cuestionario NMP-Q a una muestra de 776 estudiantes durante el calendario 2024 B. Los resultados indican una prevalencia general de nomofobia en grado moderado, con una media de 77 puntos en la escala del test, siendo ligeramente mayor entre mujeres y jóvenes de ambos sexos de 17 y 18 años. Se identificaron diferencias mínimas según el nivel educativo, la región o la situación laboral. Aunque factores como el modelo del tipo de dispositivo (principalmente iPhone) y casos aislados de bajo rendimiento académico, mostraron mayor asociación con niveles elevados de nomofobia. Las principales funciones del celular fueron el uso de redes sociales, llamadas y consumo de contenido multimedia. Se concluye que la nomofobia es un fenómeno extendido entre los jóvenes, con implicaciones educativas y sociales relevantes, que requiere atención institucional y acompañamiento psicológico, debido a las conductas adictivas que pueden presentarse al tratar de permanecer conectado a los dispositivos móviles. Asimismo, se sugiere profundizar en investigaciones futuras sobre los factores psicosociales asociados al uso problemático del celular, el contexto social de quienes tienen niveles altos de nomofobia y la formulación de políticas y normas efectivas de prevención.

Palabras clave: nomofobia, adolescentes, estudiantes de bachillerato, uso del smartphone, adicción a redes sociales, dependencia digital.

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1. Introduction

In recent years, nomophobia has become an emerging topic of interest. In 2008, the English term *nomophobia* began to be used in relation to the excessive use of cell phones and the dependence they generate. The term is derived from the phrase "*no mobile phone* phobia" and was later translated into Spanish (Notara et al., 2021). Addiction can lead to a loss of control and dependence (Echeburúa and De Corral, 2010) and can cause anxiety (Oxford English Dictionary, 2025, and Rodríguez García et al., 2025).

Among the aspects that characterize it, the most notable is the apprehension individuals feel when separated from their cell phone, leading them to seek proximity to the device. Some of the habits of people suffering from this disorder are: excessive use of the device, avoiding areas where cell phone use is limited, always carrying chargers with them, owning a second device, keeping the device close by while sleeping, using it late at night, getting lost in messages or posts on social media, and checking it immediately upon waking up (Vagka et al., 2023). These aspects are compounded by the feeling and fear of missing out on something important that is reported on social media (Moore and Craciun, 2021).

With the bombardment of posts and content, users are forced to be connected to apps and social media most of the time so as not to miss anything new. In addition, social media, online games, and gambling sites are designed to generate an addiction that depends on the production of dopamine.

This chemical produced by the brain is also referred to as the "pleasure substance" because it can act as a reward (Lembke, 2023) that the body gives to stimuli received or experiences lived from the outside (Bermejo et al., 2010).

The addictive power of dopamine lies in the fact that, after each stimulus, the body demands increasing frequency or intensity to produce the same amount of the substance (Carr, 2011).

Eventually, in extreme cases, the lack of stimuli and the resulting low production of dopamine can lead to depression. Particularly in gambling addiction, there is a lack of dopamine control, which manifests itself in a lack of sensitivity to risk, increased impulsivity, and lack of self-control (Bermejo et al., 2010). In addition, individuals may experience nervousness, anxiety, or discomfort when deprived of the device (Cortés and Herrera, 2022).

In schools and universities, nomophobia could have harmful effects on learning or educational coexistence. These range from a lack of control in the use of mobile devices or distraction to violent events related to cyberbullying or learning deficiencies.

1.2 Justification

The above reveals a risk in the university environment when considering the growing use of devices in Mexico and the type of use. The MX Internet Association reports that in 2024, connectivity in socioeconomic sectors C and D grew due to easier access to connections and the purchase of devices. In addition, 76% of the population now has access to data telephony, which, combined with the availability of Wi-Fi, means that a large part of the population has access to the internet most of the time. According to data from the National Institute of Statistics and Geography (INEGI), 81.7% of the population in Mexico has a cell phone, a significant increase compared to 2015 when the percentage was 71.4% (INEGI, 2025).

Similarly, the activities that Mexicans most frequently engage in online are sending messages (88%), work-related activities (80%), and accessing social media (79%). Cell phones are the preferred tool for connecting to the internet (and, therefore, for communication), with 97% of users surveyed (Statista, 2023). Similarly, INEGI (2025) recorded that internet users connected in order of frequency: to communicate (93%), access social networks (90.4%), and for entertainment activities (89%); followed by activities related to education, such as searching for information (88.2%) and supporting training or education (81.3%).

On the other hand, the National Survey on the Availability and Use of Information Technologies in Households (INEGI, 2024) reported that the majority of internet users were young people aged 18 to 24, and Jalisco (the territory of reference in this research) is one of the states with the highest percentage of internet users (89.7%).

In addition, in 2024, the survey documented that the average number of hours of internet use reached 4.4, although in the case of people aged 18 to 24

and 25 to 34, it rose to 5.7 and 5.6 hours, respectively (INEGI, 2025).

Even in this context, there are few studies that delve into the consequences or effects of nomophobia in the school and university environments. An empirical basis for the presence or absence of nomophobia among students will allow us to investigate the qualitative aspects that influence it and to generate proposals to dispel the effects of this addiction.

1.3 Objectives

To determine the level of nomophobia among young students in middle and high school and at the University of NN. A secondary objective is to measure the dependence and type of use that university students have on their mobile devices.

2. Method

The research was conducted using a mixed qualitative-quantitative approach. From a quantitative perspective, the aim is to access a more concrete materiality of the research (López-Roldán and Fachelli, 2015) and describe numerical distributions of the variables among the participants (Jansen, 2012). From a qualitative perspective, the aim is to determine the diversity of the phenomenon studied, nomophobia, among students.

2.1 Participants

The study population consisted of students at the University of Guadalajara who were enrolled in upper secondary education (high school) or a bachelor's degree program at this institution. Data collection was carried out during the second semester of 2024 at two university centers and high schools located in the cities of Guadalajara and Colotlán, Jalisco, using non-probabilistic convenience sampling. A total of 776 responses were obtained.

2.2 Techniques and instruments

A cross-sectional survey technique was used, with data obtained at a single point in time rather than over a prolonged period (Creswell, 2003). Specifically, the instrument called the Nomophobia Questionnaire (NMP-Q) was used, developed by Yildirim and Correia (2015) and validated in different studies and for different languages (Gutiérrez et al., 2016). It consists of 20 questions, to which some additional questions related to the academic status and availability of cell phones among young people were added.

The established concepts were translated into units and variables to obtain explicit data, allowing for the identification of concrete and operational empirical references, i.e., indicative, observable, and concrete manifestations (López-Roldán and Fachelli, 2015).

