

# Cognitive Profiles of Mexican Elementary Education Teachers on School Inclusion of Students with Disability

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**Abstract:** This research investigated the attitudes of 99 elementary education teachers toward the inclusion of students with disabilities in schools. The present authors designed a factorial experiment with 2 (View on learning difficulties: static vs. interactionist) x 2 (Teacher approach: teaching vs. learning) x 2 (Social climate: homogeneous vs. heterogeneous) x 3 (Institutional culture: individualistic vs. delegation vs. collaborative). The orthogonal combination of these factors resulted in 24 experimental conditions ready to build the 24 experimental scenarios of this study. Each scenario described a hypothetical story about the thinking of teachers who faced a school inclusion situation. The experimental task for the participants was to read each scenario individually and then assess their level of identification with the protagonist. The results indicated two types of teacher profiles among the participants: the pre-inclusive profile, which showed a low level of identification towards the inclusive vision, and the inclusive profile, which presented a moderate level of school inclusiveness. The most relevant factors for making inclusive judgments in both groups were the diversity climate ( $\eta_p^2 = 0.24$ ) and professional culture ( $\eta_p^2 = 0.13$ ). However, the pre-inclusive group showed a greater affinity with school homogeneity and individual work. In contrast, the second group showed greater acceptance of diversity and collaboration in school inclusion. In this article, the present authors discuss the implications of these findings within the classroom.

**Keywords:** Cognitive algebra, disability, elementary education, school inclusion, teachers.

## 1. INTRODUCTION

A society that provides adequate conditions for all its members, regardless of race, religion, or physical or intellectual abilities, to have access to education is a society that has achieved a high level of human development. Providing access to education gives each individual the opportunity to gain intellectual and personal improvement. According to UNESCO's 2030 Agenda for Sustainable Development [1], promoting inclusion and equity is crucial for establishing an educational system that counters exclusion and marginalization, eliminates disparities and inequalities in access to participation, and enhances learning outcomes.

In this regard, UNESCO, in the Salamanca Declaration of 1994 [2], emphasized that primary and secondary education professionals require training with a positive orientation towards disability to ensure a shift towards inclusive education; this statement underscores the role of teachers as central agents in the inclusion process [3].

Along these lines, Boyle *et al.* [4] suggested that negative teacher attitudes and expectations toward student capacity can become significant barriers to learning and hinder the inclusion process. Promoting positive attitudes towards disabilities requires that teachers accept and take ownership of the inclusive vision in education; facing this challenge requires encouraging awareness-raising and training considering a new teaching profile [5,6], which should include four values: support for all students with high expectations for all, the belief of the student diversity is an educational resource, the ongoing professional development, and the collaborative work [7].

About the first value, Herrera-Seda *et al.* [8] found that teachers' conceptions regarding the possibility of changing students' learning oscillated between two poles: a deterministic point of view, which assumed that there is no possibility of transforming students' capacities, and a transformable view, which supposes that the teaching-learning process can modify the students' capacities. In addition, they observed that most teachers tended to assume the transformative stance, which favored inclusive teaching practices. These results align with the findings of other studies [9,10]. According to Muntaner [11], this kind of teacher profile is consistent with a stance of acceptance and respect for diversity because it does not stigmatize students under any criterion.

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In contrast to the previous result, Amaro *et al.* [12] reported, in their study on Chilean teachers' attitudes toward diversity, a strong tendency among participants to use the deficit paradigm as the primary frame of reference for addressing the diversity of their students. This static view of students' abilities is an inheritance from the clinical model, which focuses on illness [13]. Thus, the clinical diagnostic model on disabilities sometimes implies that the students receive labels to categorize their abilities without considering their context. It hinders the academic development of students, as labels can elicit stigmas and negative stereotypes in the classroom, which impose limits on their learning [14] and generate low expectations for their potential performance [15].

Another factor that could hinder students' expectations for learning trends is the pessimistic beliefs that teachers hold about students' abilities. Suppose they believe that ability cannot change and that learning difficulties are inherent to the person, unchangeable, and permanent. In that case, there are fewer opportunities for students to experience academic growth. The teachers' beliefs about disabilities appear to have a substantial effect on their actions and decisions in the classroom [16]; for this reason, Lauchlan and Boyle [15] pointed out that it is essential to avoid labeling students because they often negatively influence the teachers' learning process vision.

