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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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