In this way, an attempt was made to extend the measurement of the degree of nomophobia to the knowledge of other particular characteristics that could be associated with the use of technology.

2.3 Data analysis techniques

To rate the responses, the NMP-Q uses a 7-point Likert scale, where 1 indicates complete disagreement and 7 indicates complete agreement. Thus, considering the 20 questions, the score ranges from 20 to 140, where less than 20 indicates no nomophobia; 21 to 59, mild; 60 to 99, moderate; and 100 or more indicates a high presence. Based on this, a thematic content analysis will be performed to distinguish the presence and behaviors related to the key topic of the study, and a semantic analysis will be performed to observe the relationships between the topics addressed in the responses (Andréu, 2002).

3. Results

First, some social and academic characteristics of youth consulted are described. Of the total number of participants, 61.9% of respondents are female and 38.1% are male. In terms of age, they are distributed as follows: 18 (35.6%), 17 (27.7%), 19 (10.2%), 20 (7.2%), and 21 (5.9%); other ages appear with minority data (up to over 30 years old).

It is interesting to note that 75.3% purchased a new cell phone and 24.7% purchased a used one. In terms of how long they have had the same device, most of them are new devices, as 38% indicated that they have had it for between one and two years, 33.2% for less than a year, 17.1% for between two and three years, and 6.4% for between three and four years. In terms of cell phone features, there is a

preference for the iPhone brand (43.8%), followed by Samsung (19.2%).

The pressure to obtain a trendy device may be rooted in technological, emotional, and quality issues, as it becomes an aspirational desire to have a new or recent phone. The built-in camera for taking photos, the speed of the device, and the memory capacity are key factors in making these decisions.

Regarding the main functions of the device, respondents were allowed to give three answers, resulting in 637 mentions for social media use, 567 for calls, 547 for listening to music and watching videos, and 414 for instant messaging.

Table 1. *NMP-Q test results by gender*

Variable	Category	Mean of test
Gender	Women	80
	Men	71

Regarding the test results, the average score was 77 points, the median was 76, and the mode was also 76, with a standard deviation of 25.2. These data clearly indicate a concentration of responses within the moderate nomophobia category, according to the ranges mentioned above. However, the simple fact that there is a constant average presence is already revealing because it generalizes an induced condition.

One of the notable differences in the results occurred between the sexes, as women scored an average of 80 points and men 71. This significant difference stems from the differences in consumption, use, and purposes that each has for mobile devices, not only in individual terms, but also in social and cultural terms.

Table 2. *NMP-Q test results by age*

Variable	Category	Mean of test	Other statistics relevant
Overall results	Total sample	77	Median = 76. Mode = 76. Standard deviation = 25.2
Age	17	77	Q1 = 56. Q3 = 95.5
	18	78	Q1 = 63. Q3 = 96
	17-24	70-80	—

In terms of age, most respondents are between 17 and 18 years old (63.2%), and their average level of nomophobia in the test was 77 and 78, respectively. For those aged 17, the data ranges from 56 points in quartile 1 to 95.5 in quartile 3; for those aged 18, it ranges from 63 to 96 points. This again results in the data being grouped in the moderate range of nomophobia. Between the ages of 17 and 24, the average is between 70 and 80 points (moderate), with data outside this range only occurring at ages 25, 26, 27, and 29; however, these are a minority of cases (19 students).

Table 3. *Relationship between academic average and level of nomophobia*

Academic Grade point average	Percentage of the sample	Average of test	Level of nomophobia
95-100	19,9 %	74-79	Moderate
90-94	29,3 %	74-79	Moderate
85-89	22,2 %	74-79	Moderate
Subtotal	71,4 %	—	—
65-69	Isolated cases (n = 4)	109	Severe

Their average grades do not reflect a noticeable impact on the test. The most common average grade among students is between 90 and 94 (29.3%), followed by those with grades between 85 and 89 (22.2%) and between 95 and 100 (19.9%), which together account for 71.4% of respondents. Their average test score ranges between 74 and 79 points. The particular case of students with an average grade between 65 and 69 is especially relevant because their result is 109 (severe nomophobia); although there are only four cases, it is striking because the score is significantly higher than the rest, and it would be worthwhile to explore these situations of students with this level of performance in future research.

The employment factor has a minimal impact. Fifty-five percent of respondents do not work and 45% do; although the difference is small, those who do not work scored 78 points and those who do work scored 75 points. Although the difference is small, it is worth investigating whether this may be due to the occupations that keep them active, although, at the same time, cell phones may be a tool used in their work and for communication with others and, for that reason, be a necessary tool.

Another noteworthy finding is the result regarding the type of cell phone. As mentioned previously, most have iPhones, whose users scored an average of 81 points on the test; next are Samsung cell phones, with an average score of 73 points among their users. It would be worth exploring whether the range of applications available on each cell phone brand may influence the time and manner of use. A device with cutting-edge technology, such as a camera with better resolution for taking photos, encourages users to use it more and share the results on social media or send them to friends and family, thereby spending more time online.

A valuable feature of the NMP-Q is that it is divided into four broad areas related to mobile device use: 1) Not being able to access information (four questions), i.e., losing immediate access to information and searching for what you want at the moment; 2) Giving up comfort (five questions), i.e., feelings about the comfort and psychological peace of mind of having control over one's cell phone (especially battery, coverage, and balance); 3) Not being able to communicate (six questions), understood as feelings about the loss of immediate communication; and 4) Loss of connection (five questions), emotions linked to the lack of ubiquity due to connectivity.

According to the study's results, considering each area separately on a scale of 1 to 7, the highest scores were for not being able to access information (item one, with 4.35) and feelings about the loss of immediate communication and not being able to use services (item three, with 4.2); the lowest was emotions linked to the loss of ubiquity after losing connectivity (item four, with 2.9).

"Information" is a broad category that can include keeping up to date with trends or posts on social media or researching specific topics, while communication involves keeping in touch with close friends and family, which is more interesting to students than their classes.

Finally, it is important to note that there were no differences in the results between high school and university students (76 and 77 points on the test, respectively). Taking into account only university students, who belong to two different regions of the state of Jalisco, there were also no differences, since in both cases the average is 77 points, i.e., the behavior of young people does not vary despite the differences that may exist between the regions and the living conditions of each.

4. Discussion and conclusions

The results of this study confirm the significant presence of nomophobia in high school and university students in the state of Jalisco, with a general concentration at the moderate level of the disorder. This trend was observed in both men and women, although a slight preeminence was found in the sample of women between 17 and 18 years of age, which is consistent with previous studies that highlight the greater vulnerability of this population sector, in addition to the fact that they use devices more to interact.