There are two general approaches regarding the learning process: the interactionist and static view of learning. The first one proposes that learning is the adjustment that emerges from the interaction between persons and their environment. In the education field, learning occurs from the interaction between teacher and student, which requires mutual feedback [17]; since adaptative relationships between students and teachers seem to be a core element of teaching labor [18], it should be noted the importance to training teachers in relational competences to promotes teaching strategies and actions focused on developing students' capabilities through the educational interactive process. This teaching approach permeates the educational assessment system with a new trend, incorporating observation, analysis, and continuous recording of students' learning needs as an essential element of feedback within the educational system.

In contrast, the static model of learning capabilities promotes the stigma of students with difficulties and restricts learning assessment through static

measurements. To avoid the static view of learning, UNESCO [3] emphasizes the importance of educational systems promoting teacher training opportunities that contribute to dismantling the belief that some students are incapable of learning due to a particular condition. Then, it is essential that teachers critically examine their beliefs, as they significantly impact their educational practice [19].

Very close to the type of teachers' vision of the nature of students' abilities is the value of how they conceptualize diversity within the classroom. Knowing how teachers represent diversity is crucial to identifying barriers and opportunities to achieve the goals of the established curriculum [20]. When teachers assume that diversity is something ordinary, they break down the barriers to bias toward students categorized as unique. Indeed, each student is unique in their way [21]. Thus, teacher training is necessary to encourage the observation of the particularities of each student's thoughts, tastes, and interests, regardless of their context, to design a quality and inclusive education for all [22].

In this regard, Anjovich [23] points out that recognizing each student's individuality implies teaching from the heterogeneity within the classroom with the conviction that everyone can learn. However, even today, in the educational system, a vision of homogeneous grouping predominates, which, according to Echeita *et al.* [24], seeks to integrate groups of students with uniform characteristics, separating students with special educational needs from those who are "regular," these selective groupings reduce diversity [25], which has an unfavorable influence on the learning process [26].

Considering the above, Marchesi *et al.* [27] suggested that heterogeneous groupings should replace homogeneous ones, as they are expected to favor academic performance, personal relationships, and language development [28]. Anijovich [23] points out that heterogeneous classrooms necessarily require flexibility in organizing space, time, learning channels, and groupings, as well as the use of resources in different ways depending on the situation and learning objectives, considering that students must progress according to their personal and social cognitive abilities.

Designing educational environments that consider heterogeneous groupings benefits students by exposing them to different points of view and

experiences in class, making differences a more available resource in the classroom [29]. In this regard, Puigdemívol and Krastina [30] noted that classrooms with heterogeneous groupings foster cooperation, solidarity, and the development of relationships among students. Additionally, they promote an interactionist perspective on disability among teachers and provide strategies to address the educational needs of students.

Heterogeneity in the classroom presents new challenges, including finding a balance between teaching and learning, which depends on the influence of various variables associated with the characteristics of the protagonists, the context, the teaching action, and the student's experiences. Therefore, teaching is no longer the core of education; now, students are the protagonists of their own learning process [31].

The educational approach to learning requires leaving behind the practices of the teaching-centered approach, such as inflexibly following the curriculum without considering the characteristics and needs of students, moving beyond memorization practices, and conceiving the teacher as a facilitator of learning rather than a rigid reproducer of different teaching practices [32]. To achieve this paradigm shift, it is necessary to make effective the third value of the inclusive teaching profile, the promotion of constant professional development, in new work methodologies in the classroom that keep the student's mind active, promote their involvement and meaningful learning, and are focused on the strengths and needs of the students [33,34].

Furthermore, heterogeneous classrooms require teachers to be open to new forms of participation and collaboration. In this regard, Marchesi *et al.* [27] note that schools that implement collaborative strategies more easily overcome learning barriers. Therefore, the shift in school culture from an individualistic or delegating teaching approach to a collaborative one is fundamental for developing environments that foster the academic growth of both students and teachers.