The fact that an average prevalence of the condition is recorded highlights the need for more in-depth studies to generate effective measures to reverse nomophobia in academic contexts. As discussed in the state-of-the-art section of the introduction, there are policies, rules, and regulations aimed at combating this form of addiction; however, their effectiveness has been limited. A relevant indication is the difference detected by gender: women presen-

ted higher levels of nomophobia than men, which could be related to the social pressure they face to meet expectations of image and behavior, both in face-to-face environments and in spaces of communication, interaction, and coexistence mediated by mobile devices and the internet.

The fact that no substantive differences have been identified between students from different regions or educational levels (high school and university) indicates that nomophobia responds more to generational and cultural factors of technological use than to specific academic or territorial contexts. One explanation may be that ICTs are developed and improved to become increasingly universal; ultimately, to get the most out of devices, all is needed is buy them, have electricity to charge them, and an internet connection. Meanwhile, the stimuli they generate are rooted in the psychological and social characteristics of all people and not in territorial issues.

The result related to the preference for having trendy devices or devices that are a year old or less reveals the new aspirational goals of young people. Becoming independent, buying a car, or buying a house takes a back seat, perhaps because of the impossibility or difficulty of acquiring them or because they do not represent an immediate achievement worth sharing with family and friends.

Another important finding is the relationship between the brand of the device and the level of nomophobia, with the iPhone scoring highest in the test. This could be due to factors associated with the social status of being seen and validated by others, functionality, the availability of applications, or, as Roig Vila et al. (2023) point out, in cases of loneliness, a way to connect with other people and not be isolated and excluded, which also warrants further research.

In addition, the planned obsolescence of technology, defined as the intentional action of technology manufacturers to ensure that their products and services cease to function after a limited time, is increasingly common and frequent. The Federal Consumer Protection Agency (2019) lists three types of obsolescence that are directly related to cell phones or smartphones: functional obsolescence due to a malfunction or incompatibility with an application; quality obsolescence of a device component; and psychological obsolescence, which appeals to issues of perception and emotional stress to pressure users to have the latest technology.

Furthermore, although overall academic performance did not show a direct correlation with levels of nomophobia, there were isolated cases of severe nomophobia linked to low academic performance, suggesting the need for further study on the effects of excessive cell phone use on academic performance. Some hypotheses to be tested later may be based on the fact that extreme nomophobia influences the performance of students who are more motivated by stimuli in their mobile device applications than in the classroom, which poses a challenge for universities that must generate more meaningful experiences that capture their students' attention.

From an educational and social point of view, this phenomenon becomes a challenge for educational institutions, as smartphones are one of the most important communication and information tools; however, they can become a significant distraction, impairing students' study habits, concentration, and mental health. In this regard, there is an urgent need to develop pedagogical and technological intervention strategies that promote conscious and balanced use of mobile devices, especially in school settings.

One possible reason is that technology advances and becomes internalized at a faster rate than pedagogical innovations, which always seem to be one step behind. However, as with ICT, the solution may lie in stimulating students psychologically, emotionally, and culturally to regain their interest in education or to balance the time spent using devices with that devoted to their studies.

It is suggested that future research delve deeper into the psychological and social dimensions of nomophobia and excessive addiction to technology use, and their relationship to factors such as self-esteem, anxiety, family environment, and digital socialization dynamics, in order to gain a more comprehensive understanding of the phenomenon and possible mitigation strategies.

The family, neighborhood, work, and social environments can have a significant influence on student behavior, so understanding the context of those who suffer from high levels of nomophobia can yield revealing conclusions.

Contribution by authors

PhD. Ma. Teresa Prieto Quezada: conceptualization; research; project management; supervision; visualization, writing – original draft.

PhD. Alfredo Leonardo Romero Sánchez: conceptualization; formal analysis; research; methodology; resources; software; writing – original draft.

PhD. José Claudio Carrillo Navarro: data acquisition, formal analysis; methodology, supervision, visualization, writing-revision, and editing.

Ana Cristina Pinedo Catañeda, M.A.: data curation; formal analysis; research; validation, writing–revision, and editing.

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Publication Guidelines of «Alteridad»

1. General information

«Alteridad» is a bilingual scientific journal of the Salesian Polytechnic University of Ecuador (UPS), published since January 2006 uninterruptedly, on a semi-annual basis (January-July).

It is an arbitrated scientific journal, with peer-review system under the double-blind review, following the publication standards of the American Psychological Association (APA). This system ensures authors an objective, impartial and transparent review process, making it easier for authors to be included in reference international databases, repositories, and indexes.

«Alteridad» is indexed in the Web of Science's Emerging Sources Citation Index (ESCI), at the Scientific Electronic Library Online (SciELO), in the REDALYC Scientific Information System, in the directory and selective catalog of the Regional Online Information System for Scientific Journals of Latin America, the Caribbean, Spain and Portugal (Latindex), in the Directory of Open Access Journals (DOAJ), in the European Reference Index for the Humanities and Social Sciences (ERIHPLUS), on the Dialnet Portal. It is evaluated in the Information Matrix for Journal Analysis (MIAR), the Integrated Classification of Scientific Journals (CIRC), and the Qualis review system for CAPES journals. In addition, it is in repositories, libraries and specialized catalogs around the world.

The journal is published in two versions: electronic (e-ISSN: 1390-8642) and printed (ISSN: 1390-325X) in Spanish and English; each manuscript is identified with a Digital Object Identifier System (DOI). All articles published in «Alteridad» have the Creative Commons Attribution-Non-Commercial-Share Equal license (RoMEO blue journal).

2. Scope and policies

2.1 Topics

«Alteridad» is a journal specialized in Education and its transdisciplinary topics such as Didactics, School Management, Edu-communication, Educational Technology, Social Pedagogy, among others, all related to the main topic.

2.2 Contributions

All manuscripts must be original, and must not have been published in any other journal or must not be in the arbitration or publication process in another journal. Empirical research results are published in Spanish, Portuguese or English, and studies and state-of-the-art are also allowed:

a) **Research:** 5000 to 7500 words, including title, abstracts, descriptors, tables, and references. Assessment will be made of research results, methodological rigor, the relevance of the subject, the quality of scientific discussion, the variety, timeliness, and richness of bibliographic references (preferably publications indexed in JCR and Scopus). At least 35 references must be included.

(b) Studies and literature reviews

- Studies: 5000 to 7500 words of text, including tables and references. The debate, the relevance of the topic, the originality of the contributions and the bibliographical references (preferably of publications indexed in JCR and Scopus) will be especially valued. Expected 35 references minimum.
- Literature reviews: 6000 to 8500 words of text, including tables and references. An exhaustive review of the state of the art of a current research topic will be considered, with justified and selective references of approximately 70

works (preferably from publications indexed in JCR and Scopus).

2.3 Sections

The journal has a semi-annual periodicity (20 articles per year), published in January and July and has two sections of five articles each by number; the first referring to a **Monographic** topic prepared in advance and with thematic topic and the second, a section of **Miscellaneous**, composed of varied contributions related with educational topics.

3. Editorial process

3.1 Submission of manuscripts

Manuscripts must be submitted only and exclusively through the Open Journal System (OJS), in which all authors must register in advance, although only one will be responsible for the correspondence. No author may submit or review two manuscripts simultaneously, estimating a time of four consecutive numbers (2 years). An article may have a maximum of 3 authors, although if justified depending on the study, there may be up to 5.

«Alteridad» informs by email the reception of the manuscript submitted by the authors. The information related to the acceptance or rejection of the manuscript is sent by email and the platform; and in the case of acceptance, the author is also informed of the editing process.

The Guidelines for the Authors are on the website of the journal, in the Guidelines section, as well as the template for writing the paper (LaTeX/Overleaf or Word), the cover page and cover letter, the review protocol, the pre-submission list, the evaluation forms by the external reviewers and a guide for submitting the article through OJS. Before the submission, it is strongly recommended that the manuscript be checked with the Pre-Check Protocol. Two files should be sent simultaneously:

a) **Cover page and cover letter** (use the official model), which must include:

- **Cover page** (Title, Abstract and key words provided in the Manuscript).
- **Full name of each of the authors**, organized in priority order; followed by the professional category, institution, email of each author and ORCID number. It is mandatory to indicate if the authors have a PhD academic degree (include Dr. before the name).
- A **Cover letter** will also be included indicating that the manuscript is an original contribution, has not been sent or evaluated in another journal, with the signature of the authors, and acceptance (if applicable) of formal changes to the manuscript compliant with the rules and partial transfer of rights to the publisher.

b) Fully anonymized **manuscrip**t, in accordance with the rules referred to in section 4.

3.2 Review process

Upon having received the document and in a maximum period of 30 days, the correspondence author shall receive a notification, indicating whether the manuscript is considered or dismissed for the arbitration process by the scientific reviewers. In case that the article has formal problems or does not address the educational subject or has a high similarity percentage to another document(s), the editorial board shall reject the paper without the option to send it back. Conversely, if it has superficial problems, it will be returned to the author for corrections before starting the evaluation process. The submission date of the article will be considered based on the final submission when the article is presented with the corrections.

The articles will be scientifically evaluated by an average of three experts of the topic. Reports will indicate the following recommendations: Accept the Submission, Publishable with Modifications, Sent the manuscript back for its Review, Not Publishable. The acceptance or rejection of the manuscript for its publication will be decided from the analysis of external reports. In the case of dissenting results, it shall be forwarded to a new opinion, which shall be final. The protocol used by reviewers is public (researches; studies and state-of-the-art).

In general, once the external scientific reviews are taken into view, the criteria justifying the decision on the acceptance/rejection of the manuscript by the Editorial board are:

- Current and novelty.

- Relevance and significance: advancement of scientific knowledge.
- Originality.
- Reliability and scientific validity: proven methodological quality.
- Organization (logical coherence and formal presentation).
- External support and public/private funding.
- Co-authoring and internationalization degree of the proposal and the team.
- Presentation: good writing.

The timeline for the scientific evaluation of manuscripts after the previous estimation procedures by the Editorial Board is up to 100 days. As for the manuscripts sent for Calls for papers, their scientific review dates begin once the call finishes. Manuscripts that are positively evaluated and require modifications must be sent with the changes within the next 15 days.

3.3 Editing and publishing of the manuscript

The edition and layout processes of the accepted articles is performed by the Technical Board of the journal along with the Abya-Yala Editorial. «Alteridad» reserves the right to make style corrections and editorial changes if necessary to improve the manuscript. A proof of printing in PDF format will be sent to the authors for correcting typography and spelling, and its review and comments must be sent within three days. The Editorial provides authors a free professional translation of the final version of the manuscript into English (or Spanish, according to the original version), guaranteeing its international consultation and dissemination. Articles will be published on the journal's platform in both versions (Spanish and English) and in the following formats: PDF, HTML, EPUB and XML-Jats.

4. Structure of the manuscripts

The manuscripts shall be submitted in typeface Arial 10, simple spacing, fully justified and without tabs or white space between paragraphs. Only large blocks (title, authors, abstracts, key words, credits, and captions) will be separated with white space. The page must be two centimeters in all its margins. Manuscripts must be submitted in Microsoft Word document (.doc or .docx), (https://alteridad.ups.edu.ec/pdf/alteridad/Microsoft_Word_Template.docx) o LaTeX/ Overleaf (.tex) (https://www.overleaf.com/latex/templates/revista-alteridad-ecuador/svvjcbgmcrrv), requiring the file to be anonymized in File Properties to avoid the information related to the identification of the author/s.

4.1 Cover page

Title (Spanish and English): Concise but informative, in Spanish in the first line and in English in the second, consisting of as many significant terms as possible. The title is not only the responsibility of the authors, hence changes can be proposed by the Editorial Board. A maximum of 80 characters with space are accepted.

Abstract (Spanish and English): It must be concise and must follow this order: justification, objectives, methodology used (approach and scope), more relevant results, discussion, and main conclusions. It must be written impersonally "The present work analyzes...". In the case of the Abstract (in the other language), the use of automatic translators will not be accepted. It will be between 220/230 words.

Key words (Spanish and English): 6 keywords must be presented for each language, and must be directly related to the topic of the manuscript. The use of the keywords presented in UNESCO's Thesaurus is recommended (http://bit.ly/2kIgn8I). New terms would be accepted only in exceptional cases if they present a standardized scientific nature.

4.2 IMRDC Structure

For those works involving empirical research, the manuscripts will strictly respect the IMRDC structure, with the headings of Economic Supports and Notes being optional. Literature Studies and Reviews may be more flexible under their headings, especially in Methodology, Results and Discussion. In all types of works, bibliographic references are mandatory.

1. **Introduction:** It should include the theoretical foundations and purpose of the study, using bibliographic citations, as well as the review of the most significant literature of the topic at the national and international level. The use of

high-impact references (JCR and Scopus) will be positively valued.