The first step in promoting the four values of the inclusive profile is determining how teachers cognitively appropriate these values; in order to do this, first, it is important to identify if they consider each of these values as an essential part of their teaching profile, how they incorporate these in an integrated way, and under what contexts they activate these cognitive mechanisms of information integration on school

inclusion. One way to approach this diagnostic need is through Norman Anderson's Information Integration Theory or IIT, which proposes that human beings, including teachers at all educational levels, act and make decisions using three cognitive operators or mechanisms (evaluation, integration, and response) to process the multiple sources of information that they select from the environment in which they operate [35].

Valuation is a cognitive process that involves creating a psychological representation of physical stimuli, which encompasses the purposes and individual experiences of each person, resulting in subjective mental values assigned to the valued stimuli. The combination of these psychological values results in a unitary response of an implicit nature, and this cognitive operator involves the concept of multiple determination. Finally, the implicit response is made explicit through the response operator and can manifest itself in an expression of behavior, an explicit judgment [36].

Using cognitive algebraic operators or processes to examine the inclusive teacher profile could be fructiferous to the educative field; however, there is only a handful of IIT research works related to determining the cognitive function that underlies judgments and attitudes towards school inclusion [37], job training [38], and social inclusion [39]. In this regard, Morales *et al.* [37] reported that special education teachers and psychology students had a moderately favorable expectation of success toward school inclusion when they judged the circumstances of elementary education students with physical or intellectual disabilities. Furthermore, these authors found that factors related to the school environment ( $\eta_p^2 = 0.82$ ), social support ( $\eta_p^2 = 0.78$ ), and disability severity ( $\eta_p^2 = 0.42$ ) modulated participants' judgments through a summative algebraic cognitive mechanism.

In a second study, Morales *et al.* [37] investigated the impact of teaching-related variables on the school inclusion success expectations of special education teachers and psychology students. Their experimental design took into account factors such as student gender, severity of disability, teaching level, and teacher experience in school inclusion programs. The results of their study indicated that the severity of disability ( $\eta_p^2 = 0.66$ ), followed by teacher experience ( $\eta_p^2 = 0.55$ ) and school level ( $\eta_p^2 = 0.17$ ), were the factors with the most significant weight in forming the special education teachers' judgments on inclusive education success. Psychology students enrolled in

special education courses reported that the most relevant factor in judging the inclusion success level was the teacher's experience in inclusive school programs ( $\eta_p^2 = 0.73$ ), followed by the severity of the disability ( $\eta_p^2 = 0.66$ ) and the grade level ( $\eta_p^2 = 0.16$ ). Both groups, teachers and psychology students, systematically integrate these pieces of information on school inclusion by using a summative cognitive rule. However, the valuation of the factors differs among them. For example, psychology students drastically lower their expectations of school inclusion success when the disability severity is high. At the same time, teachers tend to be more moderate in their success judgments even when the student has a severe disability.

On the other hand, Morales-Martinez *et al.*[38] investigated the cognitive functions underlying the judgments of success by special education teachers and students during an inclusive job training program for people with intellectual disabilities (PWID). These authors found three views among participants: low optimism ( $M=4.5$ ), moderate optimism ( $M=6.4$ ), and highly optimistic ( $M=8.2$ ). A tripartite mental model appears to prevail among these three approaches, which combine information about disability severity, the student's emotional traits, and the task type to be learned multiplicatively. However, the valuation of the factors differed between the low optimism view and the other visions. The group with the lowest expectations for skills training of PWID considered disability severity ( $\eta_p^2 = 0.70$ ) as the factor with the most significant relevance in their judgments, followed by the emotional traits of the student ( $\eta_p^2 = 0.56$ ) and the task type ( $\eta_p^2 = 0.16$ ). While the cluster with medium and high expectations assigned greater importance to the emotional traits of the students ( $\eta_p^2 = 0.72$ ,  $\eta_p^2 = 0.74$ ), followed by disability severity ( $\eta_p^2 = 0.58$ ,  $\eta_p^2 = 0.67$ ) and the type of task to be learned ( $\eta_p^2 = 0.21$ ,  $\eta_p^2 = 0.28$ ).