2. **Methodology:** The approach and methodology used must be written in a way that the reader can easily understand the development of the research. It should contain the explanation on the approach (quantitative, qualitative or mixed) and the scope (exploratory, descriptive, correlational or explanatory). When appropriate, it shall describe the sample and the sampling form, and it must refer to the type of statistical analysis applied. If it is an original methodology, it is necessary to set out the reasons that have led to its use and describe the possible limitations.
3. **Results:** Efforts will be made to highlight the most relevant results and observations of the investigation, describing, without making judgments, the material and methods used for the analysis. The results will be presented in figures and/or tables according to the journal's standards (See section 4.4). They will appear in a logical sequence in the text, tables or figures, avoiding data redundancy.
4. **Discussion and conclusions:** It will summarize the most important findings, relating the observations with interesting studies, pointing to contributions and limitations, without resulting in data already commented in other sections. In addition, this section should include deductions and lines for future research.

4.3 Economic support and notes

Economic support (optional): Council Science Editors recommends that authors specify the source of funding for the research. Works on the endorsement of competitive national and international projects will be considered a priority. In any case, for the scientific assessment of the manuscript, it must be anonymized with XXXX only for its initial evaluation, in order not to identify authors and research teams, which must be set out in the Cover Letter and subsequently in the final manuscript.

Notes: if necessary, notes will be at the end of the article (before references). They should be used to clarify terms or make marginal annotations. Note numbers are placed in superscript, both in the text and in the final note. Notes collecting simple bibliographic citations (without comments) are not allowed, as these should be in the references. If it contains a cite, the reference must also be found in the Bibliography section.

4.4 Bibliography

Bibliographical citations should be reviewed in the form of references to the text. Bibliography that is not cited should not be included in the text. Its number must be sufficient and necessary to contextualize the theoretical framework, methodology used and research results in an international research space: minimum 35 for empirical research manuscripts, and around 70 for literature studies and reviews.

They will be presented alphabetically by the author's first last name (adding the second one only in case the first one is very commonly used). The quote should be extracted from the original documents, preferably journals and to a lesser extent books. Given the significance of citation indixes and impact factor calculations, the use of references from indexed publications in JCR and/or Scopus and the correct citation following APA 7 norms is valued (http://bit.ly/35FNGvN).

It is mandatory that references with DOI (Digital Object Identifier System) be written in the References (can be obtained on https://search.crossref.org/). All journals and books without DOI must contain a link (in its online version, if applicable, and in a shorten version using Bitly: https://bitly.com/), and the websites must include the consultation date using the format provided.

Journal articles must be presented in English, with the exception of those in Spanish and English, in which case they will be presented in both languages using square brackets.

Norms for the references

a) Periodic publications

- **Journal article (one author):** Ochoa, A. (2019). The type of participation promoted in schools is a constraint factor for inclusive education. [El tipo de participación que promueve la escuela, una limitante para la inclusión]. *Alteridad, 14*(2), 184-194. https://doi.org/10.17163/alt.v14n2.2019.03

- **Manuscript from a journal (until twenty authors):** Guarderas, P., Larrea, M., Cuvi, J., Vega, C., Reyes, C., Bichara, T., Ramírez, G., Paula, Ch., Pesantez, L., Íñiguez, A., Ullauri, K., Aguirre, A., Almeida, M., & Arteaga, E. (2018). Sexual harassment in Ecuadorian universities: content validation for instrument development. [Acoso sexual en las universidades ecuatorianas: validez de contenido de un instrumento de medición]. *Alteridad, 13*(2), 214-226. https://doi.org/10.17163/alt.v13n2.2018.05
- **Manuscript from a journal (without DOI): López, L., &** Ramírez-García, A. (2014). Medidas disciplinarias en los centros educativos: ¿Suficientes contra el acoso escolar? *Perfiles Educativos, 36*(145), 32-50. *https://bit.ly/37Xd5mw*

b) Books and chapters of books

- **Complete books:** Cuéllar, J.C., & Moncada-Paredes, M.C. (2014). *El peso de la deuda externa ecuatoriana.* Abya-Yala.
- **Chapter of books:** Padilla-Verdugo, J. (2014). La Historia de la Educación desde los enfoques del conocimiento. In E. Loyola (Ed.), *Ciencia, Tecnología y Sociedad (CTS). Miradas desde la Educación Superior en Ecuador* (pp. 107-128). Abya-Yala. https://bit.ly/3etRnZH

c) PhD or Master dissertations

- Llorent, M. (2019). *Las políticas educativas TIC en el plano autonómico: el caso de Andalucía* [Tesis doctoral, Universidad de Sevilla]. Depósito de Investigación Universidad de Sevilla. https://bit.ly/3YRTRr5

Guidelines for Headings, Tables and Figures

The headings of the article shall be numbered in Arabic, without full case of capital letters, no underscores, no bold ones. The numbering must be at most three levels: 1. / 1.1. / 1.1.1. A carriage return will be established at the end of each numbered heading.

Tables and figures must be presented in the text in Word or LaTeX located in the place selected by the authors. They shall be used only when necessary and suitable, and must be up to 6 between tables and figures (more only under extraordinary cases if justified). Both must be listed in Arabic and titled with the description of their content. If the source of the table or figure corresponds to another author, the authors must incorporate the source consulted below the table [for example, Source: Romero-Rodríguez (2016, p. 32)].

Tables must be elaborated in document, thus tables cut and pasted from other documents that cannot be edited in the diagramming process will not be accepted. The figures, in addition to being incorporated in the document, must be sent as supplementary material when submitting to «Alteridad» OJS, with a quality greater than 600 dpi, in TIFF, JPEG or PNG files.

In the case of LaTeX/Overleaf, figures must be loaded in the template in original PDF format in order to maintain its quality, since conversion from other formats can lower the quality of the figure. In the case of Word, in addition to being incorporated in the document, figures must be sent as complementary material when submitting the file on the OJS of "Alteridad", having a quality higher than 600 dpi in TIFF, JPEG or PNG.

5. Fees and APC

«Alteridad» is an Open Access journal, included in the Directory of Open Access Journals (DOAJ) that offers all its production online for the scientific community. There are not fees throughout the editorial process for the publishing articles, including scientific review, layout and translation thereof. There is no publication fee, no Article Processing Charge (APC) associated with this publication, neither for authors nor for readers. The journal is also licensed by Creative-Commons Attribution-Non-Commercial-Share Equal (RoMEO blue journal), which allows free access, download and archive of published articles. All expenses and financing of «Alteridad» derive from the contributions made by the Salesian Polytechnic University.

6. Ethical responsibilities

Each author shall submit a responsible statement of authorship and originality, as well as their ethical responsibilities.

- **Originality:** The works must be original and should not be evaluated simultaneously in another publication; hence, the authors are responsible to comply with this standard. The

opinions expressed in the published articles are the responsibility of the author/s «Alteridad» as CrossRef®›s international partner, uses the CrossCheck® and iThenticate® anti-plagiarism tool to ensure the originality of the manuscripts.

- **Authorship:** The list of signatory authors should include only those who have contributed intellectually to the development of the work. Collaborating in data collection is not sufficient criteria of authorship. «Alteridad» rejects any responsibility for possible conflicts arising from the authorship of the manuscripts published.
- **Use of Artificial Intelligence:** In case artificial intelligence is used at any stage of the research presented in the article, authors have to clearly highlight it in the cover letter/coverletter associated with the article, indicating the specific section(s) where artificial intelligence has been used. The purpose of this indication is to inform readers about the sections where this technology has been used, providing more transparency and understanding about its application in the research presented.
  The journal Alteridad recognizes the importance of maintaining high ethical standards in scientific research, particularly in the use of artificial intelligence (AI).
  It is at the discretion of the editorial team, the acceptance of the publication that has used artificial intelligence.
- **Transmission of copyright:** the transfer of rights of the manuscript published in «Alteridad» will be included in the cover letter. The Salesian Polytechnic University (the publisher) has the copyright of published articles; it favors and allows the reuse of these under the license indicated above.

7. Promotion and dissemination of the published article

The authors commit to disseminate their published article as well as to the whole journal using the link of the website of "Alteridad" (https://alteridad.ups.edu.ec/index.php/alteridad/). In addition, they are encouraged to share their published article in academic networks (Academia.edu, ResearchGate, Mendeley, Kudos, ...), social networks (Twitter, Facebook, LinkedIn, ..., also publishing the DOI in these), institutional repositories, Google Scholar, ORCID, web or personal blog, among others. Authors are also encouraged to share the published article through email lists, research groups, and personal contacts.

«Alteridad» has a Metric Measurement System (PlumX) that allows verifying the compliance with this commitment. The impact of previous works will be considered for submitting future articles in «Alteridad».

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Normas de publicación en «Alteridad»

1. Información general

«Alteridad» es una publicación científica bilingüe de la Universidad Politécnica Salesiana de Ecuador (UPS), editada desde enero de 2006 de forma ininterrumpida, con periodicidad fija semestral (enero-julio).

Es una revista científica arbitrada, que utiliza el sistema de evaluación externa por expertos (*peer-review*), bajo metodología de pares ciegos (*doble-blind review*), conforme a las normas de publicación de la *American Psychological Association* (APA). El cumplimiento de este sistema permite garantizar a los autores un proceso de revisión objetivo, imparcial y transparente, lo que facilita a la publicación su inclusión en bases de datos, repositorios e indexaciones internacionales de referencia.

«Alteridad» se encuentra indexada en el *Emerging Sources Citation Index* (ESCI) de *Web of Science*, en la *Scientific Electronic Library Online* (SciELO), en el Sistema de Información Científica REDALYC, en el directorio y catálogo selectivo del Sistema Regional de Información en Línea para Revistas Científicas de América Latina, el Caribe, España y Portugal (Latindex), en el *Directory of Open Access Journals* (DOAJ), en el *European Reference Index for the Humanities and Social Sciences* (ERIHPLUS), en el Portal Dialnet; está evaluada en la Matriz de Información para el Análisis de Revistas (MIAR), en la Clasificación Integrada de Revistas Científicas (CIRC), y en el sistema Qualis de revisión de revistas de CAPES. Además, se encuentra en repositorios, bibliotecas y catálogos especializados de todo el mundo.

La revista se edita en doble versión: electrónica (e-ISSN: 1390-8642) e impresa (ISSN: 1390-325X) en español e inglés; siendo identificado cada trabajo con un *Digital Object Identifier System* (DOI). Todos los artículos publicados en «Alteridad» tienen licencia Creative Commons Reconocimiento-No-Comercial-Compartir igual (RoMEO blue journal).

2. Alcance y política

2.1 Temática

«Alteridad» es una revista especializada en Educación y sus líneas transdisciplinares como Didáctica, Gestión de Centros Escolares, Educomunicación, tecnología educativa, Pedagogía Social, entre otras; y todas aquellas disciplinas conexas interdisciplinarmente con la línea temática central.

2.2 Aportaciones

Todos los trabajos deben ser originales, no haber sido publicados en ningún medio ni estar en proceso de arbitraje o publicación. Se editan preferentemente resultados de investigación empírica, redactados en español, portugués o inglés, siendo también admisibles estudios y selectas revisiones de la literatura (*state-of-the-art*):

a) Investigaciones: 5000 a 7500 palabras de texto, incluyendo título, resúmenes, descriptores, tablas y referencias. Se valorarán especialmente los resultados de la investigación, el rigor metodológico, la relevancia de la temática, la calidad de la discusión científica, la variedad, actualidad y riqueza de las referencias bibliográficas (preferiblemente de publicaciones indexadas en JCR y Scopus). Se esperan mínimo 35 referencias.

b) Estudios y revisiones de la literatura

- **Estudios:** 5000 a 7500 palabras de texto, incluidas tablas y referencias. Se valorará especialmente el debate generado, la relevancia de la temática, la originalidad de las aportaciones y riqueza de las referencias bibliográficas (preferiblemente de publicaciones indexadas en JCR y Scopus). Se esperan mínimo 35 referencias.

- **Revisiones de la literatura:** 6000 a 8500 palabras de texto, incluidas tablas y referencias. Se valorará la revisión exhaustiva del estado de la cuestión de un tema de investigación actual con referencias justificadas y selectivas de alrededor de 70 obras (preferiblemente de publicaciones indexadas en JCR y Scopus).

2.3 Secciones

La revista tiene periodicidad semestral (20 artículos por año), publicada en los meses de enero y julio y cuenta por número con dos secciones de cinco artículos cada una, la primera referida a un tema **Monográfico** preparado con antelación y con editores temáticos y la segunda, una sección de **Misceláneas**, compuesta por aportaciones variadas que traten temas educativos de forma prioritaria.

3. Proceso editorial

3.1 Envío de manuscritos

Los manuscritos deben ser enviados única y exclusivamente a través del *Open Journal System* (OJS), en el cual todos los autores deben darse de alta previamente, si bien uno solo de ellos será el responsable de correspondencia. Ningún autor podrá enviar o tener en revisión dos manuscritos de forma simultánea, estimándose una carencia de cuatro números consecutivos (2 años). Un artículo podrá tener como máximo 3 autores, aunque si se justifica en función del tamaño del estudio, podrán ser hasta 5.