In general, these studies indicate that the intensity of inclusive attitudes can vary from low to highly favorable, and the integration rules in this field can vary depending on the types of factors (e.g., individual, contextual, situational) involved in experimental scenarios. Further exploration is necessary to broaden our understanding of how the nature and combination of possible factors modulate cognitive functions (selection, valuation, integration, and explicit cognitive behavior) to form an inclusive teaching vision. This study examines new sources of information that

influence teachers' judgments about school inclusion, considering the current perspective on inclusive teacher training. It introduces a new question about which factors and cognitive functions intervene to form inclusive teaching identity in elementary education teachers.

## 2. MATERIALS AND METHODS

The present study measured the attitudes of elementary education teachers toward the inclusion of students with disabilities in schools.

### 2.1. Study Design and Variables

The experimental factorial design of this study orthogonally combined four factors and their sublevels: 2(Point of view on learning difficulties: static vs. interactionist) x2(Teacher approach: teaching vs. learning) x2(Diversity climate: homogeneous vs. heterogeneous) x3(Professional culture: individualistic vs. delegating vs. collaborative) to create 24 experimental conditions, which assembled the experimental scenarios of the study instrument.

### 2.2. Participants

Ninety-nine elementary school teachers (78% women, 22% men) participated in this study; all of them were volunteers without financial compensation for their participation. Seventy-two percent were graduates, and 28% held a master's degree in education. Twenty-one percent of participants had between 1 and 5 years of teaching experience, 17% had between 6 and 10 years, 17% had between 11 and 15 years, 16% had between 16 and 20 years, 11% had between 21 and 25 years, and 17% had more than 25 years of experience. On the other hand, 16% reported having no experience with inclusion programs, 44% had limited experience, 38% had moderate, inclusive experience, and only 1% reported having sufficient experience in school inclusion. This study was part of the teacher training received during the COVID-19 pandemic lockdown, aimed at achieving educational inclusion within their institution.

All participants are teachers in a private school network in northern Mexico. This school network promotes Catholic religious values, and its mission is to provide comprehensive education to children and young people, especially those living in vulnerable conditions [41].

### 2.3. Ethical Approval

This research project was reviewed and approved by the Franco-Mexican College (dated June 25, 2021). At the time of the study, verbal informed consent was obtained from all participants.

### 2.4. Material and Instruments

The authors created 24 experimental scenarios using the 24 experimental conditions derived from the study's experimental design. Each scenario communicated a story about a school inclusion case; at the end of each story appeared a question about the level to which participants felt identified with the protagonist of the scenario; they marked their answer on an eleven-point scale with a left anchor reading "Not at all identified" and a right anchor reading "Completely identified" (Figure 1).

<p>Maria thinks that some students do not have enough capacity to learn. She teaches them the content, but they do not learn it. Therefore, they should receive individual support from a professional outside the classroom while she focuses on teaching the rest of the group.</p> <p>To what extent do you agree with Maria's beliefs?</p> <p>Nothing 0--0--0--0--0--0--0--0--0 A lot identified</p>
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**Figure 1:** Example of experimental scenario.

According to the IIT, the use of experimental scenarios ensures the systematic manipulation and integration of independent variables, as the factorial design allows for the use of all possible combinations of the manipulated variables. Therefore, the combined use of all scenarios enables the observation of cognitive rules because controlled variation is present at all levels of each factor across experimental conditions. Furthermore, the experimental stories, being contextualized in the participants' reality, guarantee the ecological validity of the instrument. In general, the objective of experimental scenarios is to gather information to determine the laws governing people's cognitive processing and to capture how these laws operate in each person's mind.

Regarding the above, the cognitive algebra paradigm enables the mathematical and cognitive modeling of the processing of multiple pieces of information (sublevels of each experimental factor) involved in the elaboration of each cognitive stimulus or scenario. The scenario development process involved a series of stages. The first step was to identify the

factors and sublevels that would be part of the experimental design. There are several ways to select them; here, we used a theoretical review, but they can also come from other sources, such as previous studies and observations of phenomena. After that, the present researchers operationalized the factors through narratives that illustrate each sublevel of the factors and combined these narratives to form each of the experimental scenarios. Finally, we conducted a pilot study to identify ambiguities, factor relevance, and other aspects.