«Alteridad» acusa recepción de los trabajos enviados por los autores e informa por email y mediante la plataforma del proceso de aceptación o rechazo; y en el caso de aceptación, del proceso de edición.

En el Portal oficial de la revista, en la sección Normativas, están las Normas para Autores, las plantillas para la redacción de los manuscritos (LaTeX/Overleaf o Word), la Portada y Carta de presentación, el Protocolo de chequeo previo al envío, los formularios de evaluación por parte de los revisores externos y una guía para el envío del artículo a través de OJS. Antes de su envío se recomienda encarecidamente que se compruebe el manuscrito con el Protocolo de chequeo previo. Deben remitirse simultáneamente dos archivos:

a) Portada y Carta de presentación (usar el modelo oficial), en la que aparecerán:

- **Portada** (Título, Resumen y Descriptores previstos en el Manuscrito).
- **Nombre y apellidos completos** de cada uno de los autores, organizados por orden de prelación; seguido por la categoría profesional, centro de trabajo, correo electrónico de cada autor y número de ORCID. Es obligatorio indicar si se posee el grado académico de doctor (incluir Dr./Dra. antes del nombre).
- Se incluirá además una **declaración** (Cover letter) de que el manuscrito se trata de una aportación original, no enviada ni en proceso de evaluación en otra revista, confirmación de las autorías firmantes, aceptación (si procede) de cambios formales en el manuscrito conforme a las normas y cesión parcial de derechos a la editorial.
- **Manuscrito** totalmente anonimizado, conforme a las normas referidas en el epígrafe 4.

3.2 Proceso de revisión

En un plazo máximo de 30 días, a partir de la recepción del documento, el autor de correspondencia recibirá una notificación, indicando preliminarmente si se estima o desestima para el arbitraje por los revisores científicos. En el caso de que el artículo presente deficiencias formales, no trate el tema educativo o tenga un elevado porcentaje de similitud con otro(s) documento(s), el Consejo editorial desestimará el trabajo sin opción de vuelta. Por el contrario, si presenta carencias superficiales de forma, se devolverá al autor para su corrección antes de comenzar del proceso de evaluación. La fecha de recepción del artículo no computará hasta la recepción correcta del mismo.

Los artículos serán evaluados científicamente por una media de tres expertos en el tema. Los informes indicarán las siguientes recomendaciones: Aceptar el envío, Publicable con modificaciones, Reenviar para revisión, No publicable. A partir del análisis de los informes externos, se decidirá la aceptación o rechazo de los artículos para su publicación. En el caso de resultados discrepantes se remitirá a un nuevo dictamen, el cual será definitivo. El protocolo utilizado por los revisores es público (Investigaciones; Estudios y revisiones de la literatura).

En general, una vez vistas las revisiones científicas externas, los criterios que justifican la decisión sobre la aceptación/rechazo de los trabajos por parte del Consejo Editor son los siguientes:

- Actualidad y novedad.
- Relevancia y significación: avance del conocimiento científico.
- Originalidad.
- Fiabilidad y validez científica: calidad metodológica contrastada.
- Organización (coherencia lógica y presentación formal).
- Apoyos externos y financiación pública/privada.
- Coautorías y grado de internacionalización de la propuesta y del equipo.
- Presentación: buena redacción.

El plazo de evaluación científica de manuscritos, superados los trámites previos de estimación por el Consejo Editor, es de 100 días como máximo; los remitidos para *Calls for papers*, sus fechas de revisión científica se inician al cierre de los mismos. Los trabajos que sean evaluados positivamente y requieran modificaciones, deberán ser reenviados con los cambios, dentro de los siguientes 15 días.

3.3 Edición y publicación del manuscrito

El proceso de corrección de estilo y maquetación de los artículos aceptados es realizado por el Consejo Técnico de la Revista en coordinación con la Editorial Abya-Yala. «Alteridad» se reserva el derecho de hacer corrección de estilo y cambios editoriales que considere necesarios para mejorar el trabajo. A los autores de artículos se enviará una prueba de imprenta en formato PDF para su corrección únicamente de tipografía y ortografía, mismo que deberán reenviar en un máximo de tres días. La Editorial realizará, gratuitamente para los autores, la traducción profesional de la versión final del manuscrito al idioma inglés (o español, según la versión original), lo que garantizará su consulta y difusión internacional. Los artículos serán publicados en la plataforma de la revista en sus dos versiones idiomáticas (español e inglés) y en los siguientes formatos: PDF, HTML, EPUB y XML-Jats.

4. Estructura de los manuscritos

Los trabajos se presentarán en tipo de letra Arial 10, interlineado simple, justificado completo y sin tabuladores ni espacios en blanco entre párrafos. Solo se separarán con un espacio en blanco los grandes bloques (título, autores, resúmenes, descriptores, créditos y epígrafes). La página debe tener dos centímetros en todos sus márgenes. Los trabajos deben presentarse en formato de Microsoft Word (.doc o .docx) (https://alteridad.ups.edu.ec/pdf/alteridad/Plantilla Microsoft Word.docx) o LaTeX/ Overleaf (.tex) (https://www.overleaf.com/latex/templates/revista-alteridad-ecuador/svvjcbgmcrrv), siendo necesario que el archivo esté anonimizado en Propiedades de Archivo, de forma que no aparezca la identificación de autor/es.

4.1 Portada

Título (español) / Title (inglés): Conciso pero informativo, en castellano en primera línea y en inglés en segunda, conformado por el mayor número de términos significativos posibles. El título no solo es responsabilidad de los autores, pudiéndose proponer cambios por parte del Consejo Editorial. Se aceptan como máximo 80 caracteres con espacio.

Resumen (español) / Abstract (inglés): Se describirán de forma concisa y en este orden: justificación del tema, objetivos, metodología empleada (enfoque y alcance), resultados más relevantes, discusión y principales conclusiones. Ha de estar escrito de manera impersonal "El presente trabajo analiza…". En el caso del *Abstract* no se admitirá el empleo de traductores automáticos. Tendrá como extensión entre 220/230 palabras.

Descriptores (español) / Keywords (inglés): Se deben exponer 6 descriptores por cada versión idiomática relacionados directamente con el tema del trabajo. Será valorado positivamente el uso de las palabras claves expuestas en el Thesaurus de la UNESCO (http://bit.ly/2kIgn8I). Solo en casos excepcionales se aceptarán términos nuevos, siempre que tengan un carácter científico estandarizado.