### 2.5. Procedure

The study consisted of three phases; first, researchers delivered an invitation to participate in the study to teachers from different schools within the same educational system. After, participants received information about the study goals, the experimental task, and their rights as participants. Participants gave verbal informed consent, received precise instructions for the study, and practiced the experimental task to familiarize themselves with it. During the study, participants read the 24 experimental scenarios individually. Afterward, they expressed the level to which they identified with the protagonist of the experimental scenario by marking their answer on an 11-point scale.

### 2.6. Data Analysis

The authors applied a cluster analysis (using Euclidean distance and K-means) to the participants' raw data to identify different cognitive styles of judgment regarding school inclusion across the sample. Afterward, they employed a mixed ANOVA and a repeated measures ANOVA on each cluster to examine specific differences in the cognitive mechanism of information integration within each group.

## 3. RESULTS

### 3.1. First Analysis: Cluster Analysis

The cluster analysis revealed two distinct perspectives on the school inclusion process among teachers. The first one (pre-inclusive teacher profile) brought together 60 participants (61%) with an identification low level with the inclusive vision ( $M=3.9$ ,  $SD=1.4$ ), while the second one (inclusive teacher profile) grouped 39 participants (39%) of the sample, with a moderate level of identification with the inclusive teacher profile ( $M=5.6$ ,  $SD=1.3$ ).

### 3.2. Second Analysis: Mixed and Repeated Measures ANOVA for Each Cluster

The factorial design to carry out the mixed ANOVA was a 2(Cluster: inclusive teacher vs. pre-inclusive teacher) x2(Point of view on learning difficulties: static vs. interactionist)x2(Teacher approach: teaching vs. learning) x2(Diversity climate: homogeneous vs. heterogeneous) x3(Professional culture: individualistic vs. delegating vs. collaborative). In contrast, for the repeated measures ANOVA, the same design was used without the clustering factor. In both types of analysis, the level of significance was set at  $p \leq 0.001$ .

The mixed ANOVA indicated that the clusters are significantly different in statistical terms ( $\eta_p^2 = 0.25$ ). In addition, for both groups, the factors with the most significant weight of relevance were the diversity climate ( $\eta_p^2 = 0.24$ ) and professional culture ( $\eta_p^2 = 0.13$ ). However, each cluster valued and integrated these factors differently (see Table 1 and Figure 1).

The pre-inclusive teaching profile cluster showed a greater affinity with a classroom environment characterized by grouping students with similar conditions ( $M = 4.3$ ) and an individualistic professional culture ( $M = 4.3$ ). In contrast, the group with an inclusive profile had greater proximity to groupings of students with diverse conditions ( $M = 7.06$ ) and a collaborative culture ( $M = 6.72$ ). Figure 2 shows that, in the second cluster, the heterogeneous grouping condition enhances the relevance of the collaborative culture.

Regarding the cognitive mechanism of information integration, the visual pattern of the study data (Figure 2) suggests that the pre-inclusive teacher profile cluster employs a rule more similar to the summative one. This cluster appears to cognitively merge the diversity environment and the professional culture effect in an additive way to form a judgment about its level of identification with the inclusive teacher profile. In contrast, cluster 2, inclusive teacher, enhances the effect of the diverse environment differently through the levels of professional culture to form its identity with the inclusive profile.

## 4. DISCUSSION

Developing an inclusive teacher profile is crucial to creating school environments that promote the academic and personal growth of both students and teachers. For this reason, understanding the cognitive

mechanisms or processes involved in the construction of inclusive teacher identity is relevant for the implementation of educational models that consider diversity as a factor that enhances the development of students and teachers since it provides them with diverse sources of information, different models of approaching learning, and a variety of models of social interaction in the academic field. Therefore, the present study examined how teachers select, integrate, and utilize specific training components to develop their inclusive profile. With this purpose in mind, the present authors discuss the various cognitive functions (valuation, integration, and response) involved in the formation of inclusive teacher identity judgments.