4.2 Estructura IMRDC

Para aquellos trabajos que se traten de Investigaciones de carácter empírico, los manuscri-

tos respetarán rigurosamente la estructura IMRDC, siendo opcionales los epígrafes de Apoyos y Notas. Los trabajos que se traten de Estudios y revisiones de la literatura podrán ser más flexibles en sus epígrafes, especialmente en Metodología, Resultados y Discusión. En todas las tipologías de trabajos son obligatorias las Referencias bibliográficas.

1 **Introducción:** Debe incluir los fundamentos teóricos y el propósito del estudio, utilizando citas bibliográficas, así como la revisión de la literatura o los trabajos relacionados más significativos del tema a nivel nacional e internacional. Se valorará positivamente el uso de referencias de alto impacto (JCR y Scopus).
2 **Metodología:** El enfoque, alcance y diseño metodológico deben ser redactados de forma que el lector pueda comprender con facilidad el desarrollo de la investigación. En su caso, describirá la muestra y la forma de muestreo, así como se hará referencia al tipo de análisis estadístico aplicado. Si se trata de una metodología original, es necesario exponer las razones que han conducido a su empleo y describir sus posibles limitaciones.
3. **Resultados:** Se procurará resaltar los resultados y las observaciones más relevantes de la investigación, describiéndose, sin hacer juicios de valor, el material y métodos empleados para el análisis. Los resultados se expondrán en figuras o/y tablas según las normas de la revista (Ver epígrafe 4.4). Aparecerán en una secuencia lógica en el texto, las tablas o figuras imprescindibles, evitando la redundancia de datos.
4. **Discusión y conclusiones:** Resumirá los hallazgos más importantes, relacionando las propias observaciones con estudios de interés, señalando aportaciones y limitaciones, sin redundar datos ya comentados en otros apartados. Asimismo, el apartado de discusión y conclusiones debe incluir las deducciones y líneas para futuras investigaciones.

4.3 Apoyos y Notas

Apoyos (opcionales): El *Council Science Editors* recomienda a los autor/es especificar la fuente de financiación de la investigación. Se considerarán prioritarios los trabajos con aval de proyectos competitivos nacionales e internacionales. En todo caso, para la valoración científica del manuscrito, este debe ir anonimizado con XXXX solo para su evaluación inicial, a fin de no identificar autores y equipos de investigación, que deben ser explicitados en la Carta de Presentación y posteriormente en el manuscrito final.

Las notas: En caso necesario, irán al final del artículo (antes de las referencias). Deben ser utilizadas para aclarar términos, hacer anotaciones marginales o indicar el posible uso de herramientas de Inteligencia Artificial. Los números de notas se colocan en superíndice, tanto en el texto como en la nota final. No se permiten notas que recojan citas bibliográficas simples (sin comentarios), pues éstas deben ir en las referencias. En caso de contener alguna cita, su referencia deberá encontrarse también en la sección de Referencias bibliográficas.

4.4 Referencias bibliográficas

Las citas bibliográficas deben reseñarse en forma de referencias al texto. No debe incluirse bibliografía no citada en el texto. Su número ha de ser suficiente y necesario para contextualizar el marco teórico, la metodología usada y los resultados de investigación en un espacio de investigación internacional: mínimo 35 para los manuscritos de investigaciones de carácter empírico, y alrededor de 70 para los estudios y revisiones de literatura.

Se presentarán alfabéticamente por el primer apellido del autor (agregando el segundo solo en caso de que el primero sea de uso muy común). Las citas deberán extraerse de los documentos originales preferentemente revistas y en menor medida libros. Dada la trascendencia para los índices de citas y los cálculos de los factores de impacto, se valorarán positivamente el uso de referencias provenientes de publicaciones indexadas en JCR y/o Scopus y la correcta citación conforme a la Norma APA 7 (http://bit.ly/35FNGvN).

Es prescriptivo que todas las citas que cuenten con DOI (Digital Object Identifier System) estén reflejadas en las Referencias (pueden obtenerse en https://search.crossref.org/). Todas las revistas y libros que no tengan DOI deben aparecer con su link (en su versión on-line, en caso de que la tengan, acortada, mediante Bitly: https://bitly.com/), y de los sitios web además la fecha de consulta en el formato indicado.

Normas para las referencias

a) Publicaciones periódicas

- **Artículo de revista (un autor):** Ochoa, A. (2019). The type of participation promoted in schools is a constraint factor for inclusive education. *Alteridad, 14*(2), 184-194. https://doi.org/10.17163/alt.v14n2.2019.03
- **Artículo de revista (hasta veinte autores):** Guarderas, P., Larrea, M., Cuvi, J., Vega, C., Reyes, C., Bichara, T., Ramírez, G., Paula, Ch., Pesantez, L., Íñiguez, A., Ullauri, K., Aguirre, A., Almeida, M., & Arteaga, E. (2018). Acoso sexual en las universidades ecuatorianas: validez de contenido de un instrumento de medición. *Alteridad, 13*(2), 214-226. https://doi.org/10.17163/alt.v13n2.2018.05
- **Artículo de revista (sin DOI):** López, L., & Ramírez-García, A. (2014). Medidas disciplinarias en los centros educativos: ¿Suficientes contra el acoso escolar? *Perfiles Educativos, 36*(145), 32-50. https://bit.ly/37Xd5mw

b) Libros y capítulos de libro

- **Libros completos:** Cuéllar, J.C., & Moncada-Paredes, M.C. (2014). *El peso de la deuda externa ecuatoriana.* Abya-Yala.
- **Capítulos de libro:** Padilla-Verdugo, J. (2014). La Historia de la Educación desde los enfoques del conocimiento. In E. Loyola (Ed.), *Ciencia, Tecnología y Sociedad (CTS). Miradas desde la Educación Superior en Ecuador* (pp. 107-128). Abya-Yala. https://bit.ly/3etRnZH

c) Tesis doctorales y de maestría

- Llorent, M. (2019). *Las políticas educativas TIC en el plano autonómico: el caso de Andalucía* [Tesis doctoral, Universidad de Sevilla]. Depósito de Investigación Universidad de Sevilla. https://bit.ly/3YRTRr5

d) Medios electrónicos

- Aunión, J. (2011, marzo 12). La pérdida de autoridad es un problema de toda la sociedad, no es específico del aula. *El País.* https://bit.ly/2NlM9Dp

Normas para epígrafes, tablas y figuras

Los epígrafes del cuerpo del artículo se numerarán en arábigo. Irán sin caja completa de mayúsculas, ni subrayados, ni negritas. La numeración ha de ser como máximo de tres niveles: 1. / 1.1. / 1.1.1. Al final de cada epígrafe numerado se establecerá un retorno de carro.

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