Regarding the selection of factors, participants from both clusters considered only two of the four pieces of information provided in each scenario, giving greater weight to factors that implicitly conveyed social information (diverse environment and professional culture) (see Table 1, Figure 2). This finding suggests that pre-inclusive and inclusive teachers assess success in school inclusion within the framework of environmental determinism. This result is consistent with the findings of Morales *et al.* [37], who suggested that contextual or situational factors (the school and social environment) have a greater influence than individual factors related to the student (severity of disability) in determining the chances of success in school inclusion programs.

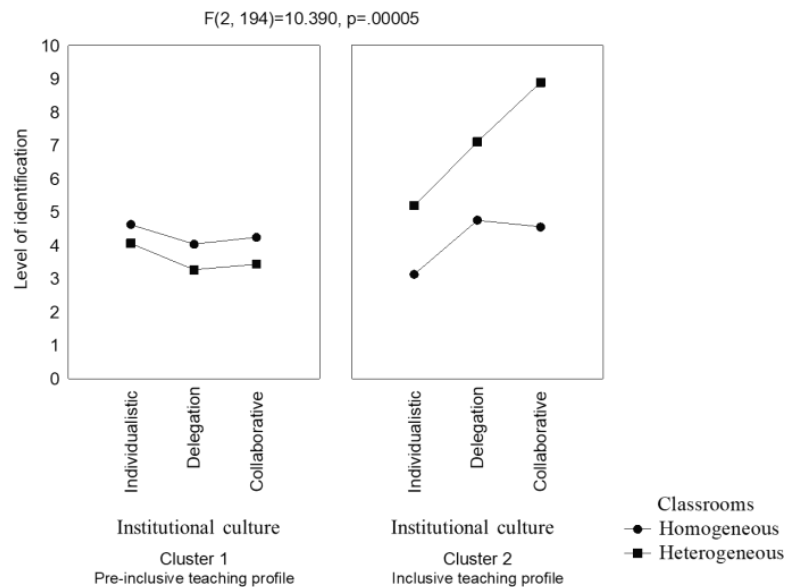
On the other hand, although the teachers' inclusive judgments appear to be environmentally deterministic, there was no evidence regarding the use of interactionist vision of learning during their teaching practice. This result conveys implicit information about the areas of opportunity in developing the inclusive teaching profile of this group of teachers. In general, teachers tend to present a bias in processing information related to their own teaching practices. For example, they omitted information related to their vision of disability (static or interactionist). They did not consider their teacher's approach within the classroom as a relevant factor for achieving school inclusion. These results suggest the need to raise awareness among participants about the importance of their involvement in the inclusion process.

Another finding of the present study is that the effect of the diversity environment factor differs between the two groups (see Figure 2). While the pre-inclusive cluster incorporates the impact of the diverse environment into the effect of professional culture, the

Table 1: Mixed and Repeated Measures ANOVA for Each Cluster

Source	df	MS	df (Error)	MS (Error)	F	p	$\eta_p^2$
<b>Mixed ANOVA</b>							
Cluster (C)	1	1566.981	97	48.06	32.604	.000*	.25
Point of View (V)	1	14.559	97	7.813	1.863	.175	.01
Teacher Approach (Ta)	1	1.545	97	8.931	.173	.678	.001
Classroom Environment (Ce)	1	684.601	97	21.483	31.865	.000*	.24
Institutional Culture (Ic)	2	200.530	194	13.081	15.329	.000*	.13
C*V	1	9.331	97	7.813	1.194	.277	.01
C*Ta	1	38.913	97	8.931	4.357	.039	.04
C*Ce	1	1866.326	97	21.483	86.871	.000*	.47
C*Ic	2	492.828	194	13.081	37.673	.000*	.27
V*Ta	1	14.423	97	7.823	1.843	.177	.01
V*Ce	1	1.200	97	5.272	.227	.634	.00
V*Ic	2	9.503	194	5.864	1.620	.200	.01
E*Ce	1	20.342	97	6.161	3.301	.072	.03
E*Ic	2	.833	194	5.319	.156	.855	.00
Ce*Ic	2	61.640	194	8.101	7.608	.000*	.07
<b>Cluster 1</b>							
<b>Pre-Inclusive Teaching Profiles</b>							
Source	df	MS	df (Error)	MS (Error)	F	p	$\eta_p^2$
Point of View (V)	1	.367	59	4.659	.078	.779	.001
Teacher Approach (Ta)	1	15.834	59	6.326	2.502	.119	.04
Classroom Environment (Ce)	1	184.1840	59	11.507	16.005	.000*	.21
Institutional Culture (Ic)	2	59.258	118	7.756	7.640	.000*	.11
V*Ta	1	2.934	59	5.342	.549	.461	.009
V*Ce	1	53.284	59	4.471	11.915	.001*	.16
V*Ic	2	10.586	118	4.766	2.221	.113	.03
E*Ce	1	2.100	59	5.816	.361	.550	.006
E*Ic	2	7.269	118	4.171	1.742	.179	.02
Ce*Ic	2	2.152	118	5.211	.413	.662	.006
<b>Cluster 2</b>							
<b>Inclusive Teaching Profiles</b>							
Source	df	MS	df (Error)	MS (Error)	F	p	$\eta_p^2$
Point of View (V)	1	19.471	38	12.710	1.531	.223	.03
Teacher Approach (Ta)	1	23.086	38	12.974	1.779	.190	.04
Classroom Environment (Ce)	1	1984.795	38	36.973	53.681	.000*	.58
Institutional Culture (Ic)	2	533.503	76	21.349	24.988	.000*	.39
V*Ta	1	12.231	38	11.67	1.047	.312	.02
V*Ce	1	20.052	38	6.515	3.077	.087	.07
V*Ic	2	40.586	76	7.568	5.362	.006*	.12
E*Ce	1	48.471	38	6.697	7.237	.01	.15
E*Ic	2	11.195	76	7.103	1.576	.21	.03
Ce*Ic	2	118.898	76	12.589	9.444	.000*	.19

Note: \*  $p \leq 0.001$ .



**Figure 2:** Interaction graph of the factors with the most significant weight for each cluster.

inclusive cluster amplifies it. This finding is consistent with the proposal of the new teaching profile [5,6], which requires teachers to conceptualize diversity as an educational resource rather than a difficulty [7]. Thus, the participants with an inclusive profile in the present study demonstrated the presence of this essential value in 21st-century inclusive classrooms.

In short, the results of the present study indicate that assessment instruments based on the cognitive algebra paradigm facilitate the identification of teachers' cognitive processes and beliefs regarding school inclusion, serving as an effective feedback tool for them. This finding aligns with the proposal by Duk *et al.* [41] that teachers should critically examine how their beliefs influence their educational practice. Furthermore, consistent with the previous idea of Marchesi *et al.* [20] about how it is very relevant to know how teachers conceptualize diversity, the information provided by cognitive algebra instruments can provide teachers with information about the cognitive mechanisms and biases they present when judging school inclusion situations, which they can use to identify the barriers and areas of opportunity in their training and capitalize on their strengths on the path to school inclusion.

## 5. CONCLUSION

Overall, the results showed that cognitive algebra designs could help identify biases, processing styles, teachers' levels of training regarding inclusion, and other related aspects. This information has implications

at the methodological level; the evidence from this study supports the benefits of the cognitive algebra technique for designing cognitive diagnostic instruments in the field of school inclusion knowledge. Second, at the theoretical level, the study provided new insights into the differences in inclusive thinking among teachers within the same population. The results revealed two distinct thinking styles, differing in terms of flexibility and sophistication in their use of information. These findings have implications for teaching practice, providing data that enable us to identify the needs in teacher training. The experimental scenarios themselves can serve as intervention tools if they are used within a program that promotes reflective analysis of school inclusion cases to modify teachers' thinking.

## LIMITATIONS

Although the study provides valuable information at the theoretical, methodological, and applied levels, it has some limitations related to the sampling. It is advisable to expand the sample and counterbalance both groups (teachers with vs. without inclusive experience), which would allow for observing differences in processing modes related to the level of expertise or experience in inclusion programs. Furthermore, exploring the inclusive teacher profile in public schools would provide an opportunity to contrast the processing of information about inclusion in various school contexts. Additionally, it is essential to incorporate new manipulations, variables, contexts, and populations to generalize the results.